The tutorial will provide an introduction to multiscale Green’s function method for static and dynamic modeling and simulation of modern advanced nanomaterials, particularly the two-dimensional materials. The emphasis will be on modeling of solids as represented by Born von Karman equations for the atomistic model and the tensorial Christoffel equations for anisotropic continuum model of crystals for elastic and mechanical calculations with some mention of Laplace/Poisson equations for thermal applications.

The Green’s function method is a powerful technique for the modeling of materials and physical processes. This technique has been used in almost all fields of science. It is ideally suited for modeling modern nanomaterials and advanced materials because it is naturally and inherently multiscale. The multiscale characteristic of the static lattice Green’s function is inherent in the fact that its asymptotic limit is exactly the macroscopic Green’s function for the elastic continuum model. This correspondence is used to seamlessly link the atomistic length scales to macro scales in the static case. In case of time-dependent processes, we use the causal Green’s functions to ensure causality. The most striking application of the causal Green’s functions is to substantially accelerate the temporal convergence in molecular dynamics type modeling of atomistic systems. In some idealized cases, it has been shown that the method can accelerate the temporal convergence of molecular dynamics type calculations by several orders of magnitude and link the time scales from femto-seconds to nano- or even microseconds.

In spite of the computational power and widespread application of the Green’s function method in other areas, its application to nanomaterials thus far has been rather limited. It is possibly because the Green’s function is considered to be an abstract mathematical concept meant only for fundamental mathematical research. This tutorial aims to remove the aura of mystery surrounding the Green’s function method and to demonstrate its practical applicability to problems in materials science. The method could also be potentially useful for application to inversion problems and materials by design, sensitivity analysis and uncertainty quantification, though it has not yet been used for such calculations for nanomaterials.

The tutorial will be of interest to theory as well as experimental researchers and students who want to familiarize themselves with the Green’s function technique of multiscale modeling. The course will prepare the theorists for learning a specialized new technique of materials modeling as developed at NIST, Boulder. The information should benefit the experimental researchers by making them aware of the strength and limitations of multiscale modeling and its applicability to research problems. The prerequisite for the course is undergraduate-level knowledge of solid state physics, quantum mechanics, and mathematical physics.

Part I

A. Introduction—Materials and Processes
   a. Materials to be modeled—nanomaterials and two-dimensional materials; composite and layered materials
   b. Physical processes to be modeled
   c. Lattice defects and strains
   d. Length scales—from atomistic to macro; coupling between the length scales
   e. Temporal scales—femto-seconds to microseconds, need for bridging the temporal scales
   f. Continuum and discrete atomistic models of materials
   g. Green’s function as response function for measurement science
   h. Just a mathematical artefact or a measurable physical characteristic?
   i. Representation and calculation of Green’s functions

B. Interatomic Potentials and Elastic Constants
   a. Energetics
   b. Phenomenological potentials
   c. Quantum mechanical approach and DFT—a very brief overview
   d. SNAP (Spectral Neighbor Analysis Potential)—a very brief overview
   e. Molecular statics/dynamics—a brief review

C. Atomistic and Continuum Green’s Functions
   a. Born von Karman model and force constants
   b. Elastic constants and elastic anisotropy
   c. Lattice Green’s function for perfect and defect lattices
   d. Dyson equation for defect Green’s function and solution
   e. Continuum Green’s functions—virtual force method
   f. Lattice Green’s function—Dyson equation for defect Green’s function
   g. Inherent approximations and uncertainties

D. Static Multiscale Green’s Functions—Bridging Length Scales
   a. Kanzaki force in lattices with defects—lattice distortion and strains
   b. Continuum model: Elastic waves in layered materials—determination of material parameters
   c. Lattice model: Propagation of ripples and elastic waves in two-dimensional materials such as graphene, phonons in nanomaterials, thermoelectric applications
   d. Example of an exactly solvable onedimensional model comparison between the exact and the Green’s function results
   e. Example: Propagation of ripples in graphene—from femto- to microseconds

G. Appendix
   a. Possible direct measurement of the Green’s functions—application to Laplace and Poisson equations
   b. Future possibilities: Inversion of Green’s functions for materials by design; possible sensitivity analysis and uncertainty quantification
   c. References and further learning

Instructor
Vinod K. Tewary, National Institute of Standards and Technology (NIST)
SYMPOSIUM CM1

New Frontiers in Aberration Corrected Transmission Electron Microscopy
March 28 - April 1, 2016

Chairs
Rafal E Dunin-Borkowski, Research Centre Jülich
Jean-Luc Rouviere, CEA Grenoble
Thomas Walther, University of Sheffield
Masashi Watanabe, Lehigh University

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* Invited Paper

TUTORIAL
Aberration-Corrected (Scanning) Transmission Electron Microscopy
Monday Afternoon, March 28, 2016
1:30 PM – 4:00 PM
PCC North, 100 Level, Room 122 C

Part I: Aberration Correction in Transmission Electron Microscopy
This segment will also include the benefits and potential pitfalls related to aberration correction with various applications.

Part II: Quantitative Evaluation of Images Obtained in Scanning Transmission Electron Microscopy
This segment will demonstrate a software package for quantification developed by instructor Sandra Van Aert’s group.

Both aberration correction technologies are still new to the fields. Since there are potential pitfalls, researchers should be aware of them when these latest instruments are used. In addition, it is always very important to evaluate experimental data quantitatively. Images obtained from scanning transmission electron microscopy approaches can now be quantified. There are always appropriate strategies for quantification.

Instructors:
David J. Smith, Arizona State University
Sandra Van Aert, University of Antwerp

1:30 PM *CM1.1.01
Achieving Absolutely Quantitative Atomic Scale Imaging with the Electron Microscope James M. LeBeau; North Carolina State Univ, United States.

SESSION CM1.2/CM3.4: Joint Session: Advanced In Situ TEM
Session Chairs: Lars Pastewka and Thomas Walther
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 121 AB

8:00 AM CM1.2.01/CM3.4.01
Compressive Property of Aerographite Spiky-Shell Particles as Studied by In Situ Electron Microscopy Kaori Hirahara, Osaka University, Japan; Osaka University, Japan.

8:15 AM CM1.2.02/CM3.4.02
In Situ TEM Observations of Superelastic Deformation in Ferroelectric Nanostructures Yu Deng, Physics School, Nanjing Univ., China; National Center for Electron Microscopy, Molecular Foundry, Lawrence Berkeley National Laboratory, United States.

8:30 AM CM1.2.03/CM3.4.03
In Situ TEM Investigations of Mechanics and Tribology at the Nanoscale Hiroyuki Fujita; Univ of Tokyo, Japan.

9:00 AM CM1.2.04/CM3.4.04
Micro Strain Measurements on Amorphous Titanium Aluminide Thin-Films during in situ TEM Straining Rohit Sarkar, Arizona State University, United States.

9:15 AM CM1.2.05/CM3.4.05
Characterization of Defect Motion at High Strain Rates by Dynamic TEM in situ Mechanical Testing Michael D. Grapes, Johns Hopkins University, United States.
SESSION CM1.2/CM3.4: Monochromators

10:00 AM BREAK

10:30 AM *CM1.2.07/CM3.4.07
In Situ Transmission Electron Microscope on Micro-Plastic Behavior under Single Asperity Friction Scott X. Mag; Univ of Pittsburgh, United States.

11:00 AM CM1.2.08/CM3.4.08
In Situ TEM Straining with Automated Crystal Orientation Mapping of Ultrafine-Grained Aluminum Films with Different Textures Ehsan Izadi; Arizona State University, United States.

11:15 AM CM1.2.09/CM3.4.09
Anomalous Beam Effects During In Situ TEM Deformation of Nanocrystalline and Ultrafine-Grained Metals Jagannathan Rajagopalan; Arizona State Univ, United States.

11:30 AM *CM1.2.10/CM3.4.10
Quantitative Dislocation Dynamics through In Situ Indentation in HRTEM Amit Misra; Univ of Michigan, United States.

SESSION CM1.3/CM3.5: Joint Session: In Situ Session
Session Chairs: Edward Boyes and Thomas Walther
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 121 AB

1:30 PM CM1.3.01/CM3.5.01
Characterizing Working Catalysts with Correlated Electron and Photon Probes Eric A. Stach; Brookhaven National Laboratory, United States.

1:45 PM CM1.3.02/CM3.5.02

2:00 PM CM1.3.03/CM3.5.03
Aberration Corrected Operando TEM of Catalyst Nanoparticle Surfaces during Catalysis Benjamin Miller; Arizona State University, United States.

2:15 PM CM1.3.04/CM3.5.04
Understanding the Reduction Processes of Shape Controlled Fe2O3 Catalysts by Aberration-Corrected Environmental TEM Yan Zhou; Dalian Institute of Chemical Physics, China.

2:30 PM *CM1.3.05/CM3.5.05
AC ESTEM/ETEM Studies of the Dynamics of Single Atoms and Nanoparticles in Catalysts under Continuous in situ Reaction Conditions Edward Boyes; University of York, United Kingdom.

3:00 PM BREAK

3:30 PM *CM1.3.06/CM3.5.06
In situ Environmental TEM study of Materials Processes at the Atomic Scale Using a Cs Corrector Seiji Takeda; Osaka Univ, Japan.

4:00 PM CM1.3.07/CM3.5.07
Testing and Application of an in situ Illumination System for an Aberration-Corrected ETEM Qianlang Liu; Arizona State Univ, United States.

4:15 PM CM1.3.08/CM3.5.08
Differential Phase Contrast Analysis with a Unitary Detector for Multiscale Characterization of Magnetic Nanomaterials Sergei Lopatin; King Abdullah University of Science & Technology, Saudi Arabia.

4:30 PM CM1.3.09/CM3.5.09
Controlled Dose for Aberration Corrected In Situ (Scanning) Transmission Electron Microscopy Observations of Iron Oxide Nanoparticle Reduction Dynamics Ryan Hufschmid; 2; 2University of Washington, United States; 3Pacific Northwest National Laboratory, United States.

SESSION CM1.4: Novel Electron Detectors
Session Chair: Jean-Luc Rouviere
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 121 A

8:30 AM *CM1.4.01
Measuring Physical and Electronic Properties at the Nanoscale David A. Muller; Cornell University, United States.

9:00 AM CM1.4.02
Evaluation of a Direct Electron Detector for EELS James L. Hart; Drexel University, United States.

9:15 AM CM1.4.03
Application of Single-Electron-Detection Camera for Phase Contrast Imaging Shery Chang; Arizona State Univ, United States.

9:30 AM *CM1.4.04
New Adventures in STEM Imaging with Pixelated Detectors Ian MacLaren; University of Glasgow, United Kingdom.

10:00 AM BREAK

10:30 AM CM1.5.01
Combining Aberration-Correction and Direct Electron Detection to Image the Molecular Structure of Liquid Crystal Polymers Eric A. Stach; Stony Brook University, United States; Brookhaven National Laboratory, United States.

10:45 AM *CM1.5.02
Off-Axial Aberration Correction Using a B-COR for Lorentz and HREM Modes Yoshifum Taniguchi; Hitachi High-Technologies Corporation , France.

11:15 AM CM1.5.03
Atomic Observation of Partial Dislocation Structure and Dynamics in Monolayer Graphene at High Temperature Alex W. Robertson; Univ of Oxford, United Kingdom.

11:30 AM CM1.5.04
Stability of Twin Boundary Junction Structure in Nanotwinned Copper Nanowires Prepared by Pulsed Electrodeposition Wei-Lun Weng; Department of Materials Science and Engineering, National Tsing-Hua University, Taiwan.

11:45 AM CM1.5.05
Structure of Amorphous Alloys: Some New Perspectives Raghvendra Tewari; Bhabha Atomic Research Centre, India.

SESSION CM1.6: Monochromators
Session Chair: Jean-Luc Rouviere
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 121 A

1:30 PM *CM1.6.01
New Horizons in Aberration-Corrected STEM Tracy C. Lovejoy; Nion Co, United States.

2:00 PM CM1.6.02
Local Detection of Hydrogen-Oxygen Bonds in Nanoparticles with Ultra-High Energy Resolution Vibrational EELS Peter A. Crozier; Arizona State Univ, United States.
2:15 PM *CM1.6.03
Vibrational EELS of Nanostructured Oxides  
Maureen Joel Lagos; Rutgers University, United States.

2:45 PM CM1.6.04
Optimization of Electron Energy-Loss Spectroscopy Acquisition Techniques for the Analysis of Interfaces in CuPc/C₆₀ and P3HT/PCBM  
Organic Solar Cells  
David W. McComb; The Ohio State University, United States.

3:00 PM BREAK

SESSION CM1.7: Chromatic Aberration Correction
Session Chairs: Rafal E Dunin-Borkowski and Maximilian Haider
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 121 A

3:30 PM *CM1.7.01
Instrumentation for Low-Energy High-Resolution Electron Microscopy with the Correction of Spherical and Chromatic Aberration  
Jianruo Wen; Argonne National Laboratory, United States.

4:00 PM CM1.7.02
Amplitude Contrast Imaging in High-Resolution Electron Microscopy  
with the Correction of Spherical and Chromatic Aberration  
Jianguo Wen; Argonne National Laboratory, United States.

4:15 PM *CM1.7.03
Energy-Filtered and Low-Voltage Chromatic Aberration-Corrected High-Resolution TEM on the PICO Instrument  
Lothar Houben1, 2; 1Forschungszentrum Juelich, Germany; 2Weizmann Institute of Science, Israel.

4:45 PM CM1.7.04
Prospects for Atomic-Resolution Chromatic Aberration Corrected Transmission Electron Microscopy in Lorentz Mode on the Titan PICO Microscope  
Rafal E. Dunin-Borkowski; Forschungszentrum Juelich, Germany.

CM1.8.07
Nan Beam Diffraction: A Versatile Tool to Characterize the Local Structure of Amorphous and Crystalline Materials  
Christian Kuebel; Karlsruhe Institute of Technology, Germany.

CM1.8.08
Dynamics and Stability of Defects in Hexagonal Boron Nitride  
Thang Pham; Univ of California-Berkeley, United States.

CM1.8.09
Detection and Characterization of Local Bandgap and Surface States on Nanoparticles with High Energy Resolution EELS  
Qianlang Liu; Arizona State Univ, United States.

CM1.8.10
Real-Time Observation of Resistive Switching in TiO₂ Nanoparticles Using Electron Holography  
Janghyun Jo; Seoul National University, Korea (the Republic of).

SESSION CM1.9: Materials Science Applications
Session Chairs: Rolf Erni and Masashi Watanabe
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 232 C

8:30 AM *CM1.9.01
Understanding Complex Heterointerfaces Using Aberration-Corrected STEM  
David J. Smith; Arizona State Univ, United States.

9:00 AM CM1.9.02
Atomically Resolved Energy Dispersive X-Ray Spectroscopy of Segregation within Stacking Faults in Ni-Based Superalloys  
Bryan D. Esser; The Ohio State University, United States.

9:15 AM CM1.9.03
STEM Study of (101) Twins in Natural and Synthetic Cassiterite  
Nina Danecu; Jozef Stefan Institute, Slovenia.

9:30 AM CM1.9.04
Structural Analysis of Au Yolk-Shell Nanoparticles by HAADF-STEM and Electron Tomography  
Alejandra Londone-Caldoron; University of Texas at San Antonio, United States.

9:45 AM CM1.9.05
Monolayer Transition Metal Dichalcogenide Alloys with Tunable Band Gaps: Atomic Structure and Optical Properties  
Amin Azizi; The Pennsylvania State University, United States.

10:00 AM BREAK

10:30 AM *CM1.9.06
Investigations of Sensitive Functional Materials by Analytical (S)TEM  
Vesna Srot; Max-Planck-Institute for Solid State Research, Germany.

11:00 AM CM1.9.07
Atomic Mapping of Novel Domain Configurations in Strained Ferroelectric Films  
Xiuliang Ma; Chinese Academy of Sciences, China.

11:15 AM CM1.9.08
EDS: Characterization of the Chemical Composition, Structure, Distribution and Surroundings of Nanoparticles  
Meiken Falke; Bruker, Germany.

11:30 AM CM1.9.09
Characterizing Atomic Ordering in Intermetallic Compounds Using X-Ray Energy Dispersive Spectroscopy in an Aberration-Corrected (S) TEM  
Hamish L. Fraser; The Ohio State University, United States.

11:45 AM CM1.9.10
Studying High Resolution Scanning Transmission Electron Microscopy Images by Template Matching Analysis: Towards the Observation of Punctual Defects  
Jianruo Wen1, 2; 1University Grenoble Alpes, France; 2CEA, France.

CM1.9.01
Simulation of Ru Nanoparticle Surfaces Observed During Operando TEM  
Nolan P. Walker; Arizona State University, United States.

CM1.9.02
Exploring the Carbon Deposition Mechanism on Ni/Gd Ceria Catalysts  
Ethan Lawrence; Arizona State Univ, United States.

CM1.9.03
Revealing the Influence of Capping Agents on Gold Nanocrystal Growth Modes with in situ Liquid S/TEM  
Silvia A. Canepa; Technical University of Denmark (DTU), Denmark.

CM1.9.04
Monochromated STEM-EELS Study of Plasmonic Metal-Metal-Semiconductor Interactions  
Jake Wei; Institute of Physics, Chinese Academy of Science, China.

CM1.9.05
ACTEM on the Effect of Interface Roughness on Superconducting Transition Temperatures of Nb/Co Multilayers  
Wolfgang Jaeger; Christian-Albrechts Universität zu Kiel, Germany.

CM1.9.06
Impact of the Dynamical Scattering Effect on the Contrast of Aberration-Corrected High-Resolution Transmission Electron Microscope Images  
Cai Wen1, 2; 1Southwest University of Science and Technology, China; 2Arizona State University, United States.
1:30 PM *CM1.10.01
From Catalysis to Plasmonics: Probing the Structure of Nanoscale Materials with STEM and EELS Gianluigi A. Botton; McMaster Univ, Canada.

2:00 PM CM1.10.02
A Comparison of CBED and ABF Atomic Imaging for GaN Polarity Determination Alexana Roshko; NIST, United States.

2:15 PM CM1.10.03
Single La Vacancy Detection in LaMnO$_3$ by High Precision Quantitative Scanning Transmission Electron Microscopy Jie Feng; University of Wisconsin-Madison, United States.

2:30 PM *CM1.10.04

3:00 PM BREAK

3:30 PM CM1.10.05
Investigation of Phase Separation in InGaN by Plasmon Loss Spectroscopy in a Transmission Electron Microscope Thomas Walther; University of Sheffield, United Kingdom.

3:45 PM *CM1.10.06
Novel Approaches to Quantitative STEM Susanne Stemmer; University of California Santa Barbara, United States.

4:15 PM CM1.10.07
Quantitative Atomic-Resolution Chemical Mapping in the Scanning Transmission Electron Microscope Christian Dwyer; Arizona State University, United States.

4:30 PM CM1.10.08
Validation of Multivariate Statistical Analysis on Spectrum-Imaging Datasets Masashi Watanabe; Lehigh Univ, United States.
**SYMPOSIUM CM2**

Quantitative Tomography for Materials Research  
March 29 - April 1, 2016

**Chairs**  
Ali Chirazi, FEI Application Software Group  
Arno Merkle, Carl Zeiss X-Ray Microscopy  
Brian Patterson, Los Alamos National Laboratory  
Paul Shearing, University College London

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* Invited Paper

**SESSION CM2.1: Tomography of Metals**  
Session Chairs: Leah Laverty and Brian Patterson  
Tuesday Afternoon, March 29, 2016  
PCC North, 100 Level, Room 126 A

1:30 PM CM2.1.01  
Investigation of Twinning in Mg Alloys Daria Drozdenko; Charles University, Czech Republic.

1:45 PM *CM2.1.02  
Quantifying Microstructural Evolution in Three Dimensions Peter W. Voorhees; Northwestern Univ, United States.

2:15 PM CM2.1.03  
Large-Scale Anti-Correlation of Copper and Zinc in Cu2ZnSnSe4 Based Samples Observed with Transmission X-Ray Microscopy (TXM) Dennis S. Pruszyn; Univ of Utah, United States.

2:30 PM *CM2.1.04  
Micro and Nano X-Ray Tomography of 3D IC Stacks Ehrenfried Zschech1; 2, 3; 1Fraunhofer Institute for Ceramic Technologies and Systems, Germany; 2Technische Universität Dresden, Germany.

3:00 PM BREAK

3:30 PM CM2.1.05  
Coating Porosity Induced Corrosion Quantitatively Investigated by Lab-Based In Situ X-Ray Tomography Shaouane Wang; Institute of Metal Research, Chinese Academy of Sciences, China.

3:45 PM CM2.1.06  
MicroCT and FIB/SEM Applied to Defect Characterization in Underwater Wet Welds Sidnie P. Paciornik; Xnovo Technology ApS, Denmark.

4:00 PM *CM2.1.07  
Laboratory-Based Diffraction Contrast Tomography (LabDCT) for 3D Crystallographic Imaging Erik M. Lauridsen; Xnovo Technology ApS, Denmark.

4:30 PM CM2.1.08  
Microstructure Modeling Using FIB/SEM Tomography Data Jochen Joos; Karlsruhe Institute of Technology (KIT), Germany.

4:45 PM CM2.1.09  

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**SESSION CM2.2: Multi Length Scales**  
Session Chairs: Arno Merkle and James Mertens  
Wednesday Afternoon, March 30, 2016  
PCC North, 100 Level, Room 126 A

1:30 PM CM2.2.01  
Oxygen Transport in Noble Metal: Metal Oxide Thin-Film Multilayers Barbara Scherrer1, 2, 3; 1Technion, Israel; 2ETH Zurich, Switzerland; 3The University of Sydney, Australia.

1:45 PM *CM2.2.02  
Multi-Scale 3D Characterization with Dark-Field X-Ray Microscopy Henning F. Poulsen; Technical Univ-Denmark, Denmark.

2:15 PM CM2.2.03  

2:30 PM BREAK

2:30 PM *CM2.2.04  
Development of a Multi-Modal 3D Characterization System to Quantify Microstructural Features in Aerospace Alloys Michael Uchic; Air Force Research Laboratory, United States.

2:45 PM CM2.2.05  
3D Elemental Identification and Quantification Using Confocal X-Ray Fluorescence James C. Mertens; Los Alamos National Laboratory, United States.

3:00 PM BREAK

3:00 PM CM2.2.06  
Conductance Tomography of Discrete Dielectric-Embedded Conducting Pathways in Next-Generation Memory Devices Using Conductive Atomic Force Microscopy Mark Buckwell; Univ College London, United Kingdom.

3:15 PM CM2.2.07  
Quantitative 3D Microstructural Characterization across Length Scales and Acquisition Techniques Harpal K. Fraser; Ohio State Univ, United States.

3:30 PM CM2.2.08  
AFM Based High-Speed Tomography in Electron and Ion Beam Microscopes Harald Plank1, 2; 1Graz University of Technology, Austria; 2Graz Centre for Electron Microscopy, Austria.

3:45 PM CM2.2.09  
Scalpel SPM: A Slice-and-View Approach For Tomography Based on Scanning Probe Microscopy Umberto Celano1, 2; 1IMEC, Belgium; 2KU Leuven, Belgium.

4:00 PM *CM2.2.10  
A Correlative Workspace for Microscopy Addressing 3D Multi-Scale Challenges Michael W. Phaneuf; Fibics Incorporated, Canada.

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**SESSION CM2.3: Simulation and Analytics**  
Session Chairs: Nikolaus Cordes and Paul Shearing  
Wednesday Afternoon, March 30, 2016  
PCC North, 100 Level, Room 126 A

1:30 PM CM2.3.01  
Computing Elastic Moduli on 3D X-Ray Computed Tomography Image Stacks Edward J. Garboczi; NIST, United States.

1:45 PM *CM2.3.02  
Development of New Methods with Multi-Dimensional Analytics Lei Zhang; Institute of Metal Research, Chinese Academy of Sciences, China.

2:15 PM CM2.3.03  
Implementing Analytics to Describe X-Ray Computed Tomography Data of Polymer Foams Nikolaus Cordes; Los Alamos National Laboratory, United States.
Microscopy in Materials Science

Development and Application of Laboratory-Based X-Ray in situ Technology, United States.

8:00 AM

9:15 AM

CM2.4.05
Numerical Simulation of Temporal Change in SOFC Anode Microstructure Naoki Shikazono1; 2; 3,4 The University of Tokyo, Japan; 2CREST, Japan.

3:15 PM

4:00 PM

CM2.4.06

3:45 PM

4:45 PM

CM2.5.05
Microstructure Analysis and Reconstruction of Blend Cathodes for Lithium-Ion Batteries by FIB/SEM Tomography Timo Bernthaler; University of Aalen, Germany.

2:15 PM

3:00 PM

CM2.5.06
Nanoscale X-ray Computed Tomography Applied to Fuel Cell and Battery Electrodes Shawn Litster; Carnegie Mellon University, United States.

2:30 PM

3:15 PM

CM2.5.08
3D Distribution of the Conductive Carbon-Binder Phase in a Composite Graphite Electrode Stephen J. Harris; Lawrence Berkeley National Lab, United States.

4:15 PM

5:00 PM

CM2.6.01
Correlative Microscopy in 3D: Combining X-Ray Microscopy with FIB-SEM Jeff Gelb; Carl Zeiss X-Ray Microscopy, United States.

SESSION CM2.5: Tomography of Energy Materials
Session Chair: Shawn Litster
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 126 A

1:30 PM

CM2.5.01
Synchrotron Tomography and X-ray Fluorescence Imaging of Nanoporous Materials for Energy Applications Yu-chen K. Chen-Wiegart; Brookhaven National Laboratory, United States.

2:00 PM

CM2.5.02
Multi-Scale Characterization of Lithium-Ion Battery Constituent Materials Timo Bernthaler; University of Aalen, Germany.

2:15 PM

3:00 PM

CM2.5.04
Nano-Scale X-ray Computed Tomography Applied to Fuel Cell and Battery Electrodes Shawn Litster; Carnegie Mellon University, United States.

3:30 PM

4:15 PM

CM2.5.07
3D Visualization and Quantification Analysis of Carbon Fiber Composites by Synchrotron X-ray CT Imaging Nicholas J. Vito; FEI, United States.

4:30 PM

5:15 PM

CM2.5.09
Quantitative Macropore Characterization of Nuclear Grade Graphite from X-Ray Computed Tomography Joshua J. Kane; Idaho National Laboratory, United States.

4:45 PM

5:30 PM

SESSION CM2.6: Poster Session
Session Chairs: Arno Merkle and Brian Patterson
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

CM2.6.01
Three-Dimensional (3D) Characterization of Tin Crystallography and Cu6Sn5 Intermetallics in Solder Joints Using Serial Sectioning and Ebsd Antony Kirubanandham; Arizona State University, United States.
CM2.6.03 Preparation of Carbon Nanotube Materials for Tomography
Mark R. Haase; University of Cincinnati, United States.

CM2.6.04 Digital Volume Correlation in X-Ray Computed Tomography of Wood Composites
Daniel J. Ching; Oregon State University, United States.

CM2.6.05 4D In Situ Study of Fatigue Crack Initiation and Growth from Corrosion Pits in 7075 Aluminum Alloys
Tyler J. Stannard; Arizona State University, United States.

CM2.6.06 Quantitative TEM Tomography of Poly Lactic Acid/Clay Nanocomposites for a Better Comprehension of Processing-Microstructure-Properties Relationship
Maider IturrondoIbeitia; University of the Basque Country-eMERG, Spain.

CM2.6.07 Understanding Three Dimensional Assembly in Directed Self-Assembled Block Copolymer Films: A Quantitative TEM Tomography Study
Tamar Segal-Peretz1, 2; 1Argonne National Laboratory, United States; 2University of Chicago, United States.

SESSION CM2.7: Tomography with Electrons and Neutrons
Session Chair: Marco Cantoni
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 106 C

8:00 AM CM2.7.01 Optimizing Run Conditions for Atom Probe Tomography Analysis of InAlAsSb Random Alloys
Nicole A. Kotulak; Naval Research Laboratory, United States.

8:15 AM CM2.7.02 Cryo-Fixation of Aqueous Solutions as a Matrix for Analyzing Materials in Atom Probe Tomography
Barbara Scherrer1, 2, 3; 1Technion, Israel; 2ETH Zurich, Switzerland; 3The University of Sydney, Australia.

8:30 AM CM2.7.03 Far-Reaching Volumetric Artefacts Due to Thermal Decomposition of Polymeric Coatings around Focused Ion Beam Milled Pigment Particles
Konrad Rykaczewski; Arizona State University, United States.

8:45 AM CM2.7.04 Time Resolved 3D Diffraction Contrast Tomography Imaging of Grain Growth in Strontium-Titanate
Peter Gumbsch1, 4; 1Karlsruhe Inst of Technology, Germany; 4Fraunhofer IWM, Germany.

9:15 AM BREAK

9:45 AM CM2.7.05 State-of-the-Art FIB Nano-Tomography
Marco Cantoni; Ecole Polytechnique Federale Lausanne, Switzerland.

10:15 AM CM2.7.06 Contour-Based Segmentation of a 3D FIB-SEM Tomogram of a Chondritic Meteorite, an n-Phase, Porous Heterogeneous Structure
Nabil D. Bassim; U. S. Naval Research Laboratory, United States.

10:30 AM CM2.7.07 Understanding Environmental Effects in Nickel-Base Superalloys Using Advanced Microscopy Approaches
Barbara Shollock; University of Warwick, United Kingdom.

11:00 AM CM2.7.08 Structure-Property Relations of Aligned Carbon Nanotube: Polymer Composites via Quantitative 3D Electron Tomography
Bharath Natarajan1; 1University of Maryland, United States; 2National Institute of Standards and Technology, United States.
**SYMPOSIUM CM3**
Mechanics and Tribology at the Nanoscale—In Situ and In Silico Investigations
March 28 - April 1, 2016

**Chairs**
Tevis Jacobs, University of Pittsburgh
Ju Li, Massachusetts Institute of Technology
Lars Pastewka, Karlsruhe Institute of Technology
Qian Yu, University of Michigan

**Symposium Support**
Asylum Research, an Oxford Instruments Company
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Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

**SESSION CM3.1: Nanostructures and Nanomaterials**
Session Chairs: James Kermode and Lars Pastewka
Monday Afternoon, March 28, 2016
PCC North, 100 Level, Room 126 B

2:00 PM CM3.1.01
Mechanical Properties of Freestanding Thin-Film Platinum Zayd C. Leseman; Univ of New Mexico, United States.

2:15 PM CM3.1.02
*In Situ* TEM Investigations of Metallic Nanobridges under Two Dynamic Conditions: Heating and Voltage Apply Tatiana Kozlova1, 2; 1Delft University of Technology, Netherlands; 2Kavli Institute of Nanoscience, Netherlands.

2:30 PM CM3.1.03
Mechanical Behavior of Carbon Nanotube Forests Grown with Chemical Vapor Deposition Parisa Pour Shahid Saeed Abadi; Georgia Institute of Technology, United States.

2:45 PM CM3.1.04
Exploring the Limit of Dislocation Based Plasticity in Nanostructured Metals Darcy Hughes; Consultant, United States.

3:00 PM BREAK

3:30 PM CM3.1.05
Mechanical Properties of Nanoporous Gold Xiving Chen; Arizona State University, United States.

3:45 PM CM3.1.06
Quantifying Mean Strength of Nanoscale Gold by Testing Nanoporous Gold at Macroscopic Scale Hai-Jun Jin; Institute of Metal Research, Chinese Academy of Sciences, China.

4:00 PM CM3.1.07
Visualization of Laser-Induced Mechanical Motion in a HAMR Lamella with Ultrafast Electron Microscopy Pranav K. Suri; University of Minnesota, United States.

4:15 PM CM3.1.08
*In Situ* SEM Study of Mechanical Properties of a Diffusion Pt-Aluminide (PtAl) Bond Coat at Elevated Temperatures Sanjit Bhowmick; Hysitron Inc, United States.

**SESSION CM3.2: Chemomechanics**
Session Chair: Tevis Jacobs
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 126 B

1:30 PM CM3.2.01
Atomic–Scale Tribology Elucidated by *in situ* Approaches Robert W. Carpick; Univ of Pennsylvania, United States.

2:00 PM CM3.2.02
Multiscale Modelling of Materials Chemomechanics: From Stress Corrosion Cracking to Catastrophic Brittle Fracture James Kermode; University of Warwick, United Kingdom.

2:15 PM CM3.2.03
Activation and Mechanochemical Breaking of C-C Bonds at the Tribological Interface between Diamond and Silica Gianpietro Moras; Fraunhofer IWM, Germany.

2:30 PM CM3.2.04
Structural Modifications Due to Interface Chemistry at Metal-Nitride Interfaces Satyesh K. Yadav; Los Alamos National Laboratory, United States.

2:45 PM CM3.2.05
Nano-Mechanical Testing of *in situ* Hydrogen Charged Nickel Alloy Craig J. Williams; University of Manchester, United Kingdom.

3:00 PM BREAK

**SESSION CM3.3: Extreme Conditions**
Session Chair: Till Junge
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 126 B

3:30 PM CM3.3.01
High Temperature Creep and High-Throughput Mechanical Measurements at Nanometer Length Scale Syed Asif Syed Amanulla; Hysitron, United States.

3:45 PM CM3.3.02
Nanowire Deformations and Axial Junction Constructions in Tandem with Photocurrent Measurements Inside a Transmission Electron Microscope Chao Zhang1, 2; 1National Institute for Materials Science, Japan; 2University of Tsukuba, Japan.

4:00 PM CM3.3.03
Mapping Dislocation Densities Resulting from Machining-Relevant High Rate Severe Plastic Deformation Sepideh Abolghasem; Universidad de los Andes, Colombia.

4:15 PM CM3.3.04
Anomalous Breeding of High-Speed Dislocations Qing-Jie Li; Johns Hopkins University, United States.

4:30 PM CM3.3.05
A Pull-to-Bend Testing Technique for Single Crystal Silicon Mohamed Elhebeary; University of Illinois Urbana-Champaign, United States.

4:45 PM CM3.3.06
Dislocation Nucleation in Nanoscale Single Crystals Qing-Jie Li; Johns Hopkins University, United States.
SESSION CM3.7: Leading-Edge Techniques
Session Chair: Tevis Jacobs
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 126 B

10:30 AM CM3.7.01
Raman Spectroscopy Enhanced IIT: In Situ Analysis of Mechanically Stressed Materials Yvonne B. Gerbig1, 2; *NIST, United States; 1The George Washington University, United States.

10:45 AM CM3.7.02
Quantitative AM-FM Mode for Fast and Versatile Imaging of Nanoscale Elastic Modulus Marta Koeun; Asylum Research, an Oxford Instruments Company, United States.

11:00 AM CM3.7.03
Quantitative Measurements of Electromechanical Response with Interferometric Atomic Force Microscopy Aleksander Labuda; Asylum Research, United States.

11:15 AM CM3.7.04
Advances in Bimodal Viscoelastic Nanomechanical Mapping Aleksander Labuda; Asylum Research, United States.

11:30 AM CM3.7.05
Acoustic Detection of Phase Transitions at the Nanoscale Rama K. Vasudevan; Oak Ridge National Laboratory, United States.

11:45 AM CM3.7.06

SESSION CM3.8: Polymers and Bioinspired Materials
Session Chair: Michael Falk
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 126 B

1:30 PM CM3.8.01
Friction Dynamics of Gecko-like Materials Jonathan B. Puthoff; Cal Poly Pomona, United States.

1:45 PM CM3.8.02
Biomechanical Measurements with a Centrifugal Force Quartz Crystal Microbalance Frank Vollmer; Max-Planck-Inst, Germany.

2:00 PM CM3.8.03
Mapping of Nanoscale Mechanical Properties of Polymers in Quasistatic and Oscillatory Atomic Force Microscopy Modes Sergei Magonev; NT-MDT Development Inc, United States.

2:15 PM CM3.8.04
Fundamental Limits of Material Toughening with Molecularly Confined Polymers Scott G. Isaacson; Stanford University, United States.

2:30 PM CM3.8.05
Nanoscale Fricition of Uniaxially Stretched Polymer Films Marina Ruthe; Univ of Massachusetts-Lowell, United States.

2:45 PM CM3.8.06
Electrical Charging Effects on the Sliding Friction of a Model Nano-Confin ed Ionic Liquid Rosario Capozza1, 2; 1Instituto Italiano di Tecnologia, Italy; 2International School For Advanced Studies (SISSA), Italy.

3:00 PM BREAK

SESSION CM3.9: Making and Breaking of Contacts
Session Chair: Gianpietro Moras
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 126 B

3:15 PM *CM3.9.01
Size Effects in Friction and Wear Isabel Szlufarska; Univ of Wisconsin, United States.

3:45 PM *CM3.9.02
In Silico and In Situ Studies of the Formation and Separation of Contacts between Nanoscale Bodies Ashlie Martini; Univ of California-Merced, United States.

4:15 PM CM3.9.03
Modeling AFM Adhesion Measurements on Rough Substrates Till Junge; Karlsruhe Institute of Technology, Germany.

4:30 PM CM3.9.04
Finite Element Analysis of Adhesive Contact of the Wei erstrass Profile Harish Radhakrishnan; ANSYS Inc., United States.

4:45 PM CM3.9.05
Multifunctional Ultra-Flat VA-CNTs Film: Towards High Static Friction, Low Adhesion, and Assembly of Nanoparticles on 3D Patterned Surfaces Sanghyun Hong; Northeastern Univ, United States.

SESSION CM3.10: Poster Session
Session Chairs: Tevis Jacobs, Ju Li, Lars Pastewka and Qian Yu
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

CM3.10.01
A Quantitative In Situ Transmission Electron Microscopy Study On Room Temperature Ductility of TiAl Alloys Seong-Woong Kim; KIMS, Korea (the Republic of).

CM3.10.02
High Output Triboelectric Nanogenerator with Work Function Controlled Metal Taewan Kim; POSTECH, Korea (the Republic of).

CM3.10.03
Typical Friction Behavior of Copper Film in Response to CeO2 Indenter Scratch Tests Ning Xu; Center for Advancing Materials Performance from the Nanoscale (CAMP-Nano) & Hysitron Applied Research Center in China (HARCC), State Key Laboratory for Mechanical Behavior of Materials, Xi’an Jiaotong University, Xi’an, 710049, China, China.

CM3.10.04
Elementary Processes of Microstructure Evolution in Copper under Reciprocating Tribological Loading Zhilong Liu; Karlsruhe Institute of Technology (KIT), Germany.

CM3.10.05
Frictional Properties of Graphene Films Studied by Atomic Force Microscopy Junho Choi; Univ of Tokyo, Japan.

CM3.10.06
Examining Nanoindentation Imprints with In Situ AFM-SEM Ernest J. Fantner; GE Tec KG, Austria.

CM3.10.07
Spontaneous Graphene Dewetting: Scanning Raman Analysis Toby Hallam; Trinity College Dublin, Ireland.

CM3.10.08
Gecko-Like Frictional Properties in Carbon Nanotubes Achieved through Ionic Bombardment and Oxidation Jennifer Cárdenas1, 2, 3; 1University of Puerto Rico-Rio Piedras, United States; 2NRC RAP, United States; 3Air Force Research Laboratory, United States.
CM3.10.09 
Curvature Dependent Wettability of Carbon Nanotubes Kaori Hirahara1,2; 1Osaka University, Japan; 2Osaka University, Japan.

CM3.10.10 
Structural Reconstruction in Carbon Nanotube Bundles during High Impact Collisions Leonardo D. Machado; Unicamp, Brazil.

CM3.10.11 
Incorporation of High Density Polyethylene with CNT Yarn for Improved Mechanical Properties Ehsan Jazaeri; Monash University, Australia.

CM3.11.05 
Colloidal Erosion of Graphene Underwear: A 'Nanotrenching' Approach with a Nanoscale Wear Tool James A. Annett; Trinity College Dublin, Ireland.

CM3.11.06 
Environmental Sensitivity of MoS2 Coatings: Probing the First Few Layers Brandon Krick; Lehigh University, United States.

CM3.11.07 
Dislocation Dynamics Simulations of Pop-In during Nanoindentation Jahanzeb M. Anwar; U.S. Army Research Laboratory, United States.

CM3.11.08 
Evaluation of Tensile Properties of Electroplated Copper Films by Single Sharp Nanoindentation Si-Hoon Kim; UNIST, Korea (the Republic of).

CM3.11.09 
Experimental and Molecular Dynamics Study of Crystalllographic Orientation, Contact Size and Surface Roughness Effects on Incipient Plasticity in Tungsten Saugy口コミ Queen's University Belfast, United Kingdom.

CM3.11.10 
Limits of Structural Superlubricity in Large Contacts Tristan Sharp; Johns Hopkins University, United States.

CM3.12.01 
Heterostructures: Formation of Strain Solitons and Interlayer Debonding Limits of Coherency and Strain Transfer in Flexible 2D van der Waals Heterostructures by Their Nanomechanical Response Stefan Zauscher; Materials Science (IAM-CMS), Germany.

CM3.12.02 
Stacking Fault Energy Effects on the Microstructure Evolution of Brass Alloys under Reciprocating Tribological Loading Christian Greiner; Karlsruhe Institute of Technology, Germany.

CM3.12.03 
Microstructural Changes and Wear of Cu/Au Multilayers under Repeated Sliding Contact Ruth Schwager; Karlsruhe Inst of Technology, Germany.

CM3.12.04 
Stress-Driven Microstructural Evolution and Grain Boundary Doping in Nanocrystalline Alloys: A Direct Link Revealed by Quantitative In Situ Electron Microscopy Roun Mo1,2; 1University of Pennsylvania, United States; 2University of Wisconsin-Madison, United States.

CM3.12.05 
Evolution of Dislocation Microstructure underneath a Sliding Contact Peter Gumbsch1,2; 1Karlsruhe Inst of Technology, Germany; 2Fraunhofer IWM, Germany.

CM3.12.06 
Evolution of Dislocation Channeling Transforms to Nano-Precipitates to β-Phase in Gum Metal Com Tasan; MIT, United States.

CM3.12.07 
Effect of Wear on the Mechanical Properties of MoS2 Rui Hao; University of Illinois at Urbana-Champaign, United States.

CM3.13.01 
Metal-(Copper, Silver, Gold) Interfacial Bonds and Their Mechanical Interactions Rui Hao; University of Illinois Urbana-Champaign, United States.

CM3.13.02 
Incorporation of High Density Polyethylene with CNT Yarn for Improved Mechanical Properties Ehsan Jazaeri; Monash University, Australia.

CM3.13.03 
Incorporation of High Density Polyethylene with CNT Yarn for Improved Mechanical Properties Ehsan Jazaeri; Monash University, Australia.

CM3.13.04 
Incorporation of High Density Polyethylene with CNT Yarn for Improved Mechanical Properties Ehsan Jazaeri; Monash University, Australia.
SESSION CM4: Verification, Validation and Uncertainty Quantification in Multiscale Materials Simulation
March 30 - March 31, 2016

Chairs
Stephen Foiles, Sandia National Laboratories
Marisol Koslowski, Purdue University
David McDowell, Georgia Institute of Technology
Simon R. Phillpot, University of Florida

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION CM4.1: Molecular Dynamics and Density Functional Theory
Session Chairs: Stephen Foiles and Richard LeSar
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 126 C

8:30 AM *CM4.1.01
A Perspective on Uncertainty Quantification in the Multiscale Simulation of Materials Richard A. LeSar; Iowa State Univ, United States.

9:00 AM CM4.1.02
Controlling and Quantifying Uncertainty during Empirical Interatomic Potential Parameterization Eugene J. Rapaka; University of Florida, United States.

9:15 AM CM4.1.03
One-Factor-at-a-Time and Design of Experiments Methods for the Quantification of Parametric Sensitivity in ReaxFF Potentials Efrain Hernandez; US Army Research Laboratory, United States.

9:30 AM CM4.1.04
Modeling Failure Mechanisms and Structure Property Relationships of High Performance Polymers with Reactive Molecular Dynamics Simulations Dundar E. Yilmaz; Zirve University, Turkey.

9:45 AM BREAK

10:15 AM *CM4.1.05
Development of an Exchange-Correlation Functional with Uncertainty Quantification Capabilities for Density Functional Theory James Kermode; University of Warwick, United Kingdom.

10:45 AM CM4.1.06
Developing Mechanical Properties of Metal Tritides for Models of Aging Peter A. Schultz; Sandia National Labs, United States.

11:00 AM CM4.1.07
Verifying Ab Initio Predictions in CoPt Alloys Using Multiscale Modeling Elizabeth Decolvensere; University of California: Santa Barbara, United States.

11:15 AM CM4.1.08
A Large-Scale Simulation Method on Transition Metal Oxides Fantai Kong; University of Texas at Dallas, United States.

11:30 AM CM4.1.09
DDEC6 Atomic Population Analysis for Quantifying the Properties of Atoms in Materials Thomas Mang; New Mexico State Univ, United States.

SESSION CM4.2: Verification and Validation
Session Chairs: David McDowell and Michael R. Tonks
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 126 C

1:30 PM *CM4.2.01
A Bayesian Approach for Multiscale Model Validation with Imprecise Probability Yan Wang; Georgia Institute of Technology, United States.

2:00 PM *CM4.2.02
Validating the Mesoscale Nuclear Fuel Performance Code MARMOT Michael R. Tonks; Pennsylvania State Univ, United States.

2:30 PM CM4.2.03
Uncertainty and Sensitivity Analysis in Nuclear Fuel Behavior Modelling: Methodology and Applications Antoine Boulou; CEA, France.

2:45 PM CM4.2.04
Verification and Validation of Atomic Simulation Results via the Use of Virtual Diffraction Techniques Douglas E. Spearot; University of Florida, United States.

3:00 PM BREAK

3:30 PM CM4.2.05
Virtual Diffraction Characterization for Validating Molecular Dynamics Simulations Shawn P. Coleman; US Army Research Laboratory, United States.

3:45 PM CM4.2.06
Computational Studies of Coarsening Rates for the Cahn-Hilliard Equation with Phase-Dependent Diffusion Mobility Shibin Dai; New Mexico State University, United States.

4:00 PM CM4.2.07
Effect of Composition and Strain on Domain Dynamics and Polarization Switching in Ferroelectric Solid Solutions with Morphotropic Boundaries: A Phase-Field Study Soumya Bandhopadhay; IIT Hyderabad, India.

4:15 PM CM4.2.08
Revising the Thermodynamic Database of ZrO2-Y2O3 System Mohammad Asadi-Kiya; Florida International University, United States.

4:30 PM CM4.2.09
Phase Field Modeling of Intercalation Kinetics: A Finite Interface Dissipation Approach Nega Alemayehu Zerihun; Addis Ababa Institute of Technology, Ethiopia.

4:45 PM CM4.2.10
Mechanical Behavior of Porous Metal Oxide Microspheres: Experimental Investigation and Multi-Scale Simulation Paul Parent; CEA/DEN, France.

SESSION CM4.3: Scale Bridging I
Session Chairs: Timothy Germann and Simon R. Phillpot
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 126 C

8:30 AM *CM4.3.01
Signal and Noise in the Mechanics of Amorphous Solids: Bridging from Atoms to Continuum Michael L. Falk; Johns Hopkins University, United States; Johns Hopkins University, United States; Johns Hopkins University, United States.

9:00 AM CM4.3.02
Benchmarking Joint DFT Predictions of the Structure and Energetics of the Electrode/Electrolyte Interface Kendra Letcharworth-Weaver; Cornell University, United States; Argonne National Laboratory, United States.

9:15 AM CM4.3.03
A Method to Estimate Uncertainty in Thermal Conductivity Predictions from Equilibrium Molecular Dynamics Simulations Laura de Sousa Oliveira; University of California, Riverside, United States.
9:30 AM CM4.3.04
Sensitivity Analysis and Uncertainty Quantification in a Multiscale Model for Defect Diffusion under Arbitrary Strain Fields Anuj Goyal; Univ of Florida, United States.

9:45 AM BREAK

10:15 AM *CM4.3.05
Role of Uncertainty Quantification in Embedded Scale-Bridging Materials Simulations Timothy C. Germann; Los Alamos National Laboratory, United States.

10:45 AM CM4.3.06
Towards Quantifying the Complex Dynamics of the Sub-, Trans-, and Supersonic Dislocations in Crystalline Materials from Atomistic to the Macroscale Liming Xiong; Iowa State University, United States.

11:00 AM CM4.3.07
D2C - A Unifying Approach towards Analyzing, Comparing, and Validating Arbitrary Dislocation Microstructure Dominik Steinberger; Institute for Materials Simulation - FAU, Germany.

11:15 AM CM4.3.08
Implementation and Validation of an Analytic Elastic Plastic Contact Model with Strain Hardening in LAMMPS Bryan Kuhr1; 1Virginia Polytechnic Inst, United States; 2Sandia National Laboratories, United States.

11:30 AM CM4.3.09
Effects of Grain Boundary on the Sources of Size Effects George Z. Voyiadis; Louisiana State University, United States.

SESSION CM4.4: Scale Bridging II
Session Chairs: Wei Chen and Marisol Koslowski
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 126 C

2:00 PM * CM4.4.01
Stochastic Multiscale Material Modeling of Unidirectional Carbon Fiber Reinforced Composites Wei Chen; Northwestern University, United States.

2:30 PM CM4.4.02

2:45 PM CM4.4.03
X-Ray-Beam Induced Current: From Particle Interactions to Charge Collection with Monte-Carlo Simulations Michael Stuckelberger; Arizona State University, ECEE, Defect Lab, United States.

3:00 PM BREAK

3:30 PM * CM4.4.04
Computational Catalyst Search with (Un)Certainty Thomas Bligaard; SLAC National Accelerator Laboratory, United States.

4:00 PM CM4.4.05
Application of a Dynamic Steady-State Detection Algorithm to a Complex Reaction Network Kinetic Monte Carlo Algorithm Thomas L. Danielson; Virginia Polytechnic Inst, United States.

4:15 PM CM4.4.06
Multiscale Simulation and Theoretical Description of Multilayer Heteroepitactic Growth of C60 on Pentacene Yaset M. Acevedo; Cornell University, United States.

4:30 PM CM4.4.07
**SYMPOSIUM EE1**

Emerging Materials and Phenomena for Solar Energy Conversion  
March 29 - April 1, 2016

**Chairs**  
Svetlana B. Boriskina, Massachusetts Institute of Technology  
Talia Gershon, IBM T. J. Watson Research Center  
Stephan Lany, National Renewable Energy Laboratory  
Kevin Sivula, École Polytechnique Fédérale de Lausanne (EPFL)

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION EE1.1: MAPI Perovskites and Related Materials  
Session Chairs: Svetlana B. Boriskina and Richard Haight  
Tuesday Afternoon, March 29, 2016  
PCC North, 100 Level, Room 122 AB

1:30 PM *EE1.1.01  
Effects of Processing Conditions on Methyl Ammonium Lead Halide Perovskite Prepared by Two-Step Process: From Fundamental Materials Properties to Device Performance 
Byungha Shin; KAIST, Korea (the Republic of)

2:00 PM EE1.1.02  
Novel Iodide Semiconductors for Photovoltaic Applications 
Rachel C. Kurchin; MIT, United States.

2:15 PM EE1.1.03  
Studying Perovskite-Based Solar Cells with High Resolution in situ Microscopy 
Jeffrey A. Aguilar; National Renewable Energy Laboratory, United States.

2:30 PM EE1.1.04  
Methylammonium Bismuth Iodide as a Lead-Free, Stable Hybrid Organic-Inorganic Solar Absorber 
Robert Hove; MIT, United States.

2:45 PM EE1.1.05  
17.6% Stabilized Efficiency in Low-Temperature Processed Planar Perovskite Solar Cells: The Role of Interface Engineering 
Annamaria Petrozza; Istituto Italiano Tecnologia, Italy.

3:00 PM BREAK

SESSION EE1.2: Kesterites I  
Session Chairs: Byungha Shin and Kevin Sivula  
Tuesday Afternoon, March 29, 2016  
PCC North, 100 Level, Room 122 AB

3:30 PM *EE1.2.01  
Industrial Perspectives on Earth Abundant, Multinary Photovoltaics and How We Can Make Them Better 
Richard Haight; IBM T.J. Watson Research Ctr, United States.

4:00 PM EE1.2.02  
Structural Characterization of Cu$_2$Zn(Sn$_{1-x}$Ge$_x$)$_2$S$_4$ by Neutron Diffraction 
Galinia Guriev; Helmholtz-Zentrum Berlin, Germany.

4:15 PM EE1.2.03  
Thermal Dependence of Cu/Zn Ordering in CZTSe Kesterites by Anomalous Diffraction 
Daniel M. Toebbens; Helmholtz-Zentrum Berlin, Germany.

4:30 PM EE1.2.04  
Solution-Based Deposition of Silver-Alloyed Cu$_2$ZnSn(S,Se)$_4$ Solar Cells 
Priscilla D. Antunez; IBM T.J. Watson Research Ctr, United States.

4:45 PM EE1.2.05  
Phase Transformation during Cu$_2$ZnSn$_{1-x}$Synthesis by Reactive Magnetron Co-Sputtering 
Pierre-Antoine Cormier; University of Mons, Belgium.

EE1.3.01  
Structural Investigations on the Solid Solution Series CH$_3$NH$_3$PbI$_3$ – CH$_3$NH$_3$PbCl$_3$ 
Alexandra Franz; Helmholtz-Zentrum Berlin, Germany.

EE1.3.02  
Surface Charge Recombination in Hybrid Perovskite Single Crystals: Implication in Applications for Photovoltaics and Narrow Band Photodetectors 
Yanjun Fang; University of Nebraska - Lincoln, United States.

EE1.3.03  
NH$_4$Cl Regulated Crystallization and Film Formation of CH$_3$NH$_3$PbI$_3$ Br for Efficient Planar Heterojunction Solar Cell 
Jian He; The Chinese Univ. of Hong Kong, Hong Kong.

EE1.3.04  
Epitaxial Thin Film Cu$_2$O Photovoltaic Devices 
Yulia Tolstova; California Inst of Technology, United States.

EE1.3.05  
Defect Behavior in CuSnS$_2$: Point Defects, Disorder, and Alloying Investigated via Theory and Experiment 
Andriy Zakutayev; National Renewable Energy Laboratory, United States.

EE1.3.06  
Toward Improving the Prospects of Antimony Chalcogenide Solar Cells 
P.Karanakaran Nair; UNAM, Mexico.

EE1.3.07  
Photovoltaic Performance of Solid State Heterojunctions with Sb$_2$S$_3$Se$_2$$_{4}$ Sensitized Mesoporous TiO$_2$ Layers 
Arcelci Hernandez-Granados$^{1,2}$;  
$^{1}$Universidad Nacional Autonoma de Mexico, Mexico; $^{2}$Universidad Autonoma del Estado de Morelos, Mexico.

EE1.3.08  
Structure-Property Relationships Study of CdTe Grain Boundaries via Wafer Bonding 
Tadas Paulauskas; University of Illinois at Chicago, United States.

EE1.3.09  
Atomistic Level Characterization of Grain Boundaries in CdTe Using STEM and DFT 
Farid G. Sen; Argonne National Laboratory, United States.

EE1.3.10  
Carbon Nanotube/Silicon Heterojunction Solar Cells Fabricated by Solution-Based Mild Process 
Eri Muramoto; Waseda University, Japan.

EE1.3.11  
Cadmium Oxysulfide (CdS$_{O}$$_{1-x}$) as Novel High Transmittance Buffer Layer Formed by Surfactant Mediated Chemical Bath Deposition for Thin-Film Heterojunction Solar Cells 
Alok C. Rastogi$^{1,2}$;  
$^{1}$Binghamton University, SUNY, Binghamton, United States; $^{2}$Binghamton University, SUNY, Binghamton, United States.

EE1.3.12  
Direct Plasmon-Driven Photoelectrocatalysis 
Hossein Robatjazi; Rice University, United States.

EE1.3.13  
Nano-Level Characterization of Optical Properties and Defect States in TiO$_2$ and Ta$_2$O$_5$ Based Photocatalysts 
Qianlang Liu; Arizona State Univ, United States.
EE1.3.14
The Effect of Critical Thickness on the Photovoltaic Performance of InGaN/GaN Multiple Quantum Wells in a p-i-n Junction Solar Cell Alex M. Fischer; Arizona State University, United States.

EE1.3.15
Combinatorial Synthesis and High-Throughput Photoelectrochemical Assessment of Fe-W-Ti-O Thin-Film Materials Libraries for Solar Water Splitting Helge S. Stein; Ruhr-Universität Bochum, Germany.

EE1.3.16
Optimizing New Type Nano-Composite Infrared-to-Ultraviolet Up-Conversion Luminescence Layer for Efficient Anatase Titania Film-Based Dye-Sensitized Solar Cells Yuzuncu Yıl University, Turkey.

EE1.3.17
High Efficient Inverted Bulk-Heterojunction Solar Cells with a Gradiently-Doped ZnO Layer Shinuk Cho; University of Ulsan, Korea (the Republic of Korea).

EE1.3.18
Thermochemical Solar to Fuel Conversion Efficiency Based on CALPHAD Data for Lanthanum Manganite Perovskites Doped with Strontium and Chromium Alexander H. Bork; ETH Zurich, Switzerland.

EE1.3.19
Cubic SnGe Nanoalloys: Beyond Bulk Composition Limit Sergei Ivanov; Los Alamos Nat’l Laboratory, United States.

EE1.3.20
Effect of Thickness on Photo Response Behavior in Si/MoS2 Heterojunction Solar Cells Sangram Pradhan; Norfolk State Univ, United States.

EE1.3.21
High Efficiency Si-Based Down-Converter Systems for Si Solar Cells Christophe Labbé; CIMAP Lab Ensciena, France; CNRS, France; UCBN, France.

EE1.3.22
Fabrication and Characterization of BaTiO3 (BTO) Ferroelectric Nanoparticles Embedded CH3NH3PbI3-xClx Perovskite Solar Cells Sarath Suxia Liang; Dalian University of Technology, China.

EE1.3.23

EE1.3.24
Mechanistic Study on the Formation and Depletion of Cu2ZnSnS4 Nanoparticles Synthesized by Modified Hot Injection Method Rameez Ahmad; Friedrich Alexander Universität Erlangen-Nürnberg (FAU), Germany.

EE1.3.25
Hetero-Junction Interface Engineering of CZTSSe/CdS for Solar Cell Efficiency Improvement Wei-Chao Chen; National Tsing-Hua University, Taiwan; Academia Sinica, Taiwan; National Taiwan University, Taiwan.

EE1.3.26
The Effect of Additional Amount of Sulphur on Solution-Processed Pure Sulphide Cu2ZnSnS4 Thin-Film Layers Zhenfei Wei; Swansea University, Engineering, Bay Campus, United Kingdom.

EE1.3.27
Density-Functional Theory Simulations of Photovoltaic CZTS,Se and AZTS,Se Materials Evgenii Chaganyuk; Univ of California-San Diego, United States.

EE1.3.28
Synthesis of Phase-Pure CZTS Powder and Layers via Nanoparticle Inks and its Intrinsic Point Defect Characterization Lisa Dieskel; Helmholtz Zentrum Berlin, Germany.

EE1.3.29
Hydrophobic Nanoreactor Templating: A Tool-Box for the Synthesis of Mesoporous and Yolk@Shell Metal-Metal Oxide Nanocomposites Anna T. Fischer; University Freiburg - Institute for Inorganic and Analytical Chemistry, Germany.

EE1.3.30
Thermal Stability of WAIN/WAlON/Al2O3-Based Solar Selective Absorber Coating Atasi Dan; Indian Institute of Science, India.

EE1.3.31
Self-Assembled Nanostructures for Efficient Charge Transport in Photovoltaic Devices Jong-In Hong; Seoul National University, Korea (the Republic of South Korea).

SESSION EE1.4: Perspectives from Industry, DOE, University and National Laboratories

Session Chairs: Talia Gershon and Andriy Zakutayev

Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 122 AB

10:30 AM *EE1.5.01
Rapid Development of Chalcostibite Photovoltaics Andriy Zakutayev; National Renewable Energy Laboratory, United States.

11:00 AM EE1.5.02
Tin Sulfide Solar Cells Prepared from a Solution-Based Precursor Route Thomas Rath; Imperial College London, United Kingdom.

11:15 AM EE1.5.03
Tetrahedrite Superabsorbers for Drift Solar Cells: A Game Changer Inseok Hye; Oregon State University, United States.

11:30 AM EE1.5.04
Electronic and Structural Properties of Dislocations in the Solar Absorber Materials CuInSe2 and CuGaSe2 Daniel A. Barragan Yam; Technische Universität Darmstadt, Germany.

11:45 AM EE1.5.05
Iodine Doping Studies of CdTe Grown Using Molecular Beam Epitaxy Olangewaju S. Ogedengbe; Texas State University, United States.

SESSION EE1.6: Photo-Electrocatalytic Materials

Session Chairs: Svetlana B. Boriskina and Alexie Kolpak

Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 122 AB

1:30 PM *EE1.6.01
Operando Spectroscopic Investigation of Water Oxidation with Hematite Photoelectrodes Thomas Harrass; Michigan State University, United States.
2:00 PM EE1.6.02
Discovering New Photocathode Materials for Solar Water Splitting by High-Throughput Methods
Helge S. Stein; Ruhr-Universität Bochum, Germany.

2:15 PM EE1.6.03
Photoelectrochemical Study of CuWO₄ Thin Films Synthesized via Stack Deposition-Annecaling (SDA) Approach
Yuan Gao; Michigan State University, United States.

2:30 PM EE1.6.04
Piezotronic-Enhanced Photoelectrochemical Reactions in Ni(OH)₂ Decorated ZnO Photanodes Yanhao Yu; Department of Materials Science and Engineering, University of Wisconsin-Madison, United States.

2:45 PM EE1.6.05
Developing New Polymeric Photocatalysts for Water Splitting
Martijn Zwijnenburg; University College London, United Kingdom.

3:00 PM BREAK

SESSION EE1.7: Oxides and Nitrides
Session Chairs: Thomas Hamann and Kevin Sivula
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 122 AB

3:30 PM *EE1.7.01
Interfacial Properties and the Design of Novel Photovoltaic Materials
Alexie Kolpak; MIT, United States.

4:00 PM EE1.7.02
Unraveling Opposing Operating Mechanisms in Multi-Layered All-Oxide Photovoltaic Cells
David A. Keller; Bar-Ilan Univ, Israel.

4:15 PM EE1.7.03
Single Crystalline and Polycrystalline Cu₃O/ZnO(O,S) Photovoltaic Devices
Stefan T. Omelchenko; California Inst of Technology, United States.

4:30 PM EE1.7.04
Doping Control in ZnSnN₂ via Off-Stoichiometry and Post-Growth Annealing
Angela N. Fioretti; National Renewable Energy Laboratory, United States; ²Colorado School of Mines, United States.

4:45 PM EE1.7.05
ZnSn Ge₃ N₉ Growth by Molecular Beam Epitaxy
Amanda Shing; California Institute of Technology, United States.

SESSION EE1.8: New Metrology
Session Chairs: Elif Ertekin and Talia Gershon
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 122 AB

8:30 AM EE1.8.01
Transmission Electron Microscopy Studies of Antisite Domain Boundaries in Cu₂ZnSnS₄
David Cherns; Univ of Bristol, United Kingdom.

8:45 AM EE1.8.02
VₓOₓ Overestimation from Photoluminescence Quantum Yield in Disordered Semiconductors
John Katahara; University of Washington, United States.

9:00 AM EE1.8.03
Probing Surface Recombination Velocities in Semiconductors Using Two-Photon Microscopy
Benoit Gaury; ¹National Institute of Standards and Technology, United States; ²Maryland NanoCenter, University of Maryland, United States.

9:15 AM EE1.8.04
Tomographic Reconstruction of Morphology in Hybrid Semiconductor Nanoparticle Conjugated Polymer Photovoltaic Devices
Raymond Hickey; UC Davis, United States.

9:30 AM EE1.8.05
Optical Properties of CdTe/MgCdTe Double Heterostructures Grown on InSb Substrates
Xinhuo Zhao; Arizona State University, United States.

9:45 AM EE1.8.06
Complementary Impedance Analysis of Hematite Photoanodes with Electrical and Optical Perturbation
Dino Klotz; Technion, Israel.

SESSION EE1.9: Interfaces and Contacts
Session Chairs: Taliya Gregson and Stephan Lany
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 122 AB

10:30 AM *EE1.9.01
Elif Ertekin; Univ of Illinois, United States.

11:00 AM EE1.9.02
Reactive Sputtering of InₓSₓ as Alternative Buffer Layer for Emerging Solar Cells
Sebastian Sioł; National Renewable Energy Laboratory, United States.

11:15 AM EE1.9.03
Copper-Alloyed Zinc Sulfide: An Earth Abundant, Room Temperature Processed p-Type Transparent Conductor for Photovoltaic Applications
Rachel Woods-Robinson; Lawrence Berkeley National Lab, United States.

11:30 AM EE1.9.04
Molecular Electronic Doping of Transparent Conductive Few Layers Graphene Films via Metal-Organic Complexes
Ahmed E. Mansour; ¹King Abdullah University of Science and Technology, Saudi Arabia; ²King Abdullah University of Science and Technology, Saudi Arabia.

11:45 AM EE1.9.05
Angle Insensitive Fully Transparent Electrode Utilizing Directed Total Internal Reflection
Pieter G. Kik; Univ of Central Florida, United States.

SESSION EE1.10: DSSC, Nano and 2D Materials
Session Chairs: Svetlana B. Boriskina and Michael McGehee
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 122 AB

1:30 PM *EE1.10.01
New Earth-Abundant Electrocatalysts and Semiconductors for Photovoltaic and Photoelectrochemical Solar Energy Conversion
Song Jin; Univ of Wisconsin-Madison, United States.

2:00 PM EE1.10.02
Three-Dimensional Nanowire Arrays as Efficient Counter Electrodes for Quantum-Dot-Sensitized Solar Cells
Jinsong Hu; Institute of Chemistry, Chinese Academy of Sciences, China.

2:15 PM EE1.10.03
Multiple-Exciton Generation in Lead Selenide Nanorod Solar Cells with External Quantum Efficiencies Exceeding 120%. Nathaniel J. Davis; Cavendish Laboratory, United Kingdom.

2:30 PM EE1.10.04
Solution-Processed 2D Transition Metal Dichalcogenides for Large-Area Solar Energy Conversion
Xiaoyun Yu; EPFL, Switzerland.

2:45 PM EE1.10.05
Gold-MoS₂ Nanostructures for Plasmon Driven Hot Electron Injection into MoS₂
Chloe F. Doiron; ¹Rice University, United States; ²Rice University, United States.

3:00 PM BREAK
EE1.11.01

EE1.11.02
Charge Transport through Organic Molecular Wires Embedded in Ultrathin Insulating Inorganic Membrane Eran Edir; Lawrence Berkeley National Laboratory, United States.

EE1.11.03
Ultrafast Characterization of P3HT:PCBM:SWNT (6,5) Blend for Organic Photovoltaics Diana G. Figueroa del Valle1, 2; 1Center for Nano Science and Photovoltaics EE1.11.03

EE1.11.04
Non-Fullerene Acceptors for Organic Solar Cells Ching Hong Tan1, 2; 1Imperial College London, United Kingdom; 2Centre for Plastic Electronics, Imperial College London, United Kingdom.

EE1.11.05
Effect of Intramolecular Donor and Acceptor Units on Ultrafast Charge Dynamics in Star-Shaped Oligothiophenes Oleg V. Kozlov1, 2; 1Moscow State University, Russian Federation; 2University of Groningen, Netherlands.

EE1.12.01
Improving Efficiency of Dye Sensitized Solar Cells with Energy Relay Donors Ainiya Puntambekar; Rensselaer Polytechnic Inst, United States.

EE1.12.02
Mesoporous Strontium Titanate Photoanode for Dye-Sensitized Solar Cell (DSSC) Dhirajbata Manda; Michigan State University, United States.

EE1.12.03
Nearly 100% Transparency Carbon Based Catalyst for High-Performance Dye-Sensitized Solar Cell Jian He; Chinese Univ of Hong Kong, Hong Kong.

EE1.12.04

EE1.12.05
Understanding the Photophysics of Reduced and Oxidized Intermediates in Electron Transfer Systems Julian Schindler1, 2; 1Leibniz Institute of Photonic Technology, Germany; 2Institute of Physical Chemistry, Friedrich-Schiller-University Jena, Germany.

EE1.12.06
Combined DTA and Mössbauer Studies of the Fe-S System B.V. Korzun; Borough of Manhattan Community College, United States.

EE1.12.07
Raman Studies of Single Crystals of the CuAlSe2 - CuGaSe2 System B.V. Korzun; Borough of Manhattan Community College, United States.

EE1.12.08
A Study of Uniform Large-Area Bylayer Graphene on BaFeO2 and InGaN-Based Photosensitive Devices Sergio Mendez; University of Puerto Rico, United States.

EE1.12.09
Various Magnetron Sputtering Methods for the Elaboration of Ta-N (O) Thin-Films with Optical Gap in the Visible Range for Solar Conversion Brigitte Houchet-Fabre; CNRS, France.

EE1.12.10
Development of Highly Efficient Lead Free Perovskite Solar Cell Shubham Bansal; Indian Institute of Technology(BHU), India.

EE1.12.11
In Situ Study of Perovskite Crystal Growth During Spin Coating under Grazing Incidence Wide Angle X-ray Scattering (giwaxs) Rahim Munir; King Abdullah University of Science and Technology (KAUST), Saudi Arabia.

EE1.12.12
Fabrication of Highly Efficient Lead Perovskite Nanowire/ MoS2 Hybrid Photodetector Himanshu Bansal; Indian Institute of Technology(IITBHU), India.

EE1.12.13
Open Circuit Voltage Enhancement in Ultra-Thin Crystalline Silicon Solar Cells Yusi Chen; Stanford Univ, United States.

EE1.12.14
Gold Nanoparticle-Carbon Nanotube Hybrid For Efficient Organic Solar Cells Taewoo Jeon; Korean Advanced Institute of Science and Technology (KAIST), Korea (the Republic of).

EE1.12.15
High Voc n-Si Heterojunctions with p-type Transparent (CuS)2; (ZnS)2,Grown by Chemical Bath Deposition Xiaojie Xu1, 2; 1Lawrence Berkeley National Laboratory, United States; 2Fudan University, China.

EE1.12.16
Chemically Deposited AgSbS2:Solar Cells Jesus Capistran-Martinez; UNAM, Mexico.

EE1.12.17
Growth of High Optical Quality GaAsBi Semi-conductor Alloys using UV Light-Assisted MBE Daniel A. Beaton; NREL, United States.

EE1.12.18
A Low-Temperature Fabrication Method for WSe2 Films Grown from Nanocrystalline Precursors Christopher L. Exstrom; University of Nebraska at Kearney, United States.

EE1.12.19
Synthesis and Characterization of Luminescent Solar Concentrator Rods Yohannes B. Aemre1, 2; 1Bahir Dar University , Ethiopia; 2University of Trento, Italy.

EE1.12.20
High Performance GaAs Nanowire Solar Cells for Flexible and Transparent Photovoltaics Dapan Li; City Univ of Hong Kong, Hong Kong.

EE1.12.21
ZnO:Al/Organic Hybrid Films Grown by Atomic and Molecular Layer Deposition for Transparent and Flexible Electrode Applications Grzegorz Luka; Polish Academy of Sciences, Poland.

EE1.12.22
Structural and Compositional Changes in Tin Selenide Thin-Films during Heating Enue Barrios-Salgado; UNAM, Mexico.

EE1.12.23
Single-Step Organic Vapor Phase Sulfurization Synthesis of p-SnS Photo Absorber for Graded Band-Gap Thin Film Heterojunction Solar Cells with n-ZnO S, Faruk Ballipinar1, 2; 1Binghamton University, SUNY, United States; 2Binghamton University, SUNY, United States.

EE1.12.24
Device Characterization of Cu-Ag-Ga-Te Thin-Films for Photovoltaic Applications Hasan H. Gulcu1, 2; 1Middle East Technical University, Turkey; 2Center for Solar Energy Research and Applications (GÜNAM), Turkey.
Formation of ZnSnSe Thin-Films Deposited by Using Sintered Stoichiometric Powder  
Hassan H. Gullu  1, 2; 1Middle East Technical University, Turkey; 2Center for Solar Energy Research and Applications (GÜNAM), Turkey.

Incorporating Silicon into Spray-Pyrolyzed CZTS Nanoparticles and Sintered Thin-Films  
Stephen Exarhos; University of California, Riverside, United States.

In Situ Raman Monitoring of Cu2ZnSnS4 Decomposition and Oxidation at Elevated Temperatures  
Osama M. Awadallah; Florida International University, United States.

Sol Gel Sulfurization of Cu2ZnSnS4 Thin Films Using ppm Level Hydrogen Sulfide  
Osama M. Awadallah; Florida International University, United States.

Optical Properties of New Emerging Two-Dimensional Group VA Materials: A Many-Body Approach  
Deniz Kecik; Bilkent University, Turkey.

Emerging Ferroelectric Material with Reduced Band Gap for Photovoltaic Applications  
Shalini Kumari; University of Puerto Rico, United States.

Atomic Layer Deposition of BiFeO3 Films for Photovoltaic Devices  
Rajesh K. Katyar; University of Puerto Rico, San Juan, United States.

Integration of Gold-Coated Silver Nanoprisms into PEDOT:PSS for Plasmonic Induced Efficiency Improvements in Organic Photovoltaics  
Jonathan Metzman; Virginia Tech, United States.

Novel Benzodithiophene-Based Copolymers for High-Performance Polymer Solar Cells (PSCs) with Efficiency over 7%  
Kwang Hun Park; Gyeongsang National University, Korea (the Republic of).

Preparation of Cu2ZnSn(S,Se)4 Thin-Film Solar Cell by Sputtering Deposition of Single-Phase Cu2ZnSnS4 Target and Selenium/Sulphur Vapor Treatment  
Yu-Pin Lin; National Chiao Tung University, Taiwan.

Pulsed Laser Deposition (PLD) of the Solar Cell Materials CZTS and CTS  
Jorgen Schou; TU Denmark, Denmark.

Enhanced Performance of Cu2ZnSn(S,Se)4 Photovoltaics with Introducing an Interfacial Ge Doping Layer  
Cheng-Ying Chen  1, 2; 1Center for Condensed Matter Science, National Taiwan University, Taiwan; 2Institute of Atomic and Molecular Science, Academia Sinica, Taiwan.

Sulfurization Free, Low-Cost Technique to Deposit CZTS with Control over Its Band-Structure and Photoresponse  
Saatviki Gupta  1, 2; 3Dayalbagh Educational Institute, India; 3Indian Institute of Technology Delhi, India.

Water Oxidation Photocatalysis with Suspended Fe2O3 Particles  
Frank E. Osterloh; Univ of California-Davis, United States.

Quantifying Materials Design Principles for Solar Thermal Fuel Applications through Adaptive High-Throughput Simulations  
Yun Liu; MIT, United States.

Synthesis and Properties of Large Single-Crystal Plates of SnS2xSe2(1-x) Alloys for Solar Applications  
Leith Samad; Univ of Wisconsin-Madison, United States.

Hematite Nanostructures for Efficient Solar Water Splitting  
Xuhui Sun; Soochow Univ, China.

Highly Effective Cu2O/NiCo2O4 Core/Shell Nanowire Arrays as Photocathode for Water Splitting  
Hongxiu Zhang; Zhejiang Univ, China.

Computational Screening of Novel Bismuth Based Solar Absorbers  
Samanthe Perera; SUNY-Buffalo, United States.

Band Alignment of Tin Halides for Solar Cell Applications  
Zewen Xiao; The University of Toledo, United States.
3:30 PM EE1.16.01
Efficient Solar Driven Water Splitting Using a Bipolar Membrane to Enable pH-Gradients
Wilson Smith; TU Delft, Netherlands.

4:00 PM EE1.16.02
Photomechanical Energy Conversion Using Polymer Brush Dissociation
Stephen Martin; Univ of California-Santa Cruz, United States.

4:15 PM EE1.16.03
Nanoscale Dielectric Films Enhance Near-Field Radiative Heat Transport
Bai Song; University of Michigan, Ann Arbor, United States.

4:30 PM EE1.16.04
Modulation of Oxygen Vacancies Assisted Photovoltaic Behavior in Multiferroic BiFeO₃ Thin-Films via (Nd, V) Co-Substitution
Radhe Agarwal; Univ of Puerto Rico-Rio Piedras, United States.

4:45 PM EE1.16.05
Cubic and Orthorhombic Tin Sulfide Thin-Films for Solar Cells
M.T. Santhamma Nair; UNAM, Mexico.
SYMPOSIUM EE2

Advancements in Solar Fuels Generation—Materials, Devices and Systems
March 28 - April 1, 2016

Chairs
Artur Braun, EMPA - Swiss Federal Laboratories for Materials Science and Technology
Nicolas Gaillard, University of Hawaii at Manoa
Hongfei Jia, Toyota Research Institute North American
Heli Wang, SABIC

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION EE2.1: Emerging Materials, Devices and Technologies
Session Chairs: Shane Ardo, Nicolas Gaillard, Sophia Haussener and John Turner
Monday Morning, March 28, 2016
PCC North, 100 Level, Room 122 C

8:00 AM *EE2.1.01

8:30 AM *EE2.1.02
Experimental Demonstrations of Solar-Driven Photoelectrochemical Water Splitting and Carbon Dioxide Reduction Joel W. Ager1, 2; 1Lawrence Berkeley National Laboratory, United States; 2University of California at Berkeley, United States.

9:00 AM *EE2.1.03
Guiding Practical Pathways for Photoelectrochemical Solar-Hydrogen Generation and Reactor Design Sophia Haussener; EPFL, Switzerland.

9:30 AM *EE2.1.04
Opportunities for Bipolar Ion-Exchange Membranes in Solar Fuels Devices Shane Ardo1, 2; 1University of California Irvine, United States; 2University of California Irvine, United States.

10:00 AM BREAK

10:30 AM *EE2.1.05
Latest Advances in Solar Water Splitting Lionel Vayssieres; Xi’an Jiaotong University, China.

11:00 AM *EE2.1.06
Solution-Processed Photoelectrode Materials for Solar Water Splitting Kevin Silvius; EPFL, Switzerland.

11:30 AM EE2.1.07
Progress in the Combinatorial Searches for New Oxide Semiconductors for Water Splitting Bruce A. Parkinson; Univ of Wyoming, United States.

11:45 AM EE2.1.08
Accelerated Photoanode Discovery: A High Throughput Pipeline for Screening Solar Fuels Materials with Experiment-Theory Feedback John M. Gregoire; California Inst of Technology, United States.

1:30 PM *EE2.2.01
Recent Developments in Complex Metal Oxide Photoelectrodes Fatwa F. Abdi; Helmholtz-Zentrum Berlin, Germany.

2:00 PM EE2.2.02
Phase Transition-Induced Band Edge Engineering of BiVO4 to Split Pure Water under Visible Light Won Jun Jo; MIT, United States.

2:15 PM EE2.2.03
Photoelectrochemical Diagnosis of Hematite (α-Fe2O3) Photoanodes for Solar Water Splitting Hen Dotan1, 2; 1Technion, Israel; 2EPFL, Switzerland.

2:30 PM EE2.2.04
Heteroepitaxial Hematite Photoanodes as a Model System for Solar Water Splitting Daniel Grave; Technion, Israel.

2:45 PM EE2.2.05
ALD of Thin-Film Ta3N5 on Ta-Doped TiO2 for Photocatalytic Water Oxidation Hamed Hajibabaei Najafabadi; Michigan State University, United States.

3:00 PM BREAK

3:30 PM *EE2.2.06
Metal Oxide Nanosurfaces and Hetero-Interfaces for Solar Harvesting Applications Sanjay Mathur; Univ of Cologne, Germany.

4:00 PM EE2.2.07
Optimization of Film Properties and Co-Catalyst Loading for Efficient Solar Water Reduction via Electrodeposited Cu I Oxide Absorber Layer Chandan Das; Indian Institute of Technology Bombay, India.

4:15 PM EE2.2.08
Fabrication of Cu-Delafossite INverse Opal Structure as a Photocathode Yunjung Oh; Yonsei Univ, Korea (the Republic of).

4:30 PM EE2.2.09
Tailoring the Bonding Structure of Graphitic Carbon Nitride to Improve Visible Light Photocatalytic Hydrogen Generation Ru-Shi Liu; Chinese Academy of Sciences, China.

SESSION EE2.3: Catalysis I
Session Chairs: Alex DeAngels and Nicolas Gaillard
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 122 C

8:00 AM *EE2.3.01
Catalyst Development and Integration onto Semiconductors for Solar H2 Production by Photoelectrochemical (PEC) Water-Splitting Thomas F. Jaramillo; Stanford University, United States.

8:30 AM *EE2.3.02
Heterostructure of Si and CoSe2 or CoS2: Promising Photocathodes Based on Non-Noble Metal Catalysts for Photoelectrochemical Hydrogen Evolution Ru-Shi Liu; National Taiwan University, Taiwan.

9:00 AM EE2.3.03
Photo-Induced Ostwald Ripening of Pt Co-Catalysts Nanoparticles on TiO2 during Water Splitting Peter A. Crozier; Arizona State University, United States.

9:15 AM EE2.3.04
Nanostructured Counter Electrode Design for Photoelectrochemical Solar Cells Demet Yolacan; TOBB University of Economics and Technology, Turkey.
9:30 AM EE2.3.05
Demonstrating the Activity and Stability of Conformal RuO2, “Nanoskins” on Planar and 3D Substrates for Water Oxidation in Acid Electrolyte
Paul A. DeSario, Naval Research Laboratory, United States.

9:45 AM EE2.3.06
Atomic Insights into Electrocatalytic Activity and Structural Stability of IrO2 Nanoparticles
Fatih G. Seng, Argonne National Laboratory, United States.

10:00 AM BREAK

10:30 AM EE2.4.01
Identifying Optimal Chalcopyrite Alloys for Photoelectrochemical Hydrogen Production through First-Principles
Joel B. Varley, Lawrence Livermore National Lab, United States.

10:45 AM EE2.4.02
Wide-Bandgap Tuneable CuGaS/Se Photocathodes for PEC Water Splitting
Alex DeAngelis, Univ of Hawaii, United States.

11:00 AM EE2.4.03
Solar to Hydrogen Generation with a Solution Processed Chalcopyrite Photocathode on a Transparent Substrate
Sang Youn Chae1, 2, Korea Institute of Science and Technology, Korea (the Republic of); 2CSIRO-Institute of Minerals and Materials Technology, Australia.

11:15 AM EE2.4.04
Enhanced Photoelectrochemical Properties of Low-Cost Photocathode Based on Solution-Processed Cu2ZnSnS4 Thin Films
Wooseok Yang, Yonsei Univ, Korea (the Republic of).

11:30 AM EE2.4.05
(Oxy) Nitride and (oxy) Chalcogenide Electrodes for Photoelectrochemical Solar Fuel Production
Tatsuo Minamishi1, 2, The University of Tokyo, Japan; 2PRESTO/JST, Japan.

11:45 AM EE2.4.06
Electrodeposition of Zirconium Selenide Decorated Cadmium Selenide Thin-Films for Photoelectrochemical Water Splitting
Je-wei Chang, National Tsing-Hua University, Taiwan.

2:45 PM EE2.5.05
Visible Light Active Semiconductor Composites for Enhanced Photocatalytic Activity
Shiba P. Adhikari, Wake Forest Univ, United States.

3:00 PM BREAK

3:30 PM EE2.5.06
Photocatalytic Overall Water Splitting Promoted by SnOx-NiGa2O4 Photocatalysts
Xiaojun Lv, Chinese Academy of Sciences, China.

3:45 PM EE2.5.07
Inorganic-Organic Heterostructured Photocatalyst for Solar Hydrogen Generation
Kamala Kanta Nanda1, 2, CSIR-Institute of Minerals and Materials Technology, India; 2Academy of Scientific and Innovative Research, India.

4:00 PM EE2.5.08
Mesosstructured Mixed Metal Oxide Photocatalysts and Composites for Clean Hydrogen Production
Roland Marschall, Justus-Liebig-Univ Giessen, Germany.

4:15 PM EE2.6.01
Copper Indium Sulfide Sensitized Zinc Oxide Nanowire Arrays for Solar Fuel Generation
Erkan Aydin, TOGB University of Economics and Technology, Turkey.

4:30 PM EE2.6.02
Nanostuctured Tandem Cells for Overall Solar Water Splitting in Alkaline Solutions
Alireza Kargar, Univ of California-San Diego, United States.

4:45 PM EE2.6.03
Broad-Band Light Absorption and High Photocurrent of (In,Ga)N Nanowire Photoanodes
Junpei Kamimura, Paul-Drude-Institut, Germany.

8:00 AM *EE2.7.01
Artificial Photosynthesis Using CO2 and H2O: 4.6% Solar-to-Chemical Conversion Efficiency by a Monolithic Device Composed of a Metal-Complex Catalyst Coupled with a Semiconductor
Takeshi Morikawa, Toyota Central R&D Labs, Japan.

8:30 AM EE2.7.02
Visible-Light-Induced CO2 Reduction Utilizing Hybrid Photocatalyst Composed of Metal-Complex Catalyst Linked with Sulfide Semiconductor
Tomiko M. Suzuki, Toyota Central R&D Labs Inc, Japan.

8:45 AM EE2.7.03
Efficient Sunlight-Driven CO2 Reduction Using Anodized Ag Cathode
Q. Zhou, Toyota Technological Center, United States.

9:00 AM EE2.7.04
As-Sprayed Silver Nanowires for Electrochemical CO2 Reduction to Syngas with Controlled CO/H2 Ratio
Minhyung Cho, KAIST, Korea (the Republic of).

9:15 AM EE2.7.05
Template Free Synthesis of 3D Mesoporous Interbraded Layered Alpha Fe2O3 for Photocatalytic Reduction of CO2 by H2 to Methane
Divya Nagaraju, CSIR- National Chemical Laboratory, India.

9:30 AM EE2.7.06
CO2 Reduction with p-Type 3C-SiC Photo-Electrodes
Shunmusesake Akaban, Tokyo Institute of Technology, Japan.
Selective and Efficient CO₂ Electrocataysts for Solar-to-Fuel Generation Application

Yun Jeong Hwang; Korea Institute of Science and Technology, Korea (the Republic of).

10:00 AM BREAK

SESSION EE2.8: III-V Materials
Session Chairs: Nicolas Gaillard and Hongfei Jia
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 122 C

10:30 AM EE2.8.01
In Situ Functionalised III-V Tandems for Efficient Water Splitting Matthias M. May1, 2; TU Ilmenau, Germany; ‘Helmholtz-Zentrum Berlin, Germany.

10:45 AM EE2.8.02
Effects of Surface Oxidation on III-V Semiconductor Photoelectrodes for Solar Hydrogen Production Tuan Anh Pham; Lawrence Livermore National Laboratory, United States.

11:00 AM EE2.8.03
Maximizing Photocurrent Onset Potential of III-V Photoelectrochemical Junctions James L. Young; NREL, United States.

11:15 AM EE2.8.04
24.4% STH Efficiency under Natural Sunlight by the Optimized Connection of Concentrator Photovoltaic Modules and Electrochemical Cells Masakazu Sugiyama; Univ of Tokyo, Japan.

11:30 AM EE2.8.05
Integrating Crystalline Oxides on III-Vs for Solar-to-Fuels David P. Fenning1, 2; ‘Univ of California-San Diego, United States; ‘MIT, United States.

11:45 AM EE2.8.06
Direct Probes of Photo-Induced Transient Electric Fields at P-GaInP₂ Electrode Surface Ye Yang; NREL, United States.

SESSION EE2.9: Light Management
Session Chair: Nicolas Gaillard
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 122 C

1:30 PM *EE2.9.01
Surface Plasmon-Enhanced Sunlight Harvesting Nismojane Wu; West Virginia Univ, United States.

2:00 PM *EE2.9.02
Enhancing Solar Photon Harvesting via Using Plasmonic and Upconverting Nanostructures Dongling Ma; Institut National de la Recherche Scientifique (INRS), University of Quebec, Canada.

2:30 PM EE2.9.03
Flip-Over Process to Improve Resonant Light Trapping in Thin-Film Hematite Photoanodes for Solar Hydrogen Production Barbara Scherrer; Technion, Israel.

2:45 PM EE2.9.04
Squeezing Light into Plasmonic Nanostructures and Two-Dimensional Materials for Photocatalysis Isabell Thomann; Rice University, United States.

3:00 PM BREAK

SESSION EE2.10: Surface and Interface Engineering
Session Chairs: Artur Braun and Alex DeAngelis
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 122 C

3:30 PM *EE2.10.01
Dye-Sensitized NiO Photocathodes for Solar Fuel Devices Elizabeth A. Gibson; Newcastle University, United Kingdom.

4:00 PM EE2.10.02
Characterizing Structural Overpotentials for Bubble Evolution on Structured Semiconductor-Electrocatalyst Interfaces Robert H. Coridan; University of Arkansas, United States.

4:15 PM EE2.10.03
Band Edge Engineering for Photoelectrochemical Water Splitting: Integration of Subsurface Dipoles with Atomic-Scale Control Yasuyuki Hikita; SLAC National Accelerator Laboratory, United States.

4:30 PM EE2.10.04
Photovoltage and Fill Factor Design for ALD Metal Oxide Protected Silicon Anodes for Tandem Water Splitting Cells Andrew Schergermann; Stanford Univ, United States.

4:45 PM EE2.10.05
Overcoming a Fundamental Tradeoff in TiO₂-Protection of Photoanodes: RuO₂-Doping for Simultaneous Optimization of Conductivity and Photovoltage Olivia Hendricks; Stanford University, United States.
SESSION EE2.12: Metal Oxides and Nitrides II
Session Chairs: Fatwa Abdi and Marcus Baer
PCC North, 200 Level, Room 222 C
Friday Morning, April 1, 2016

9:30 AM EE2.12.04
Hyperbranched Quasi-1D WO3 Nanostructures for Efficient Photoanodic Activity at Low Bias Potentials and Fast Switchable Electrochromic Devices Alessandro Mezzetti

11:45 AM BREAK

SESSION EE2.13: Advanced Characterization
Session Chairs: Artur Braun and Alex DeAngelis
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 222 C

SESSION EE2.14: Catalysis II
Session Chairs: Hongfei Jia and Heli Wang
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 222 C

11:30 AM EE2.13.05
Measuring Built-In Potentials at Particle Tandem Junctions Frank E. Osterloh; Univ of California-Davis, United States.

1:00 PM EE2.14.01
High Electrocatalytic Activities of Chalcogenides as Cathode Catalysts for Fuel Cells Xuan Cheng; 1 XianUniv, China; 2 Fujian Key Laboratory of Advanced Materials, China.

1:30 PM EE2.14.02
The Reduced Anodic Au Thin-Film for Enhanced Electrochemical CO2 Reduction Jun Tao Song; Korea Advanced Institute for Science and Technology (KAIST), Korea (the Republic of).

2:15 PM EE2.14.03
Graphene Oxide–Conjugated Polymer Nanoparticle Composite as Catalyst for Artificial Photosynthesis Hsiang-Ting Lien; National Taiwan University, Taiwan.

2:30 PM EE2.14.04
Bio-Inspired Systems for Efficient Solar Energy Conversion and Fuels Generation Han Zhou; State Key Lab of Metal Matrix Composites, Shanghai Jiaotong University, China.

3:00 PM BREAK

3:15 PM EE2.14.06
Defects Engineering on the Photocatalyst for Water Splitting Zaicheng Sun; Beijing University of Technology, China.
3:30 PM EE2.14.07
Black TiO$_2$ Nanotubes: Co-Catalyst Free Photocatalytic H$_2$ Patrik Schmuki; Univ of Erlangen-Nuremberg, Germany.

SESSION EE2.15: Solar Thermal
Session Chairs: Artur Braun and Hongfei Jia
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 222 C

3:45 PM EE2.15.01
Interplay of Thermodynamic and Kinetic Factors in Solar Thermochemical Fuel Generation Sossina M. Haile; Northwestern University, United States.

4:15 PM EE2.15.02
Using DFT to Find Redox Active Perovskites for Solar Thermochemical Water Splitting Anthony H. McDaniel; Sandia National Labs, United States.

4:30 PM EE2.15.03
Novel Oxide Composites for Lower Temperature Thermochemical Water Splitting Hyungyu Jin; Stanford University, United States.

4:45 PM EE2.15.04
Optimizing the Optical Properties of Nanotemplate-Photoisomer Hybrid Structures for High Performance Solar Thermal Fuels: A Computational Study Jee Soo Yoo; MIT, United States.
SYMPOSIUM EE3

Materials and Devices for Full Spectrum Solar Energy Harvesting
March 29 - March 31, 2016

Chairs
Matthew Escarra, Tulane University
Anita Ho-Baillie, The University of New South Wales
Matthew Lumb, U.S. Naval Research Laboratory and The George Washington University
Xing Sheng, Tsinghua University

Symposium Support
ARPA-E

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION EE3.1: Full Spectrum Solar Modules
Session Chairs: Matthew Escarra and Xing Sheng
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 123

1:30 PM *EE3.1.01
Design for High Efficiency Full Spectrum Photovoltaics Harry A. Atwater; California Inst of Technology, United States.

2:00 PM EE3.1.02
Broadband Diffractive Element for Full Spectrum Splitting in Lateral Direction Osman S. Ciftci; University of Illinois at Urbana-Champaign, United States.

2:15 PM EE3.1.03

2:30 PM EE3.1.04

2:45 PM EE3.1.05
Molecular Engineering of Panchromatic Dye-Sensitized Solar Cells: Filling in the Solar Spectrum via Co-Sensitization Jacqueline Cole1, 2, 3; Univ of Cambridge, United Kingdom; 2Argonne National Laboratory, United States; 3Rutherford Appleton Laboratory, United Kingdom.

3:00 PM BREAK

3:30 PM *EE3.1.06
Materials and Device Architectures for Champion Performance in High Concentration, Full-Spectrum Photovoltaics John A. Rogers; Univ of Illinois, United States.

4:00 PM EE3.1.07
A Prototype Full Spectrum Ultrahigh Efficiency Multijunction Solar Cell Cristofer A. Flowers; California Inst of Technology, United States.

4:15 PM EE3.1.08
A Solar-Thermal Aerogel Receiver (STAR) for Cost-Effective Electricity Generation Lee Weinstein; MIT, United States.

4:30 PM EE3.1.09
Exploiting Heterogeneity to Absorb Wider Spectrum of Sunlight Zuber Hossain; University of Delaware, United States.

4:45 PM EE3.1.10
PVMirror: A New Technology for Tandem Solar Cells and Hybrid Solar Converters Zachary Holman; Arizona State University, United States.

SESSION EE3.2: Poster Session I: Novel Absorbers—Organics
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE3.2.01
Computational Design of Near-IR Absorbing Organic Materials for Light Harvesting Application Michael Foster; Sandia National Labs, United States.

EE3.2.02
Periodic Microstructures for Light-in-Coupling in Inverted Polymer Solar Cells Raju R. Lampande; Department of Information Display, Kyung Hee University, Korea (the Republic of).

EE3.2.03
Down-Shifting Phosphor Layer Enhancement in Optically Active and Inactive Thin-Film Solar Module Regions Loucas Tsakalakos; GE Global Research, United States.

EE3.2.04
Novel Co-Solvent System for Efficient Organic Photovoltaics Printed in Ambient Condition Seonjeong Lee1, 2; Gwangju Institute of Science and Technology, Korea (the Republic of); 3Research Institute for Solar and Sustainable Energies, Korea (the Republic of).

EE3.2.05
Complementary Absorption Engineering Using Oxo Phosphorus Tetrabenzotriazacorrole and Boron Subphthalocyanine; A Potential Path to Black Bilayer Organic Photovoltaics Hasan Raboui; University of Toronto, Canada.

EE3.2.06
A Novel Series Connection Design for Large-Area Printed Polymer Solar Cell Modules with Power Conversion Efficiency Exceeding 7% Soonil Hong; Gwangju Institute and Science and Engineering, Korea (the Republic of).

EE3.2.07

EE3.2.08
High Efficiency Hybrid Solar System David Cygan; Gas Technology Institute, United States.

EE3.2.09
Transparent Aerogels for Efficient Solar-Thermal Energy Conversion Sungwoo Yang; Massachusetts Institute of Technology, United States.

EE3.2.10
Spectrally Selective and Thermally Enduring Co3O4 Nanoflower Lizzie Caldwell; University of California, San Diego, United States.

EE3.2.11
Core/Shell Quantum Dot Embedded Spectral Converting Layers for the Efficiency Enhancement of Thin-Film Solar Cells Kyu-Sang Lee1, 2; 1Electronics and Telecommunications Research Institute (ETRI), Korea (the Republic of); 2University of Science and Technology (UST), Korea (the Republic of).

EE3.2.12
Controlled Fabrication of Nanotube Arrays and Nanohole Arrays through Electrodeposition for High Efficiency Solar Energy Conversion Wipula P. Livamale; Missouri University of Science and Technology, United States.

EE3.2.13
Refractory Plasmonics for Efficient Thin-Film Solar Cells Ayman E. Selmy; The American University in Cairo, Egypt.
SESSION EE3.3: Novel Multijunction Solar Cells I
Session Chairs: Matthew Escarra and Xing Sheng
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 123

8:30 AM *EE3.3.01
Metamorphic and Bonded Four-Junction III-V Solar Cells Myles Steiner; National Renewable Energy Laboratory, United States.

9:00 AM EE3.3.02
A New Self-Assembly Printing Method to Simplify Tandem Organic Photovoltaics with Four-Layer Structure Seok Kim; Gwangju Institute of Science and Tech, Korea (the Republic of).

9:15 AM EE3.3.03
Development of GaAsSb(N)/GaAs Heterostructures for 1 eV Solar Cell Applications Aymeric Maros; Arizona State University, United States.

9:30 AM EE3.3.04
Modeling Multijunction Solar Cells by wxAMPS 3.0 Yiming Liu; University of Southern Denmark, Denmark.

9:45 AM EE3.3.05
Dual-Junction Solar Cells for High Efficiency at Elevated Temperature Minjoo L. Lee; Yale Univ, United States.

10:00 AM BREAK

10:30 AM *EE3.3.06
New Materials and Devices for One-Sun Multijunction Photovoltaics Richard R. King; Arizona State University, United States.

11:00 AM EE3.3.07
Virtual Ge Substrates with Low Threading Dislocation Density Produced by CW Laser Induced Recrystallization Ziheng Liu; University of New South Wales, Australia.

11:15 AM EE3.3.08
GaSb-Based Solar Cells for Full Spectrum Energy Harvesting Matthew P. Lumb 1, 2; 1NRL, United Kingdom; 2The George Washington University, United States.

11:30 AM *EE3.3.09
Room-Temperature Wafer Bonded Multi-Junction Solar Cell Grown by Solid State Molecular Beam Epitaxy Shulong Lu; SINANO, Chinese Academy of Sciences, China.

SESSION EE3.4: Novel Multijunction Solar Cells II
Session Chairs: Matthew Escarra and Xing Sheng
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 123

1:30 PM *EE3.4.01
Silicon-Based Tandem Solar Cells Martin A. Green; Univ of New South Wales, Australia.

2:00 PM EE3.4.02

2:15 PM EE3.4.03
Silicon Hetero-Junction Solar Cells with Excellent Infrared Response for Tandem Applications Zheneshan J. Yu; Arizona State University, United States.

2:30 PM *EE3.4.04
Recent Advances in Earth-Abundant and Tandem Photovoltaics Tonio Buonassisi; MIT, United States.

3:00 PM BREAK

3:30 PM *EE3.4.05
Increased Spectrum Utilisation with GaAsP/SiGe Solar Cells Grown on Silicon Substrates Allen Barnett; UNSW Australia, Australia.

4:00 PM EE3.4.06
The Developments of Gallium Phosphide Thin-Film and Fabrications for Interdigitated Back-Contact Heterojunction Silicon Photovoltaic Devices Jongwon Lee; Arizona State University, United States.

4:15 PM EE3.4.07
Two-Terminal Hybrid Tandem Solar Cells Comprising Dye-Sensitized and Si Solar Cells Minji Im; UNIST, Korea (the Republic of).

4:30 PM EE3.4.08
Optimization of Radial Junction p-i-n GaAs NWs for Top-Cell Integration on Silicon Natasa Vulic 1, 2; 1Ecole Polytechnique Fédérale de Lausanne, Switzerland; 2Arizona State University, United States.

4:45 PM EE3.4.09
Organometallic Halide Perovskite / Barium Di-Silicide Thin-Film Double-Junction Solar Cells Olindo Isaellis; Delft Univ of Technology, Netherlands.

EE3.5.01
Tight-Binding Implementation of the Valence Band Anticrossing Model for High Efficiency Solar Cell Materials Yongjie Zou; Arizona State University, United States.

EE3.5.02
2.55eV InGaN Quantum Well Solar Cell Operating at 450°C and Varied Concentration Heather D. McFavilen; Soitec Phoenix Labs Inc., United States.

EE3.5.03
Bandgap Engineering of Hydrogenated Amorphous Silicon Carbide Jorge A. Guerra 1, 2; 1Pontificia Universidad Catolica del Peru, Peru; 2University of Erlangen Nuremberg, Germany.

EE3.5.04
Optical Properties of Graded Composition CdSxSe1-x Thin-Films Electrochemically Deposited Ricardo E. Marotti; Univ de la Republica, Uruguay.

EE3.5.05
Surface Morphology of the Sputtered Cu-Rich Cu-Ag-In-Se Thin Films Hasan H. Gullu 1, 2; 1Middle East Technical University, Turkey; 2Center for Solar Energy Research and Applications (GÜNAM), Turkey.

EE3.5.06
Characterization of Solar Absorptance Properties of AlTiN Multi Layer Coatings Produced by Reactive Magnetron Sputtering Technique Sendur S. Ozbay; Istanbul Technical University, Turkey.

EE3.5.07
An Investigation of Transition Metal Oxides Window Layer for Thin-Film Amorphous Silicon Solar Cells Liang Fang; Tianjin Itian Solar Tech Co. Ltd., China.

EE3.5.08
Strain Relaxation and Defect Evolution in Low-Indium-Content InxGa1-xN Films (x=0.07, 0.12 and 0.15) Hengen Xie 1, 2; 1Arizona State University, United States; 2Arizona State University, United States.

EE3.5.09
Minimization of Recombination and Transport Losses at the GaP/GaSb Heterointerface in GaAsP/Si Tandem Solar Cell Mehdi Leilaeioun; Arizona State University, United States.

EE3.5.10
Polymer Embedded Silicon Microwires for Colorless, Transparent, Flexible Solar Cells Sungbum Kang; UNIST, Korea (the Republic of).
EE3.5.11 Bendable CdTe/CdS Thin-Film Solar Cells on Ultra-Thin Flexible Glass Substrates Fun Woo Cho; Korea university, Korea (the Republic of).

EE3.5.12 Self-Deposition of Pt Nanoparticles on Graphene Woven Fabrics for Improving the Efficiency of GWF/n-Si Solar Cells Xinyu Tan 1, 2; 1 China Three Gorges University, China; 2China Three Gorges University, China.

EE3.5.13 Amorphous Silicon Photovoltaic Modules on Flexible Plastic Substrates Yuri Vraganenko; CTS-UNINOVA, Portugal.

EE3.5.14 Structural and Device Investigations of GaSb Based Solar Cell for Full Spectrum Solar Energy Harvesting Ehsan Vadege; Arizona State University, United States.

EE3.5.15 Electrical Defect Characterization of 0.5 eV InGaAsSb Solar Cells Kenneth Schmieder; US Naval Research Laboratory, United States.

EE3.5.16 Molecular Architecturing for Tailoring Optical, Electrochemical and Photovoltaic Properties Vinila Nellisserry Viswanathan; Indian Inst of Science, India.

EE3.5.17 Fabrication of ZnTiO3 Nanopowder by Sol-Electrospinning for Exclusive Visible Light Photocatalysis Shama Perween; RGIPT Raebareli, India.

SESSION EE3.6: Solar Concentrator Systems
Session Chairs: Anita Ho-Baillie and Matthew Lumb
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 123

8:00 AM *EE3.6.01 Hybrids of Photovoltaic Cells and High-T Thermal Collection That Maximize Exergy Collection to Solve the Impending Renewable Energy Storage Problem Howard Branz; Branz Technology Partners, United States.

8:30 AM *EE3.6.02 Concentrating Solar Power Research and Development under the SunShot Initiative Levi Irwin; US DOE, United States.

SESSION EE3.7: Solar Thermal Systems
Session Chairs: Anita Ho-Baillie and Matthew Lumb
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 123

9:00 AM EE3.7.01 A Low LCOE Spectrum Splitting Multijunction Solar Module John Lloyd; California Institute of Technology, United States.

9:15 AM EE3.7.04 Numerical Simulation of InGaN-Based High Temperature Concentrator Solar Cells Yi Fang; Arizona State University, United States.

9:30 AM *EE3.7.05 Luminescent and Microtracking Concentration for Rooftop CPV Noel C. Giebink; The Pennsylvania State University, United States.

10:00 AM BREAK

10:30 AM *EE3.7.01 The Arpa-e Focus Research Program for Hybrid Photovoltaic-Thermal Solar Electricity: Rationales and Architectures Eric A. Schiff; Advanced Research Projects Agency - Energy, United States.

11:00 AM EE3.7.02 Spectrum Splitting Concentrated Photovoltaic Module Design for a Hybrid Photovoltaic-Photothermal System Qi Xu; Tulane Univ, United States.

11:15 AM EE3.7.03 Semiconductor-Dielectric Selective Absorbers for Solar Thermal Energy Conversion Nate Thomas; California Inst of Tech, United States.

11:30 AM EE3.7.04 Full Spectrum Collection of Concentrated Solar Energy Using PV Coupled with Selective Filtration Utilizing Nanoparticles Todd Otanicar; University of Tulsa, United States.

11:45 AM EE3.7.05 A Hybrid CPV-CSP System to Fully Utilize the Solar Spectrum Wei Pan; Sharp Labs of America, United States.

SESSION EE3.8/NT1.8: Joint Session: Recent Developments in Optoelectronics and Photovoltaics
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 129 A

1:30 PM *EE3.8.01/NT1.8.01 Optoelectronics: Is There Anything It Cannot Do; Can Opto-Electronics Provide the Motive Power for Future Vehicles Eli Yablonovitch; University of California, Berkeley, United States.

2:00 PM *EE3.8.02/NT1.8.02 Controlling both Solar and Thermal Spectra for Solar Cell Applications Shanhui Fan; Stanford Univ, United States.

2:30 PM EE3.8.03/NT1.8.03 Highly Conductive Ag Nanowire Meta-Electrodes Improve Silicon Heterojunction Solar Cells Mark W. Knight; FOM Institute AMOLF, Netherlands.

2:45 PM EE3.8.04/NT1.8.04 Largely Tunable Plasmonic Metasurfaces for Efficient Bending of Light and Light Management in Thin-Film Solar Cells Hadi Eghbali; ETH Zurich, Switzerland.

3:00 PM BREAK

SESSION EE3.9: Novel Solar Absorbers
Session Chairs: Anita Ho-Baillie and Matthew Lumb
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 123

3:30 PM *EE3.9.01 Adduct Approach for High Efficiency Perovskite Solar Cells Nam-Gyu Park; Sungkyunkwan Univ, Korea (the Republic of).

4:00 PM EE3.9.02 The Ultimate Efficiency of Organolead Halide Perovskite Solar Cells Limited by Auger Processes Anna Ho-Baillie; University of New South Wales, Australia.

4:15 PM EE3.9.03 Semi-Transparent Perovskite Solar Cell with >80% Transparent Sputtered Front and Rear Electrodes for a Four-Terminal Tandem The Duong; Australian National University, Australia.

4:30 PM *EE3.9.04 Quantum Ratchet Intermediate Band Solar Cells Nicholas Hylton; Imperial College London, United Kingdom.

SESSION EE3.10: Poster Session III: Novel Solar Energy Harvesting Concepts
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE3.10.01 Transformation of Near-Infrared Alloyed Semiconductor Nanocrystals on Water Surface Terefe G. Habteyes; Univ of New Mexico, United States.
EE3.10.02
Band Edge Electronic Structure of Doped-ZnS as a Photocatalyst for Hydrogen Production Fran Kurnia; University of New South Wales, Australia.

EE3.10.03
Photocatalytic Performance of Cuprous Oxide-Decorated Graphene-Like Nanosheets Po-Ya Chang; Feng Chia University, Taiwan.

EE3.10.04
Photovoltaic Power of Single-Walled Carbon Nanotube Films by Interface Structures of Different Film Thickness Yoshinori Sato¹, ²; ¹Tohoku Univ, Japan; ²Shinshu University, Japan.

EE3.10.05

EE3.10.06
Graphene Quantum Dots/Metal Oxide Hybrid Photoelectrodes for Efficient Solar Energy Conversion Radwa A. Shedeed; The American Univ in Cairo, Egypt.

EE3.10.07
Ge Heteroepitaxy Growth on Cube-Textured Ni(001) Foils through CaF₂ Buffer Layer Gwo-Ching Wang; Rensselaer Polytechnic Inst, United States.
Electrode Materials and Electrolytes for Lithium and Sodium Ion Batteries
March 28 - April 1, 2016

Chairs
Ayyakkannu Manivannan, USDOE/NETL
Mariappan Parans Paranatham, Oak Ridge National Laboratory
Yang-Kook Sun, Hanyang University
Donghai Wang, The Pennsylvania State University

Symposium Support
Aldrich Materials Science

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Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

TUTORIAL
Electrode Materials and Electrolytes for Next-Generation Rechargeable Batteries
Monday Morning, March 28, 2016
8:30 AM - 12:00 PM
PCC North, 100 Level, Room 124 A

8:30 AM
Part I: Arumugam Manthiram
Electrode Materials for Next Generation Rechargeable Batteries
After providing an overview of the intricacies and limitations of the currently used insertion-compound electrode materials for lithium-ion batteries, this segment will focus on the materials challenges and prospects of next-generation rechargeable battery chemistries. Specifically, it will concentrate on lithium-ion and sodium-ion batteries with safer alloy anodes as well as lithium-sulfur, sodium-sulfur and hybrid lithium-air batteries with solid electrolyte and novel cell configurations.

10:00 AM Break

10:30 AM
Part II: Austen Angell
Problems and Progress in Liquid and Solid Electrolytes for Alkali Metal-Based Electrochemical Devices
This segment will provide an overview of liquid and solid electrolytes for lithium and sodium ion-based electrochemical devices.

Instructors
Arumugam Manthiram, The University of Texas at Austin
Austen Angell, Arizona State University

SESSION EE4.1: Lithium Ion Batteries
Session Chair: Mariappan Parans Paranatham
Monday Afternoon, March 28, 2016
PCC North, 100 Level, Room 124 A

1:30 PM *EE4.1.01
Advances in Na, Li-S and Zn Battery Systems Jun Liu: Pacific Northwest Nat’l Lab, United States.

2:00 PM EE4.1.02

2:15 PM EE4.1.03
Graphene-Based Nanomaterials for Highly Efficient Energy Storage Hung-In Yeo; Los Alamos National laboratory, United States.

2:30 PM EE4.1.04
Solid Impregnation Enabled Hierarchical Porous SnO2-C Composite with Ultrahigh Lithium-Ion Storage Capability Li Shen; University of California, Los Angeles, United States.

2:45 PM EE4.1.05
Green Fabrication of Cellulose/Graphene Composite in Ionic Liquid and Its Electrochemical and Photothermal Properties Honful Zhai; Northeastern University, United States.

3:00 PM BREAK

3:30 PM *EE4.1.06
Nanowire Based Materials for High Energy Density Li-Ion Batteries Mahendra K. Sunkara; Univ of Louisville, United States.

4:00 PM EE4.1.07
Nanocatalysts for Improved Capacity Retention in Lithium-Air Batteries Neha Chawla; Florida International Univ, United States.

4:15 PM EE4.1.08
Self-Healing Polymer Chemistry for High Capacity Lithium-Ion Batteries Chao Wang; University of California Riverside, United States.

4:45 PM EE4.1.10
Polyelectrolyte-Modified Solids for High-Performance Lithium-Ion Batteries Raphael Zahn; ETH Zurich, Switzerland.

SESSION EE4.2: Cathodes and Alternate Electrodes
Session Chair: Donghai Wang
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 124 A

1:30 PM *EE4.2.01
Advanced Surface Characterization and Surface-Controlled Compositional Design of Nickel-Rich Layered Oxide Cathodes for Lithium-Ion Batteries Arumugam Manthiram; Univ of Texas-Austin, United States.

2:00 PM EE4.2.02
Polymerorphism in KFeSO4F: Structural, Electrochemical and Magnetic Properties Laura Lander1, 2; 1College de France, France; 2RS2E, France.

2:15 PM EE4.2.03
High-Voltage High-Capacity Lithium-Nickel-Manganese Oxide Li1-xNi0.5Mn1.5O4.0 (0 < x < 1) with Spherical Particle Morphology Designed for Direct Application vs. Graphite in Lithium-Ion Batteries Peter Axmann; Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg (ZSW), Germany.

2:30 PM EE4.2.04
New Insight of Voltage Fade of Lithium-Manganese-Rich Transitional Metal Oxides Zonghai Chen; Argonne National Laboratory, United States.

2:45 PM EE4.2.05
Reaction Mechanism and Dynamics of Selenium as Cathode for High Energy Density Lithium-Ion Battery Qiansian Li; Northwestern University, United States.

3:00 PM BREAK

3:30 PM *EE4.2.06
Engineered Fluids as Nonflammable Battery Electrolytes Ganesan Nagasubramanian; Sandia National Laboratories, United States.
SESSION EE4.3: Poster Session I
Session Chair: Ganesan Nagasubramanian
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE4.3.01
Manganese Sulfide as Anode Material For Lithium-Ion Batteries Yong Hao; Florida International University, United States.

EE4.3.02
Enhanced High Rate Capacity Nickel Oxide via Nano-Confinement Chunhui Chen; Florida International University, United States.

EE4.3.03
Reduction of PVdF-HFP Penetration into PE Separator Using Low Molecular Weight Ionic Fillers for Lithium-Ion Batteries Roya Naderi; South Dakota State University, United States.

EE4.3.04
Direct Growth of MnO Nanoplates on Stainless Steel and Their Electrochemical Properties Corey L. Arnold; Xavier University of Louisiana, United States.

EE4.3.05
Electrochemical Behavior of Nanostructured Nickel Oxides as Pseudocapacitor and Battery Corey L. Arnold; Xavier University of Louisiana, United States.

EE4.3.06
Cyclic Voltammetry Study of Ruthenium Oxide Nanostructured Electrode Corey L. Arnold; Xavier University of Louisiana, United States.

EE4.3.07
Holey Graphene for Energy Storage: Implications of Chemical Treatment of Graphene Oxide to Introduce Defects Swagatom Sarker; New Mexico State University, United States.

EE4.3.08
Spontaneous Evolution of Nanostructures in Dealloying of Li-Sn Anode Reservoir Ke Geng; Arizona State University, United States.

EE4.3.09
Structures and Performances of Vanadium Substituted Lithium Iron Silicates Ying Zhang; Xi'an Univ, China; Fujian Key Laboratory of Advanced Materials, China.

EE4.3.10
Multifunctional Binder Containing PEDOT:PSS for Lithium-Ion Batteries Kiung Jeon; KAIST, Korea (the Republic of).

EE4.3.11
Functionalized Carbonaceous Materials as Cathode for Lithium-Ion Batteries Hai Zhong; Tianjin institute of power source, China.

EE4.3.12
Facile and Green Synthesis of Hierarchically Porous Carbon Supported Well Defined Oxide Nanoparticles for Energy Storage Xiaoping Jiang; Changzhou University, China.

EE4.3.13
Production and Characterization of Layered Cathode Materials for Lithium-Ion Batteries Berke Piskin; Middle East Technical University, Turkey.

EE4.3.14
Novel Synthesis of Holey Reduced Graphene (HRGO) Using Ag Nanoparticles by Microwave Irradiation Method for Anode in Lithium-Ion Batteries Edreese H. Alsharha; Alfaisal University, Saudi Arabia.

EE4.3.15
Novel Synthesis of Defect Li2Ti3O7 Anode with Enhanced High-Rate Capability via Ethanol Thermal Reduction Ralph Nicolai V. Nasara; National Cheng Kung University, Taiwan.

EE4.3.16
Bestow Metal Foams with Nanstructured Surface via a Convenient Electrochemical Method for Improved Device Performance Yawen Zhan; City University of Hong Kong, Hong Kong.

EE4.3.17
Initiated Chemical Vapor Deposition (iCVD) of Highly Cross-Linked and Electrolyte-Wettable Polymer Films for Advanced Lithium-Ion Battery Separators Youngmin Yoo; Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of).

EE4.3.18
MnO Nanoparticles with Low Degree of Crystallinity and Cation Vacancies as Anode for Li-Ion Capacitor Chaofeng Liu; Beijing Institute of Nanoenergy and Nanosystems, Chinese Academy of Sciences, China.

EE4.3.19
A Single-Step Hydrothermal Synthesis of Vanadium Pentaoxides–Reduced Graphene Oxide Composite Electrodes for Enhanced Electrochemical Energy Storage Sunju Gupta; Western Kentucky University, United States.

EE4.3.20
Synthesis, Characterization and Electrochemical Properties of LiMPO4 (M = Fe, Mn, Co, Ni) Nanosheets for Enhanced Li Diffusion in Lithium-Ion Batteries Gregory Neher; University of Georgia, United States.

EE4.3.21
Core-Shelled SnO2/Polypyrrole Hollow Spheres Anodes with Enhanced Cyclic Performance for Lithium-Ion Batteries Jujun Yuan; Florida International University, United States.

EE4.3.22
Reduced Graphene oxide-SnO2 Composite as an Effective Shield Against Electromagnetic Pollution and Anode Material for Li-Ion Battery Monika Mishra; Delhi University, India.

EE4.3.23
Ultra-High Cycle Stability of α-MnO2 Nanowires in a PMMA Gel Electrolyte Mya Li; University of California, Irvine, United States.

EE4.3.24
Metal Oxide Nanowire-Microwave Exfoliated Graphene Oxide Hybrid for Lithium-Ion Battery Mohammad I. Shurvo; University of Texas at El Paso, United States.

EE4.3.25
Synthesis, Characterization and Electrochemical Analysis of Composite Cathode Material 0.5Li2MnO3-0.25LiMn2O4-0.25LiNi0.5Mn0.5O2 for LiB Applications Monica Lopez de Victoria; University of Puerto Rico, United States.

EE4.3.26
Unravelling Structural Deformation and Electronic Properties of Intercalated Rechargeable Cathode from X-Ray Spectroscopy Yufeng Liang; Lawrence Berkeley National Laboratory, United States.
EE4.3.27  
Fabricating Si/Sn Nanoparticle Composite as High-Performance Lithium-Ion Battery Anodes  
Lanlan Zhong; Univ of California-Riverside, United States.

EE4.3.28  
Nanoparticles Jet Deposition of Silicon-Carbon Composite Anode for Energy Storage Applications  
Gioanpio Nava; 1, 2 Center for Nano Science and Technology, Italy; 3 Politecnico di Milano, Italy.

EE4.3.29  
Graphene Nanosheets Supported FeP2 Hybrid as Lithium-Ion Anodes with Exciting High-Rate Performance  
Zhaoxin Yu; The Pennsylvania State University, United States.

EE4.3.30  
Nanoporous ZnCo2O4 Anode with High Capacity for Li-Ion Batteries  
Ren Lu; Chung Yuan Christian University, Taiwan.

EE4.3.31  
Synthesis and Characterization of Sulfur/Carbon/V2O5 Nanocomposite Cathode for Lithium-Ion Batteries  
Long Kong; Tokyo Inst of Tech, Japan.

EE4.3.32  
Preparation of Nanoporous Magnesium by Physical Vapor Deposition  
Han Wang; University of Science & Technology Beijing, China.

SESSION EE4.4: Novel Electrolytes and Architectures  
Session Chair: Arumugam Manthiram  
Wednesday Morning, March 30, 2016  
PCC North, 100 Level, Room 124 A

8:30 AM *EE4.4.01  
A New Class of Single Ion Conducting Electrolyte (t+ = 1); Pure Alkali Cation Plastic Crystals  
Austen Angell; Arizona State Univ, United States.

9:00 AM EE4.4.02  
Hierarchical MoS2-Carbon Microspheres: A Robust Anode for High Performance Lithium Ion Battery  
Ning Chen; New Mexico State University, United States.

9:15 AM EE4.4.03  
Formatting of Silicon Negative Electrode for Improved Cycling Performances  
Florent Lepoivre; Universite de Picardie - Jules Verne, France.

9:30 AM EE4.4.04  
Bio-Templated CuFe2O4 as an Anode for Rechargeable Sodium-Ion Batteries  
Marwan Moradi; MIT, United States.

9:45 AM EE4.4.05  
Understanding of the Electrochemical Mechanism of SnSb, a Promising Anode for LiB, by Operando Techniques  
Philippe Antitomaso; UMR 5253 CNRS, France.

10:00 AM BREAK

10:30 AM *EE4.4.06  
Epitaxial V0.2(B) Thin-Films as Capacity-Fading-Free Electrodes  
Ho Nyung Lee; Oak Ridge National Laboratory, United States.

11:00 AM EE4.4.07  
In Situ Mapping of State-of-Charge Dynamics in Lithium-Ion Batteries  
Yongjie Hu; University of California, Los Angeles, United States.

11:15 AM EE4.4.08  
Synthesis and Characterization of Empty Silicon Clathrates for Anode Applications in Li-Ion Batteries  
Kwai S. Chan; Southwest Research Inst, United States.

11:30 AM EE4.4.09  
Cycling and Aging Studies of Li-Based Cathode Materials via Aberration-Corrected STEM  
Patrick Phillips; Univ of Illinois-Chicago, United States.

11:45 AM EE4.4.10  
Development of Conjugated Organic Lithium Carboxylate with Improved Rate Capability for Li-Ion Battery  
Matthieu Becuwe; 1 Laboratoire de Réactivité et Chimie des Solides, France; 2 Institut de Chimie de Picardie, France; 3 Réseau sur le Stockage Electromichique de l’Energie, France.

SESSION EE4.5: Solid Electrolytes and Novel Electrodes  
Session Chair: Gao Liu  
Wednesday Afternoon, March 30, 2016  
PCC North, 100 Level, Room 124 A

1:30 PM *EE4.5.01  
Self-Assembly Synthesis of Electrode Architectures for Energy Storage  
Sheng Dai; 1 Oak Ridge National Laboratory, United States; 2 University of Tennessee, United States.

2:00 PM EE4.5.02  
Synthesis and Characterization of a New Fast Lithium-Ion Conductor  
Li7La2Zr2O12-x; Maria E. Maier; Paris Lodron University of Salzburg, Austria.

2:15 PM EE4.5.03  
Enhancing Ionic Transport through the Mesoscopic Scale: A Case Study of the Perovskite Solid Electrolyte for Li Batteries  
Miaofang Chi; Oak Ridge National Laboratory, United States.

2:30 PM EE4.5.04  
Structural and Ionic Transport Properties of LISICON and NASICON Solid Electrolyte Materials  
Yue Deng; Université de Picardie Jules Verne, France.

2:45 PM EE4.5.05  
Anti-Perovskite Li1OCl Superionic Conductor Films for Li-Ion Batteries  
Naijie Lu; Los Alamos National Laboratory, United States.

3:00 PM BREAK

3:30 PM *EE4.5.06  
Development of High Area Loading and Stable Sulfur Electrode through Interface Functionality Design for Lithium Sulfur Battery  
Gao Liu; Lawrence Berkeley National Laboratory, United States.

4:00 PM EE4.5.07  
A Low-Cost Carbon Composite Anode Material from Recycled Waste Tires for Lithium-Ion Batteries  
Joseph Gnanaraj; RJ Lee Group, United States.

4:15 PM EE4.5.08  
Solid-Like Biomimetic Ion-Channel Electrolytes for Lithium Metal Batteries  
Addis Fuhr; 1 University of California, Los Angeles, United States; 2 Los Alamos National Laboratory, United States.

4:30 PM EE4.5.09  
Temperature Dependence of Electrolyte Oxidation at Charged NCM Cathode Surface  
Adam Tornheim; Argonne National Laboratory, United States.

4:45 PM EE4.5.10  
Hybridization of Transition Metal Carbides (MXene) and Oxides for High Performance Li-Ion Storage  
Mengqiang Zhao; Drexel Univ, United States.

SESSION EE4.6: Poster Session II  
Session Chair: Joseph Gnanaraj  
Wednesday Afternoon, March 30, 2016  
8:00 PM  
Sheraton, Third Level, Phoenix Ballroom

EE4.6.01  
N-Doping Effect of di-Vacancy Graphene on Oxygen Reduction Reaction (ORR) of Lithium-Air Battery  
Young Hoon Yoon; Pusan National University, Korea (the Republic of).
EE4.6.02 Conductive Interwoven Bamboo Carbon Fibers Membrane for Li-S Batteries Xingxing Gu1, 2; 1Griffith Univ, Australia; 2Peking University, China.

EE4.6.03 Enhanced Efficiency of Sulfur Cathode via Cryogenic Grinding of Glassy-Like Sulfur for Application in Li-S Batteries Milos Krbal; University of Pardubice, Czech Republic.

EE4.6.04 Synthesis and Characterization of Substituted Garnet and Perovskite Based Lithium-Ion Conducting Solid Electrolytes Mariappan Parans Panthamani; Oak Ridge National Laboratory, United States.

EE4.6.05 Synergistic Sodiation of Transition Metal Oxide and Carbon Nanotubes (CNTs) Nanostructured Composite Electrodes for Sodium-Ion Battery Qianqian Li; Northwestern University, United States.

EE4.6.06 A Study of Tin Dioxide-Graphene Oxide Composite for Supercapacitor Applications Valerio Dorvilien1, 2; 1University of Puerto Rico - Rio Piedras, United States; 2Institute for Functional Nanomaterials, United States.

EE4.6.07 Effect of CeO2 Nanoparticles Modification on Porous Carbon for High-Capacity Super-Capacitor Application Mohammad I. Shuvo; University of Texas at El Paso, United States.

EE4.6.08 Neutron Scattering Studies of Lithium-Ion Diffusion in Ternary Phosphate Glasses Gavin L. Hester; Missouri State University, United States.

EE4.6.09 Morphological Evolution of Multilayer Ni/NO Thin-Film Anodes during Lithiation Guennadi Evmenenko; Northwestern University, United States.

EE4.6.10 Fabrication of a Novel Nanostructured SnO2/LiCoO2 Lithium-Ion Cell Mark Poyner; University of Tulsa, United States.

EE4.6.11 Pyrolyzed Cellulose Paper Based Sulfur Cathode for High-Performance and Cost-Effective Lithium-Sulfur Batteries Shiqi Li1, 2; 1Texas Tech University, United States; 2Chongqing Public Security Bureau, China.

EE4.6.12 Synthesis and Li-Ion Transport Properties of Garnet-Type Li-Ion Conductor Li7-3xGaxLa3Zr2O12 Reinhard Wagner; University of Salzburg, Austria.

EE4.6.13 Crystal Structure of Garnet-Related Li-Ion Conductor Li7-3xGa3La3Zr2O12; Fast Li-Ion Conduction Caused by a Different Cubic Modification Reinhard Wagner; University of Salzburg, Austria.

EE4.6.14 Low-Cost Composite Anodes for Sodium-Ion Batteries Yunchao Li1, 2; 1Oak Ridge National Laboratory, United States; 2The University of Tennessee, United States.

EE4.6.15 Effect of Carbon Coating on NaMn0.33Ni0.33Co0.33O2 by Functionalized MWCNTs for Sodium-Ion Batteries Vijay Shankar Rangasamy; KU Leuven, Belgium.

EE4.6.16 Highly Effective Water-Soluble Binder for Li-S Battery Inspired by Paper Wet-Strengthening Chemistry Jaeboom Jeong; Korea Advanced Institute of Science and Technology, Korea (the Republic of).

EE4.6.17 A Microcontact Impedance Study on NASICON-Type Li1-xAlxTi3(PO4)3 (0 ≤ x ≤ 0.5) Single Crystals Daniel Rettenwander; University of Salzburg, Austria.

EE4.6.18 In Situ Transmission Electron Microscopy Observation of Conversion Reaction in SnO2 Nanoparticle Using Graphene Liquid Cell Joon Ha Chang1, 2; 1Center for Nanomaterials and Chemical Reactions, Institute for Basic Science (IBS), Korea (the Republic of); 2Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of).

EE4.6.19 Design and Synthesis of New Quinone-Based Organic Materials for Long-Life and High-Rate Lithium Batteries Joonghphil Lee; POSTECH, Korea (the Republic of).

EE4.6.20 Step Conformal Solid Electrolyte Deposited by ALD on Robust 3D Silicon Scaffold for on Chip Li-Ion Microbattery Manon Letieuch1, 2, 3; 1UCCS, France; 2EMN, France; 3Réseau sur le Stockage Électrochimique de l’Énergie, France.

EE4.6.21 Experimental Phase Studies in the La-X-Ni-O (X=Mg, Ca, Sr) System for Metal-Air Batteries Gizem Soydan; Istanbul Technical University, Turkey.

EE4.6.22 TiO2-Coated Mesoporous Carbon Cathode for Lithium-Sulfur Battery Xing Jin; Sungkyunkwan University, Korea (the Republic of).

EE4.6.23 CNT Sponge-Based Sulfur Cathodes with GO-Enhanced Separator for Lithium-Sulfur Batteries Keisuke Hori; Waseda University, Japan.

EE4.6.24 Preparation of Nanostructured Li1,2La1/2ZrO2 Solid Electrolyte via Templating on Nanocellulose Fibers and Size Dependency of Phase Transformation Zachary Gordon; Arizona State University, United States.

EE4.6.25 Preparation of High Lithium Ion Conductive, Multi-Doped Li1,2La1/2ZrO2 Solid Electrolyte Dong Ok Shin; Electronics and Telecommunications Research Institute (ETRI), Korea (the Republic of).

EE4.6.26 Electrochemical Performance of Polymer Electrolytes Based on PVA/PAA Blend and Pyrrolidinium Ionic Liquid for Lithium Rechargeable Batteries Savitha Thayumanasundaram; KU Leuven, Belgium.

EE4.6.27 Electrosynthesis of Nanostructured Li1,2La1/2ZrO2 Solid Electrolytes and Its Particle Size-Dependent Phase Transformation Ting Yang; Arizona State University, United States.

EE4.6.28 Inexpensively Synthesized Tin and Antimony-Based Nanocrystals as Electrode Material for Lithium-Ion and Sodium-Ion Batteries Marc Walter1, 2, 3; 1ETH Zurich, Switzerland; 2Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland.

EE4.6.29 High Capacity, Safe and Stable Anode/Electrolyte for Lithium-Ion Batteries Anjot Bose; Univ of Rhode Island, United States.

EE4.6.30 Low-Cost Composite Anodes for Sodium-Ion Batteries Yunchao Li1, 2; 1Oak Ridge National Laboratory, United States; 2The University of Tennessee, United States.

EE4.6.31 Effect of Carbon Coating on NaMn0.33Ni0.33Co0.33O2 by Functionalized MWCNTs for Sodium-Ion Batteries Vijay Shankar Rangasamy; KU Leuven, Belgium.

EE4.6.32 Highly Effective Water-Soluble Binder for Li-S Battery Inspired by Paper Wet-Strengthening Chemistry Jaeboom Jeong; Korea Advanced Institute of Science and Technology, Korea (the Republic of).

EE4.6.33 A Microcontact Impedance Study on NASICON-Type Li1-xAlxTi3(PO4)3 (0 ≤ x ≤ 0.5) Single Crystals Daniel Rettenwander; University of Salzburg, Austria.

EE4.6.34 In Situ Transmission Electron Microscopy Observation of Conversion Reaction in SnO2 Nanoparticle Using Graphene Liquid Cell Joon Ha Chang1, 2; 1Center for Nanomaterials and Chemical Reactions, Institute for Basic Science (IBS), Korea (the Republic of); 2Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of).

EE4.6.35 Design and Synthesis of New Quinone-Based Organic Materials for Long-Life and High-Rate Lithium Batteries Joonghphil Lee; POSTECH, Korea (the Republic of).

EE4.6.36 Step Conformal Solid Electrolyte Deposited by ALD on Robust 3D Silicon Scaffold for on Chip Li-Ion Microbattery Manon Letieuch1, 2, 3; 1UCCS, France; 2EMN, France; 3Réseau sur le Stockage Électrochimique de l’Énergie, France.

EE4.6.37 Experimental Phase Studies in the La-X-Ni-O (X=Mg, Ca, Sr) System for Metal-Air Batteries Gizem Soydan; Istanbul Technical University, Turkey.

EE4.6.38 Preparation of Nanostructured Li1,2La1/2ZrO2 Solid Electrolyte via Templating on Nanocellulose Fibers and Size Dependency of Phase Transformation Zachary Gordon; Arizona State University, United States.

EE4.6.39 Preparation of High Lithium Ion Conductive, Multi-Doped Li1,2La1/2ZrO2 Solid Electrolyte Dong Ok Shin; Electronics and Telecommunications Research Institute (ETRI), Korea (the Republic of).

EE4.6.40 Electrochemical Performance of Polymer Electrolytes Based on PVA/PAA Blend and Pyrrolidinium Ionic Liquid for Lithium Rechargeable Batteries Savitha Thayumanasundaram; KU Leuven, Belgium.

EE4.6.41 Electrosynthesis of Nanostructured Li1,2La1/2ZrO2 Solid Electrolytes and Its Particle Size-Dependent Phase Transformation Ting Yang; Arizona State University, United States.

EE4.6.42 Inexpensively Synthesized Tin and Antimony-Based Nanocrystals as Electrode Material for Lithium-Ion and Sodium-Ion Batteries Marc Walter1, 2, 3; 1ETH Zurich, Switzerland; 2Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland.

EE4.6.43 High Capacity, Safe and Stable Anode/Electrolyte for Lithium-Ion Batteries Anjot Bose; Univ of Rhode Island, United States.

EE4.6.44 Low-Cost Composite Anodes for Sodium-Ion Batteries Yunchao Li1, 2; 1Oak Ridge National Laboratory, United States; 2The University of Tennessee, United States.

EE4.6.45 Effect of Carbon Coating on NaMn0.33Ni0.33Co0.33O2 by Functionalized MWCNTs for Sodium-Ion Batteries Vijay Shankar Rangasamy; KU Leuven, Belgium.

EE4.6.46 Highly Effective Water-Soluble Binder for Li-S Battery Inspired by Paper Wet-Strengthening Chemistry Jaeboom Jeong; Korea Advanced Institute of Science and Technology, Korea (the Republic of).

EE4.6.47 A Microcontact Impedance Study on NASICON-Type Li1-xAlxTi3(PO4)3 (0 ≤ x ≤ 0.5) Single Crystals Daniel Rettenwander; University of Salzburg, Austria.

EE4.7.01 In Situ Characterization of Advanced Electrode Materials for Na-Ion Batteries by Using Synchrotron Based Techniques Xiao-Qing Yang; Brookhaven National Lab, United States.

EE4.7.02 Structure Property Relationships of Na-Ions in an Amorphous Carbon Structure Clement Bom nier; Oregon State University, United States.
9:15 AM EE4.7.03
High Rate Performance of Bamboo-Like LiFePO₄ Nanotubes Pravati Swain; Indian Institute of Technology Madras, India.

9:30 AM EE4.7.04
Exploring High-Performance Electrodes for Lithium-Ion and Lithium-O₂ Batteries Based on Aligned Carbon Nanotube Frameworks Yang Wu; Tsinghua University, China.

9:45 AM EE4.7.05
3D Morphological Evolution of Nanoporous Silicon Anode in Lithium Ion Battery by X-Ray Nano-Tomography Chonghun Zhao; Stony Brook University, United States.

10:00 AM BREAK

10:30 AM *EE4.7.06
Roles of Solid Electrolyte Interphases in Lithium - Sulfur and Lithium - Metal Fluoride Batteries Gleb Yushin; Georgia Inst of Tech, United States.

11:00 AM EE4.7.07
SiC-Free Graphene Growth and Inter-Layer Sliding for Silicon Anodes with High Volumetric Energy Densities In Hyuk Son; Samsung Advanced Institute of Technology, Korea (the Republic of).

11:15 AM EE4.7.08
In Situ Monitoring of Elastic Properties of Common Binders via Electrochemical Quartz Microbalance with Dissipation and Dilatometry Nicolas Jacek; 1, 2 INM- Leibniz Institute for New Materials, Germany; 2Saarland University, Germany.

11:30 AM EE4.7.09
In Situ Characterization of Stress Evolution and Volume Expansion Associated with Cycling of Prismatic Lithium-Ion Batteries Jianlin Li; Oak Ridge National Laboratory, United States.

11:45 AM EE4.7.10

SESSION EE4.8: Nanostructured Electrodes, Theory and Simulations

Session Chair: K.S. Ravi Chandran
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 124 A

1:30 PM EE4.8.01
Mineral-Inspired, Nanostructured Polymer Materials for Rechargeable Battery Electrode Jian Zhao; Arizona State University, United States.

1:45 PM EE4.8.02
High Volumetric Capacity Three-Dimensional Nanocomposite Secondary Battery Electrodes Jinwon Lee; University of Illinois at Urbana-Champaign, United States.

2:00 PM EE4.8.03
Virus Templated Nickel Nanofoams for Transition Metal Oxide Battery Electrodes Alan P. Ransil; 1, 2 Massachusetts Institute of Technology, United States; 2Koch Institute for Integrated Cancer Research, United States.

2:15 PM EE4.8.04
Investigation of Li-Ion Solvation in Carbonate Based Electrolytes Using Near Ambient Pressure Photoemission Matthew Browy; ETH Zurich, Switzerland.

2:30 PM EE4.8.05
Silicon Alloy Encapsulated with Reduced Graphene Oxide as an Anode Material for High Energy Density Lithium-Ion Batteries Sange-Hyung Kim; Hanyang University, Korea (the Republic of).

2:45 PM EE4.8.06
Conductive Polymer Binder for High-Tap-Density Nano-Silicon Material for Lithium-Ion Battery Negative Electrode Application Hui Zhao; Lawrence Berkeley National Lab, United States.

3:00 PM BREAK

3:30 PM EE4.8.07
The Effect of Chemical Doping on the Lithiation Processes of the Crystalline Si Anode: A First-Principles Study Chin-Lung Kao; National Taiwan Univ, Taiwan.

3:45 PM EE4.8.08
Lithium-Ion Solution and Intercalation at Anode-Electrolyte Interface from First Principles Mitchell Ong; Lawrence Livermore National Lab, United States.

4:00 PM EE4.8.09
Assessing the Ionic Conductivity of Li and Na-Containing Borohydrides Joel B. Varley; Lawrence Livermore National Lab, United States.

4:15 PM EE4.8.10
Interface Engineered All Solid-State Li-Ion Batteries Based on Low Temperature Synthesized Garnets Semih Afyon; ETH Zurich, Switzerland.

4:30 PM EE4.8.11
In Situ Investigation of 2D Electrode Materials by Planar Micro Battery Jiayu Wan; Univ of Maryland-College Park, United States.

EE4.9.01
A First-Principles Study on the Property of Sn-Doped LiFePO₄ LianXia Hou; School of Advanced Materials, Peking University, China.

EE4.9.02
Understanding Oxygen Reduction Reaction (ORR) Mechanism on a Pristine and N-Doped Graphene for Lithium-Air Batteries Using Density Functional Theory Ji Hye Lee; Pusan National University, Korea (the Republic of).

EE4.9.03
First Principles Study on Enhanced Sodium Diffusion Behavior of N-Doped Graphene Nanoribbon (GNR) Hong Woo Lee; Pusan National University, Korea (the Republic of).

EE4.9.04
An Equivalent Circuit Model for Nanostructured Batteries Hidenori Yamasaki; Univ of California - San Diego, United States.

EE4.9.05
Correlation of Charge Transfer and Electronic Structure in Lithium Battery Cathodes: How Can We Access and Assess It Arthur Braun; EMPA, Switzerland.

EE4.9.06
Magnetic and Electronic Properties of Doped LiMnₓNi₁₋ₓO₂: A First Principles Study Yu-Hao Tsai; The University of Texas at Austin, United States.

EE4.9.07

EE4.9.08
A Comparative First-Principles Study of Li, Na, and Mg Insertion in Alpha and Beta Sn Including the Effect of Phonons Sergei Manzhos; National Univ of Singapore, Singapore.

EE4.9.09
A Comprehensive Finite Element Model for Lithium-Oxygen Batteries Shadow Huang; North Carolina State Univ, United States.
EE4.9.10 Hierarchical Ni/MnO/Carbon Composites via Cooperative Assembly during Electrospinning for High Capacity Battery Anodes Sarang M. Bhawary; The University of Akron, United States.

EE4.9.11 Effects of Crystal Field Stabilization on Phase Transformation in Li-Rich Oxides Jin-Myoungh Lim; Seoul National University, Korea (the Republic of).

EE4.9.12 Carbon Nanotube Papers Capturing Si Nanoparticles for Binder-Free Anodes of Lithium-Ion Batteries Takayuki Kowase; Waseda University, Japan.

EE4.9.13 Porous Silicon–Carbon Anodes Materials Engineered by Simultaneous Chemical Etching for High-Performance Lithium-Ion Batteries Myungbeom Sohn; Hanyang University, Korea (the Republic of).

EE4.9.14 TiO2-Coated Si/SiOx Nanocomposite Anode Material for Lithium-Ion Batteries Juhye Bae; Hanyang University, Korea (the Republic of).

EE4.9.15 Sodiation Versus Lithiation Structural Phase Transformations in FeoFe Nanocomposite Cathodes Frederic Cosandey; Rutgers Univ, United States.

EE4.9.16 Ultralong Carbon Nanofiber Grown on Porous Si Particles as an Anode Material for Lithium-Ion Battery Hyeong-II Park; Hanyang Univ, Korea (the Republic of).

EE4.9.17 Exfoliation Synthesis and Reassembly of Functional LiCoO2 Nanosheets Qian Cheng; Arizona State Univ, United States.

EE4.9.18 Li-Ion Conversion Reaction Battery Anodes with Metal-Metal Oxide Multilayer Architecture Fernando C. Castro; Northwestern Univ, United States.

EE4.9.19 Few-Layer Graphene Nanostructures as High-Capacity Lithium Storage Cells for Batteries Guizhan Baugarnov; Kazakh National Univ, Kazakhstan.

EE4.9.20 Synthesis of LiMPO4/C Nano-Composites (M=Mn, Co) from M(II) Phosphate Precipitated from a Micro-Mixer Approach Hui Yang; Nanjing Tech University, China.

EE4.9.21 Free-Standing Oxide Nanotube Array Electrodes for High Energy Density and Power Density Li-Ion Batteries Wei Wei; Uppsala University, Sweden.

EE4.9.22 Nickel Nanoparticles Decorated Nitrogen-Doped Graphene as Efficient Bifunctional Electrocatalyst for ORR and OER Shaikh N. Faisal; University of Sydney, Australia.

EE4.9.23 Facile One Step Synthesis of Nanostructured Ge/GeO2 Composite in Carbon Matrix as an Anode Material for Lithium-Ion Batteries Sukuem Yoon; Konjoo National University, Korea (the Republic of).

EE4.9.24 Precisely Engineered Colloidal Nanocrystals for Li-Ion and Na-Ion Batteries Kostiantyn Kravchyk1,2; ETH Zurich, Switzerland; 2Empa, Switzerland.

EE4.9.25 Silicon Based Nanostructures: From Production to Electrochemical Energy Storage Application Lisseong Xing; Institute for Combustion and Gas Dynamics – Reactive Fluids (IVG), University of Duisburg-Essen, Germany.

EE4.9.26 Highly Reversible Li Insertion into Nanostructured MoO2 Anode Material Ayoung Kim; Hanyang Univ, Korea (the Republic of).

EE4.9.27 Transition Metal Dichalcogenides-Based Composites: High Capacity Anode for Advanced Li-ion Battery Chuanfang (John) Zhang; Trinity College Dublin, Ireland.

EE4.9.28 Thermal Behavior, Thermal Runaway, Kinetics, and Surface Properties of Bulk and Nano Batteries and Battery Elements Studied by Thermal Analysis and Calorimetry Kristina Lilova; Setaram, United States.

EE4.9.29 Improving the Lithium-Storage Properties of Self-Grown Nickel Oxide by TiO2 Nanoparticles Interface Muhammad Sadeqy Baloug; Sun Yat-Sen University, China.

EE4.9.30 Three-Dimensional, High-Porosity Conducting Hybrid Skeletal Structure from Vapor-Phase Polymerized Conformal Surface Layer Kuk Young Cho; Hanyang University, Korea (the Republic of).

EE4.9.31 Realization of 5mAh/cm2-Level Cathode Electrode for High Density Li-Ion Battery Haisol Nam; UNIST, Korea (the Republic of).

EE4.9.32 Electrochemical Evaluation of V2O5 Coatings Grown by Atomic Layer Deposition Ian M. Povey; Tyndall National Institute-UCC, Ireland.

EE4.9.33 New Insights into Synthesis of Graphene Oxide Nanoflakes and Electrochemical Performance as Sodium-Ion Battery Electrodes Victoria Voigt; Kansas State University, United States.

EE4.10.01 Few Layer MoS2/graphene/Au-Cu Pentacle Composite Based Paper Anode for Sodium Battery and Supercapacitor Application Manish K. Singh; Indian Institute of Technology(BHU), India.

EE4.10.02 A Functional Electrolyte Promotes New Reaction Pathway for High-Performance Lithium-Sulfur Batteries Shuru Chen; Pennsylvania State Univ, United States.

EE4.10.03 Soybean-Derived 3-in-1 Carbon Structure for High-Performance Lithium-Sulfur Batteries Guoqiang Ren; Texas Tech University, United States.

EE4.10.04 Advanced Sulfur Cathode Enabled by Highly Crumpled Nitrogen-Doped Graphene Sheets for High-Energy-Density Lithium-Sulfur Batteries Jianxuan Song; Pennsylvania State Univ, United States.

EE4.10.05 Performance Optimization of Hybrid Electrochemical Capacitors Richa Agrawal; Florida International University, United States.

EE4.10.06 Nanocoating of Polymer, Ionic Liquid and Polymer Ionic Liquid Blends for the Fabrication of Battery Electrolytes Indumini U. Jayasekara; The University of Tulsa, United States.

EE4.10.07 A Comparative Study on Cubic Li15Al20La2ZrO12/Li17Ga20La2Zr2O3 Garnet Solid Solution Daniel Rettenwander; University of Salzburg, Austria.
Large Scale Differential Scanning Calorimetry of Partial or Complete Li-Ion Coins for Determination of Key Safety and Performance Characteristics

Peter Ralbovsky; NETZSCH Instruments NA LLC, United States.

In Situ Environmental Transmission Electron Microscopy (ETEM) Study of Thermal Degradation of Nickel-Based Cathode Materials

Khim Karki1, 2; 1Brookhaven National Laboratory, United States; 2NECCES at Binghamton University, United States.

The Importance of Solid Electrolyte Interphase (SEI) Formation for Long Cycle Stability Full-Cell Na-Ion Battery

Xiaolin Li; Pacific Northwest National Lab, United States.

Operando X-Ray Investigations of Self-Healing Silicon Anodes in Lithium-Ion Batteries

Sean C. Andrews1, 2; 1Stanford University, United States; 2SLAC National Accelerator Lab, United States.

Li-Ion Transport in Transmission Electron Microscope

Nan Jiang; Arizona State Univ, United States.

Stable Barrier Coatings for All Solid-State Batteries

Lincoln Miara; Samsung Advanced Institute of Technology - USA, United States.

All-Solid-State Lithium-Sulfur Batteries

Alice Cassel1, 2, 3; 1Laboratoire de Réactivité et Chimie des Solides - Université de Picardie Jules Verne, France; 2Réseau sur le Stockage Electrochimique de l’Energie (RS2E), France; 3ALISTORE-ERI, France.

All-Solid-State Lithium-Ion Thin-Film Batteries Using a New Lithiated Titanium Oxysulfide Cathode: High Performance and Reversibility

Frederic Le Cras; CEA LETI, France.

Fe2(MoO4)3 as an Alternative Positive Electrode for Li or Na Thin-Film Batteries

Vincent Pele1, 2; 1ICMCB, France; 2CEA, France.

Materials Design Guidelines for All-Solid-State Batteries

Yan E. Wang; Massachusetts Institute of Technology, United States.

X-Ray Nanodiffraction Study of the Delithiation Mechanism of LiFePO4 Single Particles

Brian May; University of Illinois at Chicago, United States.

Tailoring Materials Chemistry for Improved Solid State Sodium-Ion Conductors

Erik D. Spoerke; Sandia National Laboratories, United States.

Science and Technology of Electrically Conductive/Corrosion Resistant Ultrananocrystalline Diamond-Coated Natural Graphite-Copper Anode for New Long Life Lithium-Ion Battery

Orlando Auciello1, 2; 1University of Texas at Dallas, United States; 2University of Texas at Dallas, United States.

Nitrogen Rich Carbon Nanotubes Induced by Rayleigh Instability for High-Performance Energy Storage Anodes Enabling Robust Cycle Life

Jong Ho Won; Korea Advanced Institute of Science and Technology, Korea (the Republic of).
**SYMPOSIUM EE5**

Next-Generation Electrical Energy Storage Chemistries  
March 29 - April 1, 2016

**Chairs**  
Bruce Dunn, University of California, Los Angeles  
Arunugam Manthiram, University of Texas at Austin  
Linda Nazar, University of Waterloo  
Gleb Yushin, Georgia Institute of Technology

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**SESSION EE5.1: Advanced Intercalation Materials**  
Session Chairs: Arumugam Manthiram and Linda Nazar  
Tuesday Afternoon, March 29, 2016  
PCC North, 100 Level, Room 124 B

1:30 PM *EE5.1.01  
Optimization Strategy of Li-Ion Cells and Beyond  
Odysseas Paschos; BMW AG, Germany.

2:00 PM *EE5.1.02  
Progress in High Capacity Core-Shell and Concentration Gradient Cathode Materials for Lithium-Ion Batteries  
Yang-Kook Sun; Hanyang University, Korea (the Republic of).

2:30 PM BREAK

2:45 PM *EE5.1.03  
Pushing the Frontiers of Intercalation for Lithium Batteries  
M. Stanley Whittingham; SUNY-Binghamton, United States.

3:15 PM *EE5.1.04  
Storage Mechanisms of Li and Na Batteries: Thermodynamic and Kinetic Aspects  
Joachim Maier; Max-Planck-Instit, Germany.

3:45 PM EE5.1.05  
Overcharging the Layered NMC and NCA Oxides: Impact on Electrochemistry and Crystal Structure  
Lamuel David; Oak Ridge National Lab, United States.

4:00 PM *EE5.1.06  
Olivine with Zero Anti-Site Defect and Three Dimensional Lithium Diffusion Paths  
Kisuk Kang; Seoul National Univ, Korea (the Republic of).

4:30 PM *EE5.1.07  
Tire-Derived Carbon Composite Electrodes for Energy Storage Applications  
Mariappan P. Paranthaman; Oak Ridge National Lab, United States.

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**SESSION EE5.2: Poster Session I: Next-Generation Battery Materials and Devices**  
Session Chairs: Arumugam Manthiram and Linda Nazar  
Tuesday Afternoon, March 29, 2016  
8:00 PM  
Sheraton, Third Level, Phoenix Ballroom

EE5.2.01  
Printed Air Cathode for Flexible and High Energy Density Zinc-Air Battery  
Soorathep Kheawhom; Chulalongkorn Univ, Thailand.

EE5.2.02  
Printed Flexible Zinc-Air Battery Using an Alkaline Polymer Gel Electrolyte  
Soorathep Kheawhom; Chulalongkorn Univ, Thailand.

EE5.2.03  
Lithium Iodide as a Promising Electrolyte Additive for Lithium-Sulfur Batteries: Mechanisms of Performance Enhancement  
Feixiang Wu; Georgia Institute of Technology, United States.

EE5.2.04  
Novel Formulations for Stable, High-Performance Li-Based Battery Electrodes Nanoarchitectures Based on Graphene Related Materials  
Sanju Gupta; Western Kentucky University, United States.

EE5.2.05  
Nitrogen-Doped Graphene Nanosheets/Sulfur as Cathode Material for Room-Temperature Sodium-Sulfur Battery  
Yong Hao; Florida International University, United States.

EE5.2.06  
Facile Synthesis of Surface Modified Nitrogen/MnO$_2$/3D-Graphene Hybrid Structure for High-Performance Lithium-Sulfur Battery  
Junhua Song; Washington State University, United States.

EE5.2.07  
High Performance Sulfur Cathodes Based on Regenerative Polysulfide-Scavenger Layers  
Fang Liu; Univ of California-Los Angeles, United States.

EE5.2.08  
O and N Ion Battery with Transition Metal as Anode  
Satyesh K. Yadav; Los Alamos National Laboratory, United States.

EE5.2.09  
Two-Dimensional Gallium Sulfide Nanosheets Produced by Liquid-Phase Exfoliation of Commercial Layered Powders: High Capacity Anode for Advanced Li-Ion Battery  
Chuanfang (John) Zhang; Trinity College Dublin, Ireland.

EE5.2.10  
Fabrication of One-Dimension Li$_7$La$_3$Zr$_2$O$_{12}$ Using Biomass Template  
Xiaogang Han; University of Maryland, College Park, United States.

EE5.2.11  
One-to-One Comparison of Silicon Nanolayer-Embedded Graphite Anodes with Commercial Benchmarking Materials as Feasible Candidates for High Energy Lithium-Ion Battery  
Namhyeong Kim; UNIST (Ulsan National Institute of Science and Technology), Korea (the Republic of).

EE5.2.12  
Nanostructured Iron and Nickel Electrodes for Rechargeable Alkaline Batteries  
Danni Lei; Georgia Institute of Technology, United States.

EE5.2.13  
Rechargeable Ni-Na Aqueous Battery with Hierarchical Nanostructured Ni(OH)$_2$ Electrodes  
Xiaomei Xie; Ulsan National Institute of Science and Technology(UNIST), Korea (the Republic of).

EE5.2.14  
Metal Oxychloride/Metal Electrode Systems for Chloride-Ion Batteries  
Xianyu Zhao; Nanjing Tech University, China.
SESSION EE5.3/EE6.4: Joint Session: High Capacity Anodes for Rechargeable Li and Li-Ion Batteries

Session Chairs: Feng Wang and Gleb Yushin
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 124 B

8:00 AM *EE5.3.01/EE6.4.01
Electrodeposition of Metals in Nanostructured Electrolytes: Transport Phenomena and Stability
Lynden Archer; Cornell University, United States.

8:30 AM EE5.3.02/EE6.4.02
Practical Investigation of Silicon Oxide Anode Material for Lithium-Ion Batteries Yeonguk Son; UNIST, Korea (the Republic of).

8:45 AM EE5.3.03/EE6.4.03
Effect of Composition and Structure on Electrochemical Properties of Ternary Type I Silicon Clathrates for Lithium-Ion Battery Anodes Ran Zhao; Arizona State Univ, United States.

9:00 AM *EE5.3.04/EE6.4.04
Current Status of Si-Based Anode Materials for High Capacity Li-Ion Batteries Jaephil Cho; UNIST, Korea (the Republic of).

9:30 AM EE5.3.05/EE6.4.05
Limits of Energy Density in Silicon Anode Based Lithium-Ion Batteries Ranjan Dash; SABIC, United States.

9:45 AM BREAK

SESSION EE5.4/EE6.5: Joint Session: Electrochemical Interfaces in New Battery Chemistry
Session Chairs: Feng Wang and Gleb Yushin
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 124 B

10:00 AM *EE5.4.01/EE6.5.01
Realization of Metal Fluoride Conversion Nanocomposite Electrodes for Batteries Glenn G. Amatucci; Rutgers University, United States.

10:30 AM *EE5.4.02/EE6.5.02
Solid State Batteries: Promise and Challenges Nancy J. Dudney; Oak Ridge National Laboratory, United States.

11:00 AM *EE5.4.03/EE6.5.03
Coulombic Inefficiency and the Structure Directing Role of Interfacial Films on Magnesium and Lithium Kevin R. Zavadil; Sandia National Labs, United States.

11:30 AM *EE5.4.04/EE6.5.04
Ion Solvation and the Formation of Aqueous Interphase Kang Xu; US Army Research Lab, United States.

SESSION EE5.5: Lithium-Sulfur and Related Batteries
Session Chairs: Linda Nazar and Gleb Yushin
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 124 B

1:45 PM *EE5.5.01
Li-S Batteries: Overview on the Scientific Gap between Fundamental Research and Practical Applications Jie Xiao; University of Arkansas, United States.

2:15 PM EE5.5.02
High Loading Lithium Sulfur Batteries Achieved through Multi-Functional Binders Min Ling; Lawrence Berkeley National Lab, United States.

2:30 PM EE5.5.03
Three-Dimensional Electrodeposition of Li,S and Improved Charge Transport in Dissolved Lithium-Sulfur Batteries Facilitated by Organic Redox Mediators Identified with High-Throughput Computational Screening Peter D. Frischmann; Lawrence Berkeley National Lab, United States.

2:45 PM BREAK

3:15 PM *EE5.5.04
Comparative Commercial-Viability Evaluation of Rechargeable-Battery Chemistries Sigita Urbanaita-Trabesinger; Paul Scherrer Institute, Switzerland.

3:45 PM EE5.5.05
Material Structure Design for Long Cycle Life Lithium-Sulfur Batteries Hailiang Wang; Yale Univ, United States.

4:00 PM EE5.5.06
Hierarchical Particle-Shell Architecture for Long-Term Cycle Stability of Li,S Cathodes Feixiang Wu; Georgia Institute of Technology , United States.

4:15 PM EE5.5.07
Binder-Free, Boron/Nitrogen Heteroatom-Doped Reduced Graphene Oxide for High-Performance Lithium-Sulfur Batteries Pauline Han; University of Texas at Austin, United States.

4:30 PM EE5.5.08
X-Ray Absorption Spectroscopy as a Probe of Dissolved Polysulfides in Lithium-Sulfur Batteries Tod A. Pascal; Lawrence Berkeley National Lab, United States.

4:45 PM EE5.5.09
Mass Production of Free-Standing Carbon Nanotube Sponges as New Catholyte Reservoir for Li-S Batteries Gang Yang; Texas A&M University, United States.

SESSION EE5.6: Metal-Oxygen Batteries
Session Chairs: Ho-Cheol Kim and Arumugam Manthiram
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 124 B

8:00 AM *EE5.6.01
Progress in Materials Research on Non-Aqueous Lithium-Oxygen Battery Ho-Cheol Kim; IBM Research-Almaden, United States.

8:30 AM EE5.6.02
Investigations of Transition Metal Oxides (MoO₃, Co₃O₄, RuO₂) for Lithium Oxygen Battery Cathodes with DEMS Dhalvan Dh; IBM, United States.
9:30 AM BREAK

SESSIOEE5.7: Metal and Metal-Ion Batteries beyond Lithium I
Session Chairs: Glenn Amatucci and Gleb Yushin
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 124 B

10:00 AM *EE5.7.01
Challenges in Mg Battery Claudiu Bucur; Toyota Research Institute of N. America, United States.

10:30 AM EE5.7.02
Trends in Lidg Modification for Magnesium-Ion Electrolyte Improvement Carl Nist-Lund; Princeton University, United States.

10:45 AM EE5.7.03
Pyrite (FeS2) Nanocrystals as Electrode Material for Sodium-Ion and Sodium/Magnesium-Ion Hybrid Batteries Marc Walter; Empa - Swiss Federal Laboratories for Materials Science and Technology, Switzerland; ETH Zurich, Switzerland.

11:10 AM EE5.7.04
A Binder-Free V2O5 • 0.5H2O Cathode Used in Rechargeable Aluminum Battery Huali Wang; 1Beijing Institute of Technology, China; 2Lawrence Berkeley National Laboratory, United States.

11:15 AM EE5.7.05
Surface Phenomena and Characterization of Magnesium Anodes in Prototypical Electrolytes Jake Herb; Princeton University, United States.

1:30 PM EE5.8.01
Anode Architectures, Anode/Electrolyte Interfaces, and High Energy-Density Anodes for Rechargeable Magnesium Battery Systems Nikhilendra Singh, Toyota Research Institute of North America, United States.

1:45 PM EE5.8.02
A Facile Microwave-Assisted Technique for Chemical Insertion of Mg and Zn Ions into a Microporous Mo2.5+yVO9+z Cathode for Multivalent-Ion Batteries Watchareeva Kaeveevisitchai; University of Texas at Austin, United States.

2:00 PM EE5.8.03
Transforming Two-Dimensional Transition Metal Charcogenides for High Capacity Rechargeable Magnesium Batteries Yan Yao; 1Univ of Houston, United States; 2TSUH, United States.

2:15 PM EE5.8.04
P-Block Elements for Rechargeable Mg System: Electrochemical Performance and Structural Characterization Fabrizio Murgia; 1Institut Charles Gerhardt de Montpellier, France; 2Reseau sur le Stockage Electrochimique de l’Energie, France.

2:30 PM BREAK

3:00 PM EE5.8.05
First-Principles Study of Mg Intercalation in Nanostructured MoO3 Cathode Liwen Wan; Lawrence Berkeley National Lab, United States.

3:15 PM EE5.8.06
Renormalization of Electrolyte Energy Levels at Mg-Based Electrodes Nitin Kumar; University of Michigan, United States.

3:30 PM EE5.8.07
Progress in Lewis Acid-Free and Anodically Stable Magnesium Ion Electrolytes Chen Liao; 1Argonne National Lab, United States; 2Joint Center of Energy Storage Research, United States.

3:45 PM EE5.8.08
Investigation of the Na2MoO4 Phase Diagram from Sodium Electrochemical (de)Intercalation Laura Vitoux; CNRS, Univ. Bordeaux, ICMCB, UPR 9048, France.

4:00 PM EE5.8.09
Sodium Intercalation Mechanisms into Corrugated Titanate Structures for Na-Ion Batteries Isaac M. Markus; 1UC Berkeley, United States; 2Lawrence Berkeley National Laboratory, United States.

4:15 PM EE5.8.10
Effect of Iron Addition on Electrochemical Properties in Na-(Ni,Fe)Cl2 Battery Chael-Woo Ahn; Korea Institute of Materials Science (KIMS), Korea (the Republic of).

4:30 PM EE5.8.11
First-Principles Simulation of Mg Intercalation in NiO2 Cathode Lizhen Li; 1Tsinghua Univ, China; 2Beijing Institute of Technology, China.

4:45 PM EE5.8.12
Battery Cycling of Mg-Ion Electrolytes in Trifluoroethanol Cathode Fluids Jeffery G. Smith; University of Michigan, United States.

5:00 PM EE5.8.13
Evaluation of the Pre-Degradation in Mg-Ion Batteries Charlotte B. M. Svennevig; 1UC Santa Barbara, United States; 2Lawrence Berkeley National Laboratory, United States.

5:15 PM EE5.8.14
Effect of Iron Addition on Electrochemical Properties in Na-(Ni,Fe)Cl2 Battery Izumi Tanaka; 1Kansai Institute of Polytechnics, Osaka, Japan; 2Koganei Institute of Polytechnics, Tokyo, Japan.

5:30 PM EE5.8.15
Mg-Ion Batteries for Next-Generation High-Performance Devices Jeffery G. Smith; University of Michigan, United States.

5:45 PM EE5.8.16
Mg-Ion Batteries: Energy Storage, Design, and Manufacturing Challenges Xin Li; 1University of Minnesota, United States; 2University of Houston, United States.

5:00 PM EE5.9.01
Light-Weight Nitrogen-Doped Hierarchically Porous Carbon Foam for Energy Storage Devices Ji Zhang Chen; The Chinese University of Hong Kong, Hong Kong.

EE5.9.02
Novel Carbon Nanoscale Architectures for Supercapacitors Guanhua Zhang; 1Arizona State University, United States; 2Hunan University, China.

EE5.9.03
From Lignin to a Nanoporous Carbon: How the Synthesis Steps Affect the Final Texture/Structure and the Electrochemical Properties Adriana M. Navarro-Suarez; CIC energiGUNE, Spain.

EE5.9.04
Zeolite-Templated Carbons in Alkaline Electrolyte as Electric Double Layer Capacitors Chenchen Hu; 1Georgia Institute of Technology, United States; 2Huazhong University of Science and Technology, China.

EE5.9.05
Polyaniline-Carbon Nanotube Composite for High Performance Pseudocapacitive Desalination Jim Benson; Georgia Inst of Technology, United States.

EE5.9.06
Mesoporous Hollow Carbon Nanofibers for Supercapacitors Yan Song; Arizona State University, United States.

EE5.9.07
Large-Scale Fabrication of Three-Dimensional Carbon Based Materials for Supercapacitors Xihong Lu; Sun Yat-Sen Univ, China.

EE5.9.08
Graphene and Poly (3,4-ethylenedioxythiophene) (PEDOT) Based Hybrid Supercapacitors with Ionic Liquid Gel Electrolyte in Solid-State Design and their Electrochemical Performance in Storage of Solar Photovoltaic Generated Electricity Alok C. Rastogi; 1Binghamton University, SUNY, Binghamton, United States; 2Binghamton University, SUNY, Binghamton, United States.
EE5.9.09 Reduced Graphene Oxide Hydrogel Deposited in Nickel Foam for Supercapacitor Applications: Toward High Volumetric Capacitance Viet Hung Pham; Brookhaven National Laboratory, United States.

EE5.9.10 Cellulose Nanofibril (CNF)–Reduced Graphene Oxide (RGO)–Carbon Nanotube (CNT) Hybrid Aerogels for Highly Flexible and All-Solid-State Supercapacitors Qifeng Zheng; Univ of Wisconsin-Madison, United States.

EE5.9.11 Freestanding 3D Macroporous Graphene and Polyaniline Nanowire Arrays Hybrid Frameworks for High-Performance Supercapacitors Pingping Yu; Fudan Univ, China.

EE5.9.12 Fabricating Covalent Hybrids of Nanoscaled Cobalt and Cobalt Oxide Polymorphs on Graphene: Towards High-Performance Electrochemical Energy Storage Supercapacitors and Enzymeless Glucose Detection Sanju Gupta; Western Kentucky University, United States.

EE5.9.13 Recycling Waste Si Wafer for Supercapacitor Electrodes by Conversion to Micro/Mesoporous SiC Flakes Myeongjin Kim; Chung-Ang Univ, Korea (the Republic of).


EE5.9.15 Highly Stretchable Coiled Yarn Supercapacitor Changsoon Choi; Hanyang Univ, Korea (the Republic of).

EE5.9.16 High Performance Flexible Double-Sided Micro-Supercapacitors with Redox Additive Organic Gel Electrolyte Doo Yeon Kim; Korea university, Korea (the Republic of).

EE5.9.17 Heavily n-Dopable π-Conjugated Redox Polymers with Ultrafast Energy Storage Capability Yanliang Liang; University of Houston, United States.

EE5.9.18 Self-Assembly Synthesis of 2D, Vertically Aligned Molybdenum Trioxide Electrodes for Electrochemical Supercapacitor Devices Silvia Leonardi; Center of Nanoscience and Technology, Istituto Italiano di Tecnologia, Italy.

EE5.9.19 Template-Free Synthesis of Hierarchical Mixed-Metal Oxides: Magnetic and Electrocapacitive Study Dipesh Neupane; Univ of Memphis, United States.

EE5.9.20 2D Vanadium Doped Manganese Dioxides Nanosheets for Pseudocapacitive Energy Storage Liang Huang; Huazhong Univ of S&T, China.

EE5.9.21 Flexible Asymmetric Microsupercapacitor with MoO3, Nano-ball@MWNTs/V2O5, and Wrappend MWNTs Electrodes and Gel Electrolyte Junyong Yun; Korea Univ, Korea (the Republic of).

EE5.9.22 Aqueous Manganese Dioxide Ink for High Performance Capacitive Energy Storage Devices Jasheng Qian; the Hong Kong Polytechnic University, Hong Kong.

EE5.9.23 Au-Ag Core Shell Nanowire Network for Highly Stretchable and Transparent Supercapacitor Applications Habeom Lee; Seoul National Univ, Korea (the Republic of).

EE5.9.24 Holey Tungsten Oxynitride Nanowire Anode with High Rate Capability and Ultralong Cyclic Stability for Flexible Asymmetric Supercapacitors Minhao Yu; Sun Yat-Sen Univ, China.

EE5.9.25 Preparation and Characterization of Carbon Nanotube Papers as Supercapacitors and Cathode Materials for Seawater Battery Hsiao-Ling Chen; NTHU, Taiwan.

EE5.9.26 Engineered Pyrolysis Process towards the Synthesis of High Surface Area Supercapacitor Grade Carbon from Easily Available Biomass Precursors Malik A. Wahid; National Chemical Laboratory, India.

EE5.9.27 Thin-Film Carbide-Based Carbon for Energy and Biomedical Applications Jeffrey D. Hettinger; Rowan University, United States.

EE5.9.28 Three Shape Engineerable Composite Fibers Based on Carbon Nanomaterials Kang Min Kim; Hanyang Univ, Korea (the Republic of).

EE5.9.29 Solution-Processable and Flexible Solid-State Micro-Supercapacitors for Miniaturized Energy Storage Devices Bo Song; Georgia Institute of Technology, United States.

EE5.9.30 Superconductive Polymer Supercapacitors: Conformal, Portable and Tactical Energy Solution Young-Gi Kim; Delaware State Univ, United States.

EE5.9.31 Organic Mesostructured Hybrid Electrodes for High-Performance Pseudocapacitors Sung-Kon Kim; Department of Materials Science and Engineering and Beckman Institute for Advanced Science and Technology, United States.
SESSION EE5.11: Advanced Supercapacitors I
Session Chairs: Bruce Dunn and Yury Gogotsi
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 231 A

10:15 AM *EE5.11.01
Multidimensional Material and Device Architectures for Hybrid
(Faradaic+Capacitive) Energy Storage of the Future Yury Gogotsi; Drexel
Univ, United States.

10:45 AM EE5.11.02
Fabrication and Characterization of Nb2O5/Carbide-Derived Carbon
Pseudocapacitors Chun-Han Lai; University of California, Los Angeles,
United States.

11:00 AM EE5.11.03
Microcapacitors Based on Silicon Nanostructures Operating in Ionic
Liquid Krzysztof Fic; Poznan University of Technology, Poland.

11:15 AM *EE5.11.04
Novel Chemistries for Aqueous Supercapacitors Elzbieta Frackowiak;
Poznan Univ of Technology, Poland.

11:30 AM EE5.11.05
Nanoporous Carbon with Embedded Li4Ti5O12 Nanoparticles for High
Energy Asymmetric Supercapacitors Enbo Zhao; Georgia Institute of
Technology, United States.

11:45 AM EE5.11.06
High Rate Pseudocapacitive Behavior in Two-Dimensional Ti3C2 and Mo2C
MXenes Sankarp S. Koli; 1Drexel University, United States; 2A.J. Drexel
Nanotechnology Institute, United States.

SESSION EE5.12: Advanced Supercapacitors II
Session Chairs: Elzbieta Frackowiak and Gleb Yushin
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 231 A

1:30 PM *EE5.12.01
First-Principles Studies of Oxides as Electrochemical Pseudocapacitor
Materials Vidvuds Ozolins; Univ of California-Los Angeles, United States.

2:00 PM EE5.12.02
Supercapacitors Based on CuSbS2 Nanoplates Karthik Ramasamy; Los
Alamos National Laboratory, United States.

2:15 PM EE5.12.03
Advanced Ti-Doped Fe3O4@PEDOT Core-Shell Anode for High-Energy
Asymmetric Supercapacitors Yinxiang Zeng; Sun Yat-Sen Univ, China.

2:30 PM *EE5.12.04
High Energy Density Hybrid Type Supercapacitors Mei Cai; General
Motors, United States.

3:00 PM BREAK

3:15 PM *EE5.12.05
Microporous Carbons for Electrical Double Layer Capacitor: Charge
Storage Mechanism and Electrochemical Performance Patrice Simon2;
1; University Paul Sabatier, Toulouse III, France; 2RSE, FR CNRS 3459,
France.

3:45 PM EE5.12.06
New Composite Cathodes for In Situ Pre-Lithiation of Graphite in Lithium
Ion Capacitor Francois Boppan; Poznan University of Technology, Poland.

4:15 PM EE5.12.08
Tailoring Metal Organic Framework Gels to Derive Highly Active
Electrode Materials for Electrochemical Supercapacitors Asif Mahmood;
Peking University, China.

4:30 PM EE5.12.09
3D Electrode Architecture of Carbon Nanotubes for Enhancing the
Cycling Stability of Conducting Polymers Rachit Malik; Univ of Cincinnati,
United States.

4:45 PM EE5.12.10
Chemistry of Aging Phenomena in High-Voltage Carbon-Based
Supercapacitors Investigated by in situ Gas Analysis Elzbieta Frackowiak;
Poznan University of Technology, Poland.
SESSION EE6.1 In Situ/Operando Electrochemical Interfaces
Session Chairs: Yang Shao-Horn and Feng Wang
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 125 A

1:30 PM *EE6.1.01
New Insights into the Electrode/Electrolyte Interface on Positive Electrodes in Li-Ion Batteries Yang Shao-Horn; MIT, United States.

2:00 PM *EE6.1.02
Operando X-Ray Microscopies for Studying Lithium-Ion Batteries Vanessa Wood; ETH Zurich, Switzerland.

2:30 PM EE6.1.03
Tracking Nanoscale Ion Insertion Kinetics in LiFePO4 Using In Situ X-ray Liquid Imaging Yiyang Li; Stanford Univ, United States.

2:45 PM EE6.1.04
Probing Battery Chemistry with In Situ Electrochemical Scanning Transmission Electron Microscopy and Electron Energy Loss Spectroscopy Raymond R. Unocic; Oak Ridge National Laboratory, United States.

3:00 PM BREAK

SESSION EE6.2: Probing Electrochemical Interfaces in Model Systems I
Session Chairs: Shirley Meng and Yuki Orikasa
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 125 A

3:30 PM *EE6.2.01
Mechanism of Enhanced Rate Capability by Interfacial Modification between LiFePO4 Cathode and Electrolyte Yuki Orikasa; Kyoto Univ, Japan.

4:00 PM EE6.2.02
Effect of Surface Structure of SrTiO3 on the Catalysis of Photo-Assisted Water Splitting Xin Huang; Cornell Univ, United States.

4:15 PM EE6.2.03
Optical Fluorescence Microscopy for Spatially Characterizing Electron Transfer across a Solid-Liquid Interface on Heterogeneous Electrodes Eric Choudhary; NIST, United States.

4:30 PM EE6.2.04
Tracking Lithium-Ion Transport and Reactions at Electrolyte-Electrode Interfaces by in situ Liquid Cell TEM Wei Zhang; Brookhaven National Lab, United States.

4:45 PM EE6.2.05
In Situ Studies of Oxide-Electrolyte Interface Reactivity in Lithium-Ion Batteries Xiao Chen; Northwestern University, United States.

SESSION EE6.3: Poster Session: Liquid-Solid Interfaces in Electrochemical Systems
Session Chairs: Shirley Meng and Feng Wang
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE6.3.01
Using Neutron Reflectometry to Investigate Solid-Electrolyte Interphase Formation, In Situ, in Energy Storage Materials Jim Browning; Oak Ridge National Lab, United States.

EE6.3.02
Structures and Interactions at the Solid–Ionic Liquid Interface – A Complementary X-Ray Reflectivity and Molecular Dynamics Approach Andreas Majerl; Univ of Erlangen-Nürnberg, Germany.

EE6.3.03
A Theoretical Overview on Nanoporous Carbon Design Strategies to Enhance Supercapacitor Performance Alexander Pak; Univ of Texas-Austin, United States.

EE6.3.04
Surface Evolution in LiNi0.5Co0.2Al0.3O2 Cathode Materials - A STEM/ EELS Study Pinaki Mukherjee; Rutgers University, United States.

EE6.3.05
Scanning Electrochemical Microscopy/Atomic Force Microscopy (SECM/AFM) at the Nanoscale for Heterogeneous Nanocatalysts Jayavel Velmurugan1, 2; NIST, United States; 2University of Maryland, United States.

EE6.3.06
In Situ X-Ray Spectroscopy Study of Electrodeposited Ni-Fe Hydroxide Catalysts for Electrochemical Oxygen Evolution Reaction Kaist Nie1, 2; 1Institute of Functional Nano & Soft Materials, Soochow University, China; 2Advanced Light Source, United States.

EE6.3.07
Surface Modified Pore-Filled Anion-Exchange Membranes for High Performance Reverse Electrodialysis Moon-Sung Kang; Sangmyung Univ, Korea (the Republic of).

EE6.3.08

EE6.3.09
New Directions in the Study of Ion Storage Properties in Eumelanin Pigments Pratik Sinha; Ecole Polytechnique Montreal, Canada.

EE6.3.10

EE6.3.11

EE6.3.12
Ionic Liquid Mixture Electrolytes to Increase Performance in Electrochemical Capacitors Katherine Van Aken; Drexel University, United States.

EE6.3.13
Pt-Based Alloy–Ionic Liquid Composite Dispersed on Carbon Black as an Efficient Catalyst for Oxygen Reduction Reaction Quoc Chinh Tran; Chungnam National University, Korea (the Republic of).
EE6.3.14
Choice of Different Reaction Pathways in the Electrodeposition of Zinc Oxide Blocking Layers for Mesoscopic Solar Cells Martina Stumpf; Univ Giessen, Germany.

EE6.3.15
Self-Assembling Amphiphilic Fluorophores: In Situ Monitoring and Photonic Characterization Maximilian Hupfer1,2; 1Institute of Physical Chemistry, Germany; 2Leibniz Institute of Photonic Technology , Germany.

EE6.3.16
Focused-Ion-Beam-Deposited Platinum Wires for TEM Imaging of Metal-Water Interfacial Reactions Sung-Wook Nam; Institute for Basic Science (IBS), Korea (the Republic of).

SESSION EE6.4/EE5.3 Joint Session: High Capacity Anodes for Rechargeable Li and Li-Ion Batteries Session Chairs: Feng Wang and Gleb Yushin Wednesday Morning, March 30, 2016 PCC North, 100 Level, Room 124 B

8:00 AM *EE6.4.01/EE5.3.01 Electrodeposition of Metals in Nanostructured Electrolytes: Transport Phenomena and Stability Lynden Archer; Cornell University, United States.

8:30 AM EE6.4.02/EE5.3.02 Practical Investigation of Silicon Oxide Anode Material for Lithium-Ion Batteries Yeonguk Son; UNIST, Korea (the Republic of).

8:45 AM EE6.4.03/EE5.3.03 Effect of Composition and Structure on Electrochemical Properties of Ternary Type I Silicon Clathrates for Lithium-Ion Battery Anodes Ran Zhao; Arizona State Univ, United States.

9:00 AM *EE6.4.04/EE5.3.04 Current Status of Si-Based Anode Materials for High Capacity Li-Ion Batteries Jaephil Cho; UNIST, Korea (the Republic of).

9:30 AM EE6.4.05/EE5.3.05 Limits of Energy Density in Silicon Anode Based Lithium-Ion Batteries Sang-Doo Shin; SABIC, United States.

9:45 AM BREAK

SESSION EE6.5/EE5.4 Joint Session: Electrochemical Interfaces in New Battery Chemistry Session Chairs: Feng Wang and Gleb Yushin Wednesday Morning, March 30, 2016 PCC North, 100 Level, Room 124 B

10:00 AM *EE6.5.01/EE5.4.01 Realization of Metal Fluoride Conversion Nanocomposite Electrodes for Batteries Glenn G. Amatucci; Rutgers University, United States.

10:30 AM *EE6.5.02/EE5.4.02 Solid State Batteries: Promise and Challenges Nancy J. Dudney; Oak Ridge National Laboratory, United States.

11:00 AM *EE6.5.03/EE5.4.03 Coulombic Inefficiency and the Structure Directing Role of Interfacial Films on Magnesium and Lithium Kevin R. Zavadil; Sandia National Labs, United States.

11:30 AM *EE6.5.04/EE5.4.04 Ion Solvation and the Formation of Aqueous Interphase Kang Xu; US Army Research Lab, United States.

SESSION EE6.6: Novel Characterization of Heterogeneity and Interfaces Session Chairs: Ryoji Kanno and Miquel Salmeron Wednesday Afternoon, March 30, 2016 PCC North, 100 Level, Room 125 A

1:30 PM *EE6.6.01 Microscopy and Spectroscopy of Solid-Gas and Solid-Liquid Interfaces at Ambient Conditions Miquel Salmeron1,2; 1Lawrence Berkeley National Laboratory, United States; 2University of California, Berkeley, United States.

2:00 PM EE6.6.02 X-Ray Total Scattering Analysis of Nanosheet MnO2 Electrodes Scott T. Muddle; Alfred Univ, United States.

2:15 PM EE6.6.03 Correlations between Electronic Structure and Charge Transport in Metal Oxide Electrodes Determined with Valence Band Spectroscopy and Electroanalytical Methods Artur Braun; EMPA, Switzerland.

2:30 PM EE6.6.04 High-Pressure Photoelectron Spectroscopy Investigation of the Interaction between CO2 and Cu-Based Reduction Catalysts Anna Regoutz; Imperial College London, United Kingdom.

2:45 PM EE6.6.05 Structure and Chemical Composition of Electrode-Electrolyte Interfaces Yan-Yan Hu1,2; 1Florida State Univ, United States; 2National High Magnetic Field Laboratory, United States.

3:00 PM BREAK

SESSION EE6.7: Modeling/Theory of Electrochemical Interfaces I Session Chairs: Gerbrand Ceder and Shirley Meng Wednesday Afternoon, March 30, 2016 PCC North, 100 Level, Room 125 A

3:30 PM *EE6.7.01 Predicting the Interfacial Reactions between Cathodes and Liquid and Solid Electrolytes Gerbrand Ceder; UC Berkeley, United States.

4:00 PM EE6.7.02 Stresses at Electrode-Electrolyte Interface in Lithium-Ion Batteries via Multiphysics Modeling Shadow Huang; North Carolina State Univ, United States.

4:15 PM EE6.7.03 Graphene Oxide-Sulfur Composite Cathodes for High Performance Li-S Batteries: A Molecular Dynamics Study Soumik Banerjee; Washington State University, United States.

4:30 PM *EE6.7.04 Ab initio Modeling the Electrochemical Interface Karen Chan1,2; 1Stanford University, United States; 2SLAC National Accelerator Laboratory, United States.

SESSION EE6.8: Probing Electrochemical Interfaces in Model Systems II Session Chairs: Paul Fenter and Ryoji Kanno Thursday Morning, March 31, 2016 PCC North, 100 Level, Room 125 A

8:00 AM *EE6.8.01 In Situ Studies of Structures and Processes at Model Electrode/Electrolyte Interfaces Paul Fenter; Argonne National Laboratory, United States.

8:30 AM *EE6.8.02 Lithium-Ion Distribution in Intercalation Electrode/Liquid Electrolyte Interfaces Determined by In Situ Neutron Reflectometry Masaaki Hirayama; Tokyo Institute of Technology, Japan.
SESSION EE6.9: Electrolyte-Electrode Interface/Interphases in Batteries I
Session Chairs: Zonghai Chen and Ryoji Kanno
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 125 A

10:30 AM *EE6.9.01
Investigating the Interfacial Reactions in Lithium Batteries Zonghai Chen; Argonne National Laboratory, United States.

11:00 AM EE6.9.02
Mitigating Capacity Fading of Lithium-Ion Battery by Surface Coating of Electrode Materials: The Beneficial and Detrimental Effect Chongmin Wang; Pacific Northwest National Lab, United States.

11:15 AM EE6.9.03
Charge Carrier Chemistry in Composite Liquid/Solid Lithium Electrolytes Jelena Popovic; Max Planck Institute for Solid State Research, Germany.

11:30 AM EE6.9.04
Solid Electrolyte LiPON as a Protective Nano-Cladding Layer for 3D Conversion Electrodes Chuan-Fu Lin1, 2; 1University of Maryland, United States; 2University of Maryland, United States.

11:45 AM EE6.9.05
Tailoring the Desired Solid Electrolyte Interphase in Silicon-Based Lithium-Ion Batteries with Electrolyte Additives Feifei Shi1, 2; 1Univ of California-Berkeley, United States; 2Lawrence Berkeley National Lab, United States.

SESSION EE6.10: Modeling/Theory of Electrochemical Interfaces II
Session Chairs: Oleg Borodin, Mark Hybertsen and Kevin Leung
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 125 A

1:30 PM *EE6.10.01
Insight into Lithium Battery Electrolytes and Their Interaction with Electrodes from Molecular Modeling Oleg Borodin; US Army Research Laboratory, United States.

2:00 PM EE6.10.02
Understanding the Solid Electrolyte-Electrode Interfaces in All-Solid-State Li-Ion Batteries: Insights from Atomistic Modeling Yifei Mo; University of Maryland-College Park, United States.

2:15 PM EE6.10.03
Computational Studies of Doping and Dissolution in Lithium Transition Metal Oxides Cong Liu; Argonne National Laboratory, United States.

2:30 PM EE6.10.04
Modelling Species Diffusion and Electrolyte Interaction in Li-Air Batteries Forrest S. Gittleson; Sandia National Laboratories, United States.

SESSION EE6.11: Electrolyte-Electrode Interface/Interphases in Batteries II
Session Chairs: Steven Greenbaum and Feng Wang
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 226 A

8:00 AM EE6.11.01
Metal Segregation in Hierarchically Structured Cathode Materials for High Energy Lithium Batteries Feng Lin; Lawrence Berkeley National Lab, United States.

8:15 AM EE6.11.02
High Voltage Mg/Li Hybrid Battery Technologies Guosheng Li; Pacific Northwest National Lab, United States.

8:30 AM *EE6.11.03
NMR Investigations Related to SEI formation in Lithium-Ion Batteries Steven G. Greenbaum; Hunter College-CUNY, United States.

9:00 AM EE6.11.04
Interfacial Mechanisms in Layered Lithium Metal Oxides for Oxygen Electrocatalysis Veronica Augustyn; North Carolina State University, United States.

9:15 AM EE6.11.05
Breaking Pourbaix Limits to Enable High Voltage Aqueous Li-Ion Chemistries Liumin Suo; university of Maryland, United States.

9:30 AM EE6.11.06
Surface Hole Diffusion and Recombination Dynamics at n-GaN/Electrolyte Interface Haoyang Dong; UC Berkeley, United States.

9:45 AM EE6.11.07
Toward Understanding the Lithium Transport Mechanism in Garnet-Type Solid Electrolytes: Li+ Ion Exchanges and Their Mobility at Octahedral/Tetrahedral Sites Dawei Wang1, 2; 1Xiamen University, China; 2Brookhaven National Lab, United States.

10:00 AM BREAK

SESSION EE6.12: New Electrochemical Systems/Interfaces
Session Chairs: Glenn Amatucci and Feng Wang
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 226 A

10:30 AM *EE6.12.01
Reflection on the Performance Defining Properties Induced by the Positive Electrode – Electrolyte Interface Chemistry Glenn G. Amatucci; Rutgers University, United States.
11:00 AM EE6.12.02
3D Printed Energy Storage Devices with Multifunctional Materials Hui Ying Yang; SUTD, Singapore.

11:15 AM EE6.12.03
Advanced Micro-Supercapacitors Based on Silicon Nanostructures: Towards Integrated All Solid On-Chip Electrochemical Double Layer Capacitors Dorian Gaboriau; CEA Grenoble, France.

11:30 AM EE6.12.04
Sputtered LiMn$_{1.5}$Ni$_{0.5}$O$_4$ Thin-Film for Li-Ion Microbattery Manon Letiche; Institut d’Electronique, de Microélectronique et de Nanotechnologie, France; Unité de Catalyse et de Chimie du Solide (UCCS), Université Lille 1 Sciences et Technologies, France; Réseau sur le Stockage Electrochimique de l’Energie, France.

11:45 AM EE6.12.05
First-Principles Study of Mg Diffusion in Layered MoO$_3$-xFx Cathode Liwen Wan; Lawrence Berkeley National Lab, United States.
SYMPOSIUM EE7
Mechanics of Energy Storage and Conversion—Batteries, Thermoelectrics and Fuel Cells
March 29 - April 1, 2016

Chairs
Haleh Ardebili, University of Houston
Marc Kamalah, Karlsruhe Institute of Technology
Jiangyu Li, University of Washington
Wenqing Zhang, Shanghai University

Symposium Support
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1:30 PM *EE7.1.01
Application of Computational Materials Science in the Development of Lithium-Ion Battery Materials Siqi Shi; Shanghai University, China.

2:00 PM EE7.1.02
In Situ Study of Strain-Dependent Ion Conductivity of Stretchable Polyethylene Oxide Electrolyte Taylor H. Kelly; Univ of Houston, United States.

2:15 PM *EE7.1.03
Tuning the Carrier Mobility by Defect Compensation in BiTeI Jihui Yang; University of Washington, United States.

2:45 PM BREAK

SESSION EE7.2: Fuel Cells
Session Chairs: Douglas Loy and Peiqi Wang
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 221 B

3:15 PM EE7.2.01
Imaging of Doped Ceria Using Scanning Probe Microscopy Peiqi Wang; Univ of Washington, United States.

3:30 PM EE7.2.02
High Performance Nanocellulose Crystal-Based Electrolyte Membrane for Alkaline Fuel Cell Soydan Ozcan; Oak Ridge National Laboratory, United States.

3:45 PM EE7.2.03
SAD-GLAD Pt-Ni @Ni Nanorods as Highly Active Oxygen Reduction Reaction Electrocatalysts Mahbuba Begum; Univ of Arkansas-Little Rock, United States.

4:00 PM EE7.2.04
Operando-Spectroscopy-Oberved Oxygen Reduction Reaction via Biomimetic Non-Precious Electrocatalyst in Fuel Cells Hsiang-Ting Lien; National Taiwan University, Taiwan.

4:15 PM EE7.2.05

4:30 PM EE7.2.06
Electrochemical Heat Engine Systems Andrey Poletaev; Stanford University, United States.

4:45 PM EE7.2.07

8:00 AM *EE7.3.01
Mechanical Stability of SnS/C Anodes during Electrochemical Cycling Katerina E. Aifantis; University of Arizona, United States.

8:30 AM *EE7.3.02
In Situ Mechanics on Lithiation Process in Nanostructured Electrodes Scott X. Ma; Univ of Pittsburgh, United States.

9:00 AM EE7.3.03
Mapping Phonon Spectra and Ionic Mechanics for Energy Conversion and Storage Materials Yongjie Hu; University of California, Los Angeles, United States.

9:15 AM *EE7.3.04
In Situ Study of Li-Ions Diffusion and Deformation in Li-Rich Cathode Materials by Using Scanning Probe Microscopy Techniques Kayyang Zeng; National Univ of Singapore, Singapore.

9:45 AM EE7.3.05
Resolving Thermodynamics of Ionic Transport in Electrochemical Strain Microscopy (ESM) Ahmedreza Eshghinejad; University of Washington, United States.

10:00 AM BREAK

SESSION EE7.4: LIB Mechanical Characterization
Session Chairs: Scott Mao and Kaiyang Zeng
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 221 B

10:30 AM EE7.4.01
In Operando and Chemistry Agnostic Mechanical Acoustic Analysis of Closed Electrochemical Cells through Acoustic Interrogation Daniel Steinert; Princeton Univ, United States.

10:45 AM *EE7.4.02
Mechanical Measurements on Electrode Materials for Lithium-Ion Batteries Reiner Moenig1,2; 1Karlsruhe Institute of Technology, Germany; 2Helmholtz-Institute-Ulm, Germany.

11:15 AM EE7.4.03
Characterizing Lithium-Ion Electrodes at Practical Charge Rates with Strain Zachary J. Schiffer; Princeton University, United States.

11:30 AM EE7.4.04
In Operando X-Ray Characterization (GISAXS/GIXD) of Ordered Mesoporous Film Anodes during Charge-Discharge Cycling Zhe Qiang; Univ of Akron, United States.
SESSION EE7.5: LIB Anode Materials
Session Chairs: Hanqing Jiang and Rahul Panat
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 221 B

1:30 PM EE7.5.01
Driven Coherent Phase Separation in Nanoparticles Martin Z. Bazant1,2;
1MIT, United States; 2Stanford University, United States.

2:00 PM EE7.5.02
Direct Measurements of Li-Si Composition, Volume Expansion and
Modulus Variation of Amorphous Si after Electrochemical Lithiation
Hanjing Jiang; Arizona State Univ, United States.

2:15 PM EE7.5.03
Non-Intermediate MoS2-Intercalated 3D-Nanostructured Graphite
for Prevention of Sulfur Diffusion to Enhance the Electrochemical
Performance of MoS2 Anodes in Li-Ion Batteries
Anand P. Tiwari; Sungkyunkwan University, Korea (the Republic of).

2:30 PM EE7.5.04
Mechanical Degradation of SnSb Anodes in Mg-Ion Batteries Generates
Electrochemically Active Nanostructured Sn
Peter V. Sushko; Pacific Northwest National Lab, United States.

2:45 PM EE7.5.05
Controlled Multi-Scale Porous Electrode Materials for Li-Ion Batteries
Made by Micro Additive Manufacturing
Rahul Panat; Washington State University, United States.

3:00 PM EE7.5.06
Numerical and Experimental Investigation of (de)Lithiation-Induced
Strains of Silicon and Nickel-Tin Anodes with Inverse Opal Scaffold for
Lithium-Ion Batteries
Hoon-Hwe Cho; Northwestern University, United States.

3:15 PM BREAK

SESSION EE7.6: Energy Harvesting
Session Chairs: Reinhold Dauskardt and Marc Kamlah
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 221 B

3:30 PM EE7.6.01
Timescale Tunability in Mechanical Energy Harvesters Sanjue Kim; MIT, United States.

3:45 PM EE7.6.02
Exploiting Piezoelectrochemical Phenomena in Lithium-Ion Batteries
for Low Frequency Mechanical Energy Harvesting and Storage
Craig B. Arnold; Princeton Univ, United States.

4:00 PM EE7.6.03
Self-Powered Flexible Electronics Based on Self-Poled “Ferroelectretic”
Nanogenerator Sujoy K. Ghosh; Jadavpur Univ, India.

4:15 PM EE7.6.04
A Universal Self-Charging System Driven by Random Biomechanical
Energy for Sustainable Operation of Mobile Electronics
Simjiao Niu; Georgia Inst of Technology, United States.

4:30 PM EE7.6.05
Degradation of Adhesion in Silicone for Concentrator Photovoltaic
Application Can Cai; Stanford University, United States.

SESSION EE7.7: Poster Session: Mechanics of Energy Storage and
Conversion—Batteries, Thermoelectrics and Fuel Cells
Session Chairs: Haleh Ardebili, Marc Kamlah, Jiangyu Li and Wenqing Zhang
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE7.7.01
Engineering Conducting Polymers toward Better Thermoelectric
Performance Pejman Talemi; University of Adelaide, Australia.

EE7.7.02
Preparation of Fe,TiZ (Z = Si, Sn) Thermoelectric Heusler Alloys by
Mechanical Alloying Vladimir Khovaylo; National University of Science and
Technology, Russian Federation.

EE7.7.03
Fabrication of Many-Layered Solid Oxide Fuel Cell Architectures via
Multi-Material 3D-Printing of Liquid Inks Nicholas Geisendorfer1,2;
1Northwestern University, United States; 2Northwestern University, United States.

EE7.7.04
Production of Proton Conducting Solid Oxide Fuel Cells by Reactive Spray
Deposition Technology Ryan Ouimet1, 3; 1University of Connecticut, United
States; 2University of Connecticut, United States.

EE7.7.05
Electrochemical Refrigeration and Energy Harvesting Utilizing the
Vanadium-Bromide Redox Family Jan S. McKay; Stanford University,
United States.

EE7.7.06
First Principles Study of Charge Transfer in Hybrid Inorganic-Organic
Systems Xiaoming Wang; Rutgers University, United States.

EE7.7.07
First Principles Calculations of Thermionic Transport across Gold/
Graphene/Phosphorene van der Waals Heterostructures Xiaoming Wang;
Rutgers University, United States.

EE7.7.08
Integrated Ag/Transition Metal Oxide Composites as a Route to Improved
Electrical Conductivity in High-Temperature Thermoelectrics David
Boldrin; Imperial College London, United Kingdom.

EE7.7.09
High ZT in N-Type PbTe Nano-Composite with Nano-Precipitations
Hung Chang Hsu; China Steel Corporation, Taiwan.

EE7.7.10
Favorable Effects of Phase Separated Indium Inclusions on Thermoelectric
Properties of Undoped In2Se3
Hyun Hwan Park; Yonsei Univ, Korea (the Republic of).

EE7.7.11
Doping & Size Dependent the Seebeck Effect in 2D Si TE Devices Dong
Kiwon Kim; ICT Convergence Technology for Health & Safety and Department
of Electronics and Information Engineering, Korea University, 2511 Sejong-ro,
Korea (the Republic of).

EE7.7.12
Controlled Optimization of Carrier Concentration via Zn Doping
Using Zintl Chemistry in Mg,Sb2: Synergistic Approach for Improving
Thermoelectric Figure-of-Merit Dinesh Misra; National Physical Laboratory,
Council of Scientific and Industrial Research, India.

EE7.7.13
Crystal Structure and Improved Thermoelectric Performance of Iron
Incorporated Cu,SnS2 Compound Baoli Du; Queen Mary University of
London, United Kingdom.

EE7.7.14
Enhanced Phonon Scattering in Cage-Like Structure Oxides with
“Rattling” Atoms Michiaka Ohtaki; Kyoto University, Japan.
EE7.7.15
Thermal Conductivity Reduction of In Doped SnTe-Se System by Nanostructures of Se Substitution Junphil Hwang; Yonsei Univ, Korea (the Republic of).

EE7.7.16
Record High ZT in p-Type PtFe-SrTe via Hierarchical Architecturing of Microstructure Fengyuan Shi; Northwestern University, United States.

EE7.7.17
Thermoelectric Effects in Graphene Antidot Lattices: The Impact of Chirality and Pure-Edge Configuration Dongchao Xu; University of Arizona, United States.

EE7.7.18
Oxidant Dependent Thermoelectric Properties of ZnO Films Deposited by Atomic Layer Deposition Hyunho Kim; King Abdullah University of Science and Technology (KAUST), Saudi Arabia.

EE7.7.19
Printed Bi,Te, Base Thermoelectric Material Technology Development Chia-Chun Hsu; Industrial Technology Research Institute, Taiwan.

EE7.7.20
Cost-Effective Protonic Ceramic Fuel Cells with High Performance at Low Temperatures Chuancheng Duan; Colorado School of Mines, United States.

EE7.7.21
Oxygen Diffusion and Electrochemical Performance of La_{0.6-x}Ba_{0.4}Co_{1-y}Fe_{3}O_{4} Hua Zhang; Nanjing Tech Univ, China.

EE7.7.22
Flexible Thermoelectric Devices with H_{2}SO_{4}-Treated PEDOT:PSS Sunghyun Kim; Seoul National Univ, Korea (the Republic of).

EE7.7.23
Significantly Enhanced Thermopower at Room Temperature in Mg_{1-x}SeO Based Zintl Phase Thermoelectric Materials via Se Doping Nagendra S. Shubhit Goel1, 2; 1Academy of Scientific & Innovative Research (AcSIR), India; 2National Physical Laboratory, Council of Scientific and Industrial Research, India.

EE7.7.24
Tuning Thermoelectric Parameters in Copper Deficient BiCu_{2-x}SeO Alloy via Te Doping in BiCu_{2-x}SeO_{1-y}Te_{y} (0 ≤ y ≤ 1) for Optimization of ZT Dongchao Xu; University of Arizona, United States.

EE7.7.25
The Effect of Sulfur on the Thermoelectric Properties of BiOCuSe Mi-Kyung Han; Ewha Womans University, Korea (the Republic of).

EE7.7.26
Vanadium-Doped ZnO and Polymer Composite Structure for High Performance Flexible Piezoelectric Nanogenerator Sung-Ho Shin; Chungnam National Univ, Korea (the Republic of).

EE7.7.27
Triboelectric Generator Output Power Enhancement by Chemical Surface Modifications Sung-Ho Shin; Chungnam National Univ, Korea (the Republic of).

EE7.7.28
Triboelectric Output Power Enhancement by Nanoimprinted Surface Yang Hyeog Kwon; Chungnam National Univ., Korea (the Republic of).

EE7.7.29
Thin-Film Flexible Piezoelectric Nanogenerators with ZnO p-n Homojunction Yang Hyeog Kwon; Chungnam National Univ., Korea (the Republic of).

EE7.7.30
Development of Nafion/SiO_{2} Composite Membranes with Potential Application IR Fuel Cells Sugeheidy Y. Carranza; Universidad Autónoma de Nuevo León, Mexico.

EE7.7.31
Facile Hydrothermal Synthesis of Molybdenum Disulfide (MoS_{2}) as Advanced Electrodes for Super Capacitors Applications Hitesh Adhikari; Univ of Memphis, United States.

EE7.7.32
Surfactant Assisted Synthesis of SrFe_{x}Al_{3}O_{5}−\gamma Magnetic and Supercapacitor Ferrite Dipesh Neupane; Univ of Memphis, United States.

EE7.7.33
Thermal Stress Effects in Vanadium Oxide/YSZ Composite Anodes for Built-In Energy Storage in Thin-Film YSZ Fuel Cell Structures Alexis M. Fenton; University of Alabama at Birmingham, United States.

EE7.7.34
Insulator Gap and Thermopower of Bi and Bi1-xSb2-x Te Doping in BiCuOSeO

EE7.7.35
Facile Synthesis of Metallic Aerogels and Their High Performances as Electro catalysts in Fuel Cell Qwaron Sh; Washington State University, United States.

EE7.7.36
High-Power Biofuel Cells Based on Three-Dimensional Reduced Graphene Oxide/Carbon Nanotube Micro Arrays Yin Song; Florida International University, United States.

EE7.7.37
Computational Prediction of Theoretical Overpotentials for Li and Mg Anodes Kyle Nagy; University of Michigan, United States.

EE7.7.38
A Multi-Cell Paper-Based Alkaline Fuel Cell Stack for Electrical Power Application Vicente Galvan; California State University, Los Angeles, United States.

EE7.7.39
Laminated Cotton-Polyester-Based Microfluidic Fuel Cells Catherine Tang and Alex X. Mendez; California State University, Los Angeles, United States.

EE7.7.40
Synthesis of Novel Birnessite Type MnO_{2} Nanochains by Electrospinning and Their Application as Supercapacitor Electrodes Victoria Voigt; Kansas State University, United States.
SESSION EE7.9: LIB Multiscale Modeling
Session Chairs: Marc Kamlah and Arno Kwade
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 221 B

10:30 AM *EE7.9.01
Impact of Stress on the Electrical Double Layer Clemens Gühlke;
Weierstrass Institute, Germany.

11:00 AM *EE7.9.02
Space Charges and Contact Defects in Lithium All-Solid-State Batteries
Arnulf Latz1, 2, 3; 1German Aerospace Center, Germany; 2Helmholtz Institute Ulm, Germany; 3University Ulm, Germany.

SESSION EE7.10: Capacitors
Session Chairs: Qun-Dong Shen and Jihui Yang
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 221 B

1:45 PM EE7.10.01
Nanoscale Energy Release in High-Energy-Density Dielectric Polymer Capacitors Qun-Dong Shen; Nanjing University, China.

2:00 PM EE7.10.02
Vertically Aligned Helically Coiled Carbon Nanotube Arrays for use as Electrodes in Supercapacitors Anthony S. Childress1, 2; 1Clemson University, United States; 2Clemson Nanomaterials Center, United States.

2:15 PM EE7.10.03
Thin-Films of (Ba0.85Ca0.15)(Zr0.1Ti0.9)O3 for Scalable Electrical Energy Storage Applications Alvaro A. Instan Ballesteros; University of Puerto Rico, Rio Piedras Campus, United States.

2:30 PM BREAK

SESSION EE7.11: LIB Coupling Effects
Session Chairs: Clemens Gühlke and Siqi Shi
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 221 B

3:00 PM *EE7.11.01
Big, Deep and Smart Data in Electromechanical Scanning Probe Microscopies Rama K. Vashudevan; Oak Ridge National Lab, United States.

3:30 PM EE7.11.02
Mechanical Interactions Regulated Kinetics and Morphology of Composite Electrodes in Li-Ion Batteries Keise Zhao; Purdue Univ, United States.

3:45 PM EE7.11.03
Modeling the Microstructural and Micromechanical Influence on Effective Transport Properties of Granular Electrode Structures in Electrochemical Cells Marc Kamlah; Karlsruhe Inst of Technology, Germany.

4:00 PM EE7.11.04
Mechanical Methods of Determining Battery Aging and State of Health Measurements in Lithium-Ion Pouch Cells Xinxi Liu; Princeton University, United States.

4:15 PM EE7.11.05
Modeling C-Rate Dependent Diffusion-Induced-Stresses for Lithium-Ion Battery Materials Shadow Huang; North Carolina State Univ, United States.

SESSION EE7.12: Thermoelectrics and Mechanics
Session Chairs: Gerda Rogl and Wenqing Zhang
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 221 B

10:00 AM *EE7.12.01
Perspectives and Challenges in Copper Chalcogenide Thermoelectrics Lidong Chen; CAS, China.

10:30 AM EE7.12.02
Dynamic Probing of Local Thermal Heterogeneity in Nanostructured Materials and System Elham N. Nasr Esfahani; Univ of Washington, United States.

10:45 AM EE7.12.03
High-Performance Flexible Thermoelectric Paper Consist of Graphene/ PEDOT:PSS/Tellurium Nanowire Jaeyoo Choi1, 2; 1Seoul National University, Korea (the Republic of); 2Korea Institute of Science and Technology (KIST), Korea (the Republic of).

11:00 AM EE7.12.04
High Thermoelectric Performance of n-Type Carbon Nanotubes and Poly(3,4-ethylenedioxythiophene) Composite Hong Wang; Texas A&M Univ, United States.

11:15 AM EE7.12.05
Interface Engineering in Hybrid Organic-Inorganic Composites for Flexible and High-Performance Thermoelectrics Summi Shin; University of California, San Diego, United States.

11:30 AM EE7.12.06
Optimizing Thermoelectric Properties of Fast Electrodeposited Thick Lead Telluride (PbTe) Film in Alkaline Solution Tingjun Wu; Univ of California-Riverside, United States.

11:45 AM EE7.12.07
Thermal Stress Management for High-Temperature and High-Reliability Thermoelectric Devices Luke Schoensee; Boise State University, United States.

SESSION EE7.13: Thermoelectrics—Synthesis and Characterization
Session Chairs: Lidong Chen and Rui-zhi Zhang
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 221 B

1:30 PM EE7.13.01
Conducting Polymer Electrodes for Thermogalvanic Cells Kosala Wijeratne; Linköping University, Campus Norrköping, Sweden.

1:45 PM EE7.13.02
Deterioration of Thermoelectric Figure of Merit Due to Phase Segregation in Magnesium Silicide Stannide Solid Solution Su-in Yi; Texas A&M University, United States.

2:00 PM EE7.13.03
Development of a ZT-Measurement System for Thin-Films plus Additional Hall Constant Determination in a Temperature Range from LN2 up to 350°C Alexander Makitka; Linsies, United States.

2:15 PM EE7.13.04
New Thermoelectric Sulphide Ceramics Identified by High-Throughput Screening Rui-zhi Zhang1, 2; 1Queen Mary University of London, United Kingdom; 2Northwest University, China.

2:30 PM BREAK
SESSION EE7.14: Thermal Conductivity in Thermoelectrics
Session Chairs: Jaeho Lee and Tiejun Zhu
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 221 B

3:00 PM EE7.14.01
Phonon Transport and Thermoelectric Properties in Silicon Nanowires at High Temperatures Jaeho Lee1, 3; 1University of California, Irvine, United States; 3Lawrence Berkeley National Laboratory, United States.

3:15 PM EE7.14.02
Enhancement of Thermoelectric Property in Nanocomposites due to Surface-Bound Small Molecules Yue Wu; Iowa State University, United States.

3:30 PM EE7.14.03
Thermal Investigation of Nanostructured Bulk Thermoelectric Materials with Hierarchical Structures: An Effective Medium Approach Hongbo Zhao; Univ of Arizona, United States.

3:45 PM EE7.14.04
Coherent Scattering of Phonons at Room Temperature with Sub-Micron Phononic Crystals Zayd C. Leseman; Univ of New Mexico, United States.

4:00 PM EE7.14.05
Thermally-Active Screw Dislocations in Si, SiC, PbSe, and SiGe Nanowires Jihong Al-Ghalith; University of Minnesota, United States.

4:15 PM EE7.14.06
Spectral Analysis of Phonon Transport in Nanophononic Metamaterials Sanghamitra Neogi1, 2; 1University of Colorado Boulder, United States; 2Max Planck Institute for Polymer Research, Germany.
SYMPOSIUM EE8
Grid-Scale Energy Storage
March 29 - March 30, 2016

Chairs
Mitchell Anstey, Sandia National Laboratories
Babu Chalamala, Sandia National Laboratories
Sagar Mitra, Indian Institute of Technology Bombay
Jun Wang, A123 Systems LLC

Symposium Support
Army Research Office

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* Invited Paper

SESSION EE8.1: Energy Storage Safety and Reliability
Session Chairs: Mitchell Anstey and Jun Wang
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 121 C

1:30 PM *EE8.1.01
A Material Science Approach to Improving Energy Storage Safety
Christopher J. Orendorff; Sandia National Labs, United States.

2:00 PM EE8.1.02
Advanced Methodology for the Development of Safe and Reliable Energy Storage Systems
David M. Rosewater; Sandia National Laboratories, United States.

2:15 PM EE8.1.03
 Ionic Liquids for Lithium-Gas Energy Storage
Fuminori Mizuno; Toyota Research Inst of NA, United States.

2:30 PM EE8.1.04
Safety Research and Development Challenges in Stationary Storage Systems
Summer R. Ferreira; Sandia National Labs, United States.

2:45 PM BREAK

SESSION EE8.2: Technologies beyond Li-Ion
Session Chairs: Babu Chalamala and Sagar Mitra
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 121 C

3:00 PM *EE8.2.01
New Sodium Iron Sulfate Chemistry for Grid-Scale Power Storage: Materials Perspective
Prabdeep Barranda; Indian Institute of Science, India.

3:30 PM EE8.2.02
Development of Sodium-Iodine Battery Unit Cell with Tubular NaSICON Membrane for Large-Scale Energy Storage
Sai Vishnuvhatla Bhavaraju; Ceramatec Inc, United States.

3:45 PM EE8.2.03
Advanced Intermediate Temperature Na-NiCl2 Battery Technologies
Guosheng Li; Missouri University of Science and Technology, United States.

4:00 PM EE8.2.04
Surface Reactions in Aqueous Sodium-Ion Batteries for (Micro)Grid Applications
Mona Shirpour; Univ of Kentucky, United States.

4:15 PM EE8.2.05
Study of Electrodeposited Zinc Morphology in Rechargeable Alkaline Batteries
Xia Wei; The City College of New York, United States.

4:30 PM EE8.2.06
Advanced Alkaline MnO2-Zn Batteries: Accessing the Second Electron Capacity
Gautam G. Yadav; City College of New York, United States.

4:45 PM EE8.2.07
Highly Flexible and Transparent Solid-State Supercapacitors Based on RuO2/PEDOT Hybrid Ultrathin Films
Chuanfang (John) Zhang; Trinity College Dublin, Ireland.

SESSION EE8.3: Frontiers of Li-Ion Chemistry
Session Chairs: Travis Anderson and Mitchell Anstey
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 121 C

8:00 AM *EE8.3.01
Electron-Donating Phenothiazines for Energy Storage Applications
Susan A. Odom; University of Kentucky, United States.

8:30 AM *EE8.3.02
Water-in-Salt Electrolyte Enables High Voltage Aqueous Li-Ion Chemistries
Chunsheng Wang; Univ of Maryland, United States.

9:00 AM EE8.3.03
Evaluation of Binders for High Capacity Si/Graphite Composite Anode
Jun Wang; A123 Systems LLC, United States.

9:15 AM EE8.3.04
New Iron-Based Mixed-Polyanionic Compounds as Cathode Materials for Rechargeable Lithium- and Sodium-Ion Batteries for Grid Applications
Amritava Choudhury; Missouri University of Science and Technology, United States.

9:30 AM *EE8.3.05
Thermal Loss Analyses of Lithium-Ion Cells Using Graphite and LTO Anodes
Balaya Palani; National University of Singapore, Singapore.

10:00 AM BREAK

SESSION EE8.4: Redox Flow Batteries
Session Chairs: Sagar Mitra and Susan Odom
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 121 C

10:30 AM *EE8.4.01
Next Generation Flow Batteries
Wei Wang; Pacific Northwest National Lab, United States.

11:00 AM *EE8.4.02
Advances in Materials for Ionic Liquid Flow Batteries
Travis M. Anderson; Sandia National Laboratories, United States.

11:30 AM EE8.4.03
Dialkyl Sulfide-Based Electrolytes for Nonaqueous Redox Flow Batteries
Leo I. Small; Sandia National Laboratories, United States.

11:45 AM EE8.4.04
Low-Cost, Pump-Free, Membrane-Free and Highly Dynamic ZnBr2 Batteries for Grid Scale Storage
Daniel Steinhardt; Princeton Univ, United States.
SYMPOSIUM EE9

Hydrogen and Fuel Cell Technologies for Transportation—Materials, Systems and Infrastructure
March 28 - April 1, 2016

Chairs
Katherine Ayers, Proton OnSite
Xinliang Feng, Technische Universitaet Dresden
Yu Morimoto, Toyota Central R&D Labs., Inc.
Yuyan Shao, Pacific Northwest National Laboratory
Yushan Yan, University of Delaware

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* Invited Paper

TUTORIAL
Electrochemical Interfaces—Fundamentals and Applications
Monday Afternoon, March 28, 2016
1:30 PM - 5:00 PM
PCC North, 100 Level, Room 125 B

Part I: Electrode/Liquid Electrolyte Interfaces and Application Examples
The basic concepts of electrochemical interfaces in liquid electrolytes will be covered, including a general overview of electrochemistry concepts, electrode kinetics, electrochemical double layer and electrocatalysis. This segment also introduces electrochemical interface-related application examples, including fuel cells and hydrogen production (hydrogen evolution, oxygen evolution) in acidic and alkaline systems. The synthesis and characterization of nanostructured electrocatalysts may also be discussed.

Part II: Electrode/Polymer Electrolyte Interfaces and Application Examples
The electrochemical interfaces in contact with polymer electrolytes will be covered, including ionomer-electrode interface, ionomer thin film on substrates, ionomer influence on electrocatalysis (ionomers can be both acidic ones and alkaline ionomers), etc. Diagnostics, formation and modeling of these interfaces will be introduced. Application examples include fuel cells, flow batteries, and solar-fuel generators.

Instructors
Nenad M. Markovic, Argonne National Laboratory
Adam Weber, Lawrence Berkeley National Laboratory

SESSION EE9.1: Opening and General Aspects
Session Chairs: Everett Anderson and Yuyan Shao
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 125 B

1:30 PM *EE9.1.01

2:00 PM *EE9.1.02
NEDO’S R&D Program for Dissemination of FCV Eiji Ohira; New Energy and Industrial Technology Development Organization, Japan.

2:30 PM *EE9.1.03
The Role of Hydrogen as an Energy Carrier to Enable Future Low Carbon Energy Infrastructure Everett B. Anderson; Proton OnSite, United States.

3:00 PM BREAK

3:30 PM *EE9.1.04
The Development of Toyota’s FCV “MIRAI” Tsuyoshi Takahashi; Toyota Motor Corporation, Japan.

4:00 PM *EE9.1.05
PEFC Research in FC-Cubic TRA Kazuhiko Shinohara; FC-Cubic TRA, Japan.

4:30 PM *EE9.1.06
In-Line Quality Control for Fuel Cell and Electrolysis Materials Michael Ufuk; National Renewable Energy Laboratory, United States.

SESSION EE9.2: Poster Session: H2/Fuel Cell
Session Chairs: Katherine Ayers, Xinliang Feng, Yuyan Shao and Yushan Yan
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE9.2.01
Simultaneous Thermal Reduction and Nitrogen-Doping of Graphene Oxide in Air Donghe Du; National University of Singapore, Singapore.

EE9.2.02
Atomic Layer Deposited TiO2/Pt Nanocatalysts on Supramolecular Peptide Nanofiber Templates for Efficient Hydrolytic Dehydrogenation of Ammonia Borane Mohammad Aref Khaliqi; Bilkent University, Turkey.

EE9.2.03
Catalyst Free Hydrogen Generation For Fuel Cells Levent Semiz; TOBB University of Economics and Technology, Turkey.

EE9.2.04
The Thermodynamic Investigation of the Effect of CO2 to the Stability of LSCF Yu Zhong; Florida International University, United States.

EE9.2.05

EE9.2.06

EE9.2.07
Investigating the Decomposition Pathways and Hydrogen Storage Capacity of V, Cr, and Fe Amino Borohydrides Zachary J. Huba; US Naval Research Laboratory, United States.

EE9.2.08
High Performance Hydrogen Evolution by Molybdenum Sulhide/N-Doped CNT Forest Hybrid Catalysts Gil Yong Lee; KAIST, Korea (the Republic of).

EE9.2.09
Synthesis of Iron and Nitrogen Co-Doped Ordered Mesoporous Carbon for Highly Efficient Oxygen Reduction Reaction Xing Jin; Sungkyunkwan University, Korea (the Republic of).

EE9.2.10
Proton Conductivity Measurements in Membranes Based on Modified PBI Used in HT-PEMFC Agustin Baron Jaimes; Instituto de Energias Renovables, Mexico.

EE9.2.11
Phenomenological Study of Perfluorosulfonic Acid Ionomer Binder in the Electrodes for Proton Exchange Membrane Fuel Cells Jin-Soo Park; Sungkyunkwan University, Korea (the Republic of).

EE9.2.12
High Stable Hydrogen Gas Sensor Based on Palladium-Graphene Hybrid Structure Seungbae Ahn; Inha Univ, Korea (the Republic of).
EE9.2.13
High Electrocatalytic Activity of FeSe2/C toward Oxygen Reduction Reaction Xuan Cheng1, 2; 1Xiamen Univ, China; 2Fujian Key Laboratory of Advanced Materials, China.

EE9.2.14
Facile Synthesis of Graphene/N-Doped Carbon Nanowire Composites as an Effective Electrocatalyst for the Oxygen Reduction Reaction Tran Van Tam; Univ of Ulsan, Korea (the Republic of).

EE9.2.16
Perfluorinated Block-Copolymers for Dry Proton Exchange Membranes Anja Mueller; Central Michigan Univ, United States.

EE9.2.17
Understanding the Molecular Mechanisms of Catalytic Oxygen Evolution on LiCoO2 from First Principles Yu-Hao Tsai; The University of Texas at Austin , United States.

EE9.2.18
Three-Dimensional TiO2@C Nano-Network with High Porosity as Highly Efficient Pt-Based Catalyst Support for Methanol Electrooxidation Xuelei Sui; Harbin Institute of Technology, China.

EE9.2.19
Enhanced H2, Dissociative Phenomena of Pt–Ir Electrocatalysts for PEMFCs: An Integrated Experimental and Theoretical Study Soochul Kwon; Pusan National University, Korea (the Republic of).

EE9.2.20
Important Improvement of the Desorption Kinetics of a TiFe Base Alloy Important Improvement of the Desorption Kinetics of a TiFe Base Alloy Philippe Nardin1, 2; 1University of Franche-Comte, France; 2Femto-st institute, France.

EE9.2.21
Three-Dimensional Heterostructures of MoS2 Nanosheets on Conducting MoO2 as an Efficient Electrocatalyst to Enhance Hydrogen Evolution Reaction Revannath D. Nikam1, 2, 4; 1National Taiwan Univ, Taiwan; 2Institute for Basic Science, Korea (the Republic of); 4Academia Sinica, Taiwan, Taiwan International Graduate Program, Academia Sinica, Taiwan.

EE9.2.22
Understanding the Molecular Mechanisms of Catalytic Oxygen Evolution on LiCoO2 from First Principles Yu-Hao Tsai; The University of Texas at Austin , United States.

EE9.2.23
Three-Dimensional TiO2@C Nano-Network with High Porosity as Highly Efficient Pt-Based Catalyst Support for Methanol Electrooxidation Xuelei Sui; Harbin Institute of Technology, China.

EE9.2.24
Enhanced H2, Dissociative Phenomena of Pt–Ir Electrocatalysts for PEMFCs: An Integrated Experimental and Theoretical Study Soochul Kwon; Pusan National University, Korea (the Republic of).

EE9.2.25
Important Improvement of the Desorption Kinetics of a TiFe Base Alloy Philippe Nardin1, 2; 1University of Franche-Comte, France; 2Femto-st institute, France.

EE9.2.26
Three-Dimensional Heterostructures of MoS2 Nanosheets on Conducting MoO2 as an Efficient Electrocatalyst to Enhance Hydrogen Evolution Reaction Revannath D. Nikam1, 2, 4; 1National Taiwan Univ, Taiwan; 2Institute for Basic Science, Korea (the Republic of); 4Academia Sinica, Taiwan, Taiwan International Graduate Program, Academia Sinica, Taiwan.

EE9.2.27
Understanding the Molecular Mechanisms of Catalytic Oxygen Evolution on LiCoO2 from First Principles Yu-Hao Tsai; The University of Texas at Austin , United States.

EE9.2.28
Three-Dimensional TiO2@C Nano-Network with High Porosity as Highly Efficient Pt-Based Catalyst Support for Methanol Electrooxidation Xuelei Sui; Harbin Institute of Technology, China.

EE9.2.29
Enhanced H2, Dissociative Phenomena of Pt–Ir Electrocatalysts for PEMFCs: An Integrated Experimental and Theoretical Study Soochul Kwon; Pusan National University, Korea (the Republic of).

EE9.2.30
Important Improvement of the Desorption Kinetics of a TiFe Base Alloy Philippe Nardin1, 2; 1University of Franche-Comte, France; 2Femto-st institute, France.

EE9.2.31
Three-Dimensional Heterostructures of MoS2 Nanosheets on Conducting MoO2 as an Efficient Electrocatalyst to Enhance Hydrogen Evolution Reaction Revannath D. Nikam1, 2, 4; 1National Taiwan Univ, Taiwan; 2Institute for Basic Science, Korea (the Republic of); 4Academia Sinica, Taiwan, Taiwan International Graduate Program, Academia Sinica, Taiwan.

EE9.3.01
Alkaline Anion Exchange Membrane Fuel Cell Hongmei Yu; Dalian Institute of Chemical Physics, Chinese Academy of Sciences, China.

EE9.3.02
Nanostructured Anion Exchange Membranes Michael Hickner; Oak Ridge National Laboratory, United States.

EE9.3.03
Radiation-Grafted Anion-Exchange Polymer Electrolyte Materials for Electrochemical Energy Technologies John Varepo; University of Surrey, United Kingdom.

EE9.3.04
Break

EE9.3.05
Advances in Perfluorinated Anion Exchange Membrane Fuel Cells Bryan Pivovar; NREL, United States.

EE9.3.06
Advances in Polyphenylene-Based Anion Exchange Membranes for Alkaline Electrolysis Cells Michael Hibbs; Sandia National Laboratories, United States.

EE9.3.07
Rapid Computational Screening of Inorganic Proton Conducting Materials Pandu Wisesa; Johns Hopkins University, United States.

EE9.3.08
Remarkably Improved Conductivity of Nanocomposite Membranes via Grotthus Mechanism Hee-Woo Rhee; Sogang Univ, Korea (the Republic of).

EE9.3.09
Towards High Efficiency Membrane-Less Electrolysis S. Mohammad H. Hashemi; EPFL, Switzerland.

EE9.4.01
Material Degradation in PEM Fuel Cells Rod L. Borup; Los Alamos National Lab, United States.

EE9.4.02
Environmental TEM Study of Nanostructure Evolution of Pt/CNT: O2, H2O or Electron Beam Chongmin N. Wang; Pacific Northwest National Lab, United States.

EE9.4.03
Progress in Materials Design of Electrocatalysts for Fuel Cells Vojislav Stamenkovic; Argonne National Lab, United States.

EE9.4.04
Fundamental Study of Nucleation and Binding of Metal Catalysts on Nanostructured Carbon Jun Liu; Pacific Northwest Nat’l Lab, United States.

EE9.4.05
Nanoscale Architecture for Fuel Cell Electrocatalyst Yung-Fun Sun1, 2; 1Seoul National Univ, Korea (the Republic of); 2Institute for Basic Science, Korea (the Republic of).

EE9.4.06
Platinum Nanotubes Array as Carbon-Free PEMFC Cathode Olivier Marconet1, 2; 1CEA, France; 2Universite Grenoble Alpes, France.

EE9.5.01
Development of Highly-Reliable Hydrocarbon-Based Membrane for Polymer Electrolyte Fuel Cells Daitsuke Inohara; Toray Industries, Inc., Japan.

EE9.5.02
Understanding Ionomer Thin-Films in Fuel Cells Adam Z. Weber; Lawrence Berkeley National Lab, United States.

EE9.5.03
Understanding Ionomer Dispensions in PEM Fuel Cell Catalyst Layers: Correlation with Fuel Cell Performance, Durability, and Degradation Karren L. More; Oak Ridge National Laboratory, United States.

EE9.5.04
In-Line Monitoring of PEM Membranes Using Spectral Reflectance Imaging Blrushan L. Sopori; National Renewable Energy Lab, United States.

EE9.5.05
Correlation with Fuel Cell Performance, Durability, and Degradation Karren L. More; Oak Ridge National Laboratory, United States.

EE9.5.06
Impact of Magnetically Aligned CNTs in Polymeric Membranes on Charge and Mass Transport Properties for Hydrogen and Fuel Cell Applications Anshu Sharma; University of Rajasthan, India.
10:45 AM EE9.5.07
One-Step Synthesis of Self-Supported Porous NiSe2/Ni Hybrid Foam: An Efficient 3D Electrode for Hydrogen Evolution Reaction Shuo Chen; University of Houston, United States.

11:00 AM EE9.5.08
Co22t Selenide as an Efficient Trifunctional Catalyst for HER, OER and ORR Jahanzeer Masud; Missouri University of Science & Technology, United States.

11:15 AM EE9.5.09
Metal and Polymer Nanostructures Synthesized in Swollen Hexagonal Mesophases: Application in Fuel Cells Dina Floreysong; Laboratoire de Chimie Physique, Universite Paris Sud, France.

11:30 AM EE9.5.10
Graphite-C, Nanotubes Modified Carbon Nanotubes as High-Performance PtRu Catalyst Support for Methanol Electrooxidation Cunzhi Li; Harbin Institute of Technology, China.

11:45 AM EE9.5.11
Hybrid of Carbon-Supported Pt Nanoparticles and Three-Dimensional Graphene Aerogel as High Stable Electrocatayst for Methanol Electrooxidation Lei Zhao; Harbin Institute of Technology, China.

SESSION EE9.6: Electrocatalysts II
Session Chairs: Tim-Patrick Fellinger and Yuyan Shao
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 125 B

1:30 PM *EE9.6.01
Nitrogen Doped Carbon Electrocataysts for the Oxygen Reduction Tim-Patrick Fellinger; Max-Planck-Institute of Colloids and Interfaces, Germany.

2:00 PM *EE9.6.02
Carbon-Based Metal-Free Electrocataysts for ORR in Fuel Cells and Beyond Liming Dai; Case Western Reserve Univ, United States.

2:30 PM EE9.6.03
Rational Design of Heteroatom-Doped Graphene as Bifunctional Catalysts for Oxygen Reduction and Evolution Reactions in Fuel Cells and Metal-Air Batteries Zhenhai Xia; Univ of North Texas, United States.

2:45 PM EE9.6.04
Pore Tuning towards Highly Active Nitrogen Doped Carbon Electrocataysts Tim-Patrick Fellinger; Max Planck Institute of Colloids and Interfaces, Germany.

3:00 PM BREAK

3:30 PM *EE9.6.05
Non-Precious Metal Electrocataysts for Oxygen Reduction Piotr Zelenay; Los Alamos National Lab, United States.

4:00 PM EE9.6.06
Designing Porous Structures in Carbon-Based Electrocataysts Xinliang Feng; Technische Universitdt Dresden, Germany.

4:15 PM EE9.6.07
Bifunctional Nano-Sponges Serving as Non-Precious Metal Catalysts and Self-Standing Cathodes for High Performance Fuel Cell Applications Cunzhi Li; Harbin Institute of Technology, China.

4:30 PM EE9.6.08
Efficient Oxygen Electroreduction: Hierarchical Porous Fe-N-Doped Hollow Carbon-Nanosshells Yuan Wang; University of California at Riverside, United States.

SESSION EE9.7: Characterization and H2 Storage
Session Chairs: Yuyan Shao and Zhenbo Wang
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 105 A

8:30 AM *EE9.7.01
Use of Mass Spectrometry for the Investigation Corrosion Processes in Fuel Cells Carsten Cremers; Fraunhofer Institute for Chemical Technology ICT, Germany.

9:00 AM EE9.7.02
Toward 4D STEM Mapping of Electrocatayst Degradation within the Catalyst Layer of PEM Fuel Cells Brian T. Sneed; Oak Ridge National Laboratory, United States.

9:15 AM EE9.7.03
Determining Fundamental Characteristics of Metallic Nanoalloys for Fuel Cells by In Operando High-Energy XRD Valeri Petkov; Central Michigan Univ, United States.

9:30 AM EE9.7.04
In Situ Single Atom Resolution Observations of Dynamic Water Gas Shift Pathways for Hydrogen Production Pratibha L. Gai1, 2, 4; 1University of York, United Kingdom; 2University of York, United Kingdom; 4University of York, United Kingdom.

9:45 AM EE9.7.05
WGS Catalysis and In Situ Studies of CoO1-x, PtCo/C3O4, and PtCo/C3O4 Nanorod Catalysts Shiran Zhang2, 1; 1University of Notre Dame, United States; 2University of Kansas, United States.

10:00 AM EE9.7.06
Morphological and Chemical Evolution of Nanoporous Stainless Steel for Energy Applications Chonghang Zhao; Stony Brook University, United States.

10:15 AM BREAK

10:45 AM EE9.7.07

11:00 AM EE9.7.08
Nanointerface-Driven Reversible Hydrogen Storage in the Nanoconfined Li-N-H System Brandon Wood; Lawrence Livermore National Laboratory, United States.

11:15 AM EE9.7.09
Phase Minimization as a Promising Strategy for Improving the Hydrogen Storage Properities of Complex Metal Hydrides Vitalic Stavila; Sandia National Laboratories, United States.

11:30 AM EE9.7.10
Kinetics and Thermodynamics of Hydrogen Sorption Studied by Manometric and Coupled Manometric-Calorimetic Techniques Kristina Lilova; Setaram, United States.

11:45 AM EE9.7.11
Synthesis of Metal Nanosponges and Their Hydrogen Storage Properties Sourav Ghosh; Indian Institute of Science, India.
SYMPOSIUM EE10

Recent Advances in Materials for Carbon Capture
March 30 - March 31, 2016

Chairs
Jason Bara, University of Alabama
Chunqing Liu, UOP, LLC, Honeywell Performance Materials and Technologies
Shannon Mahurin, Oak Ridge National Laboratory

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

SESSION EE10.1: Porous Materials and Membranes
Session Chairs: Jason Bara and Shannon Mahurin
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 121 C

1:30 PM *EE10.1.01
Preparation of N-Doped Porous Carbon from Porous Aromatic Framework for Gas Storage Shilun Qiu; Jilin University, China.

2:00 PM EE10.1.02
Preparation of Ordered N-Doped Mesoporous Carbon via Polymer-Ionic Liquid Assembly Xili Cui; Zhejiang University, China.

2:15 PM EE10.1.03

2:30 PM *EE10.1.04
CO₂ Capture by Cold Membrane Operation Sudhir Kulkarni; Air Liquide, United States.

3:00 PM BREAK

3:30 PM *EE10.1.05
Separation of Carbon Dioxide Based on Porous Membranes Sheng Dai1,2; 1Oak Ridge National Laboratory, United States; 2University of Tennessee, United States.

4:00 PM EE10.1.06
Development of Passive Polymer Membranes for High Flux Carbon Dioxide Separation Tomonori Saito; Oak Ridge National Laboratory, United States.

4:15 PM EE10.1.07
Experiments and Simulations of Mixed Matrix Membranes for CO₂ Capture from Post-Combustion Flue Gas David Hopkinson; National Energy Technology Laboratory, United States.

4:30 PM EE10.1.08
Metal Organic Covalent Network Based Films for Carbon Capture Minhui Wang; Massachusetts Institute of Technology, United States.

4:45 PM EE10.1.09
Electrospin Nanocomposite Membranes for Separation Bin Mu; Arizona State University, United States.

SESSION EE10.2: Poster Session
Session Chair: Shannon Mahurin
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE10.2.01
Direct Observation of CO₂ Sorption on the Eutectic Mixture Promoted MgO Soonha Hwang; Myongji University, Korea (the Republic of).

EE10.2.02
Thermodynamic Properties of MgO and Substrates in CO₂ Adsorption Based on Density Functional Theory Sung Hwan Kwon; Pusan National University, Korea (the Republic of).

EE10.2.03
Lewis-Base Derivatized Covalent Metal-Organic Networks (CMONs) for Carbon Capture David R. Manke; University of Massachusetts Dartmouth, United States.

EE10.2.04
Use of Organic/Inorganic Hybrid Aerogels for Low-Concentration CO₂ Capture Yong Kong1,2; 1Nanjing Tech University, China; 2University of Wyoming, United States.

SESSION EE10.3: Computation
Session Chairs: Jason Bara and Chunqing Liu
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 121 C

8:00 AM *EE10.3.01
Computational Materials Chemistry for Carbon Capture De-en Jiang; Univ of California-Riverside, United States.

8:30 AM EE10.3.02
Theoretical Design of Triptycene-Derived Covalent Organic Frameworks for CO₂ Capture Ziqi Tian; University of California, Riverside, United States.

8:45 AM *EE10.3.03
Multiscale Modeling of Metal-Organic Frameworks for Carbon Capture Randall Q. Snurr; Northwestern University, United States.

9:15 AM EE10.3.04
Understanding and Controlling CO₂ Uptake Reduction of MOF-74 after Exposure to Humid Conditions Sebastian Zuluaga; Wake Forest Univ, United States.

9:30 AM EE10.3.05
Computational Modelling of Stimuli Responsive Metal-Organic Frameworks Runhong Huang; Monash University, Australia.

9:45 AM EE10.3.06
Ab Initio Thermodynamics of the Flexible Framework Material MIL-53 (Cr) Eric Cookayne; NIST, United States.

10:00 AM BREAK

SESSION EE10.4: Framework Materials
Session Chairs: Jason Bara and Chunqing Liu
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 121 C

10:30 AM *EE10.4.01
Amine-Functionalized MOFs/PPNs for Carbon Capture Hongcai Zhou; Texas A&M Univ, United States.

11:00 AM EE10.4.02
Pore Space Partition for Dramatically Enhanced Carbon Dioxide Uptake Xiang Zhao; UC Riverside, United States.
11:15 AM EE10.4.03
Surface Area and Porosity Assessment of MOFs by Combining Ar Adsorption with Sub- and Supercritical CO₂ Adsorption Katie A. Cychosz; Quantachrome Instruments, United States.

11:30 AM EE10.4.04
Changes in Microstructure and Structure during Selective Gas Adsorption in Advanced Carbon Capture Materials Andrew J. Allen; NIST, United States.

11:45 AM EE10.4.05
Exceptional Carbon Dioxide (CO₂) Sorption Properties of Hierarchical FAU Zeolites Having a High Crystallinity, Produced through a Scalable and Sustainable Synthetic Method Dong-Kyun Seo; Arizona State University, United States.

SESSION EE10.5: Unconventional Materials
Session Chairs: Chunqing Liu and Shannon Mahurin
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 121 C

1:30 PM *EE10.5.01
Ionic Liquids – Phase Behavior to Carbon Dioxide Capture Mark Shiflett; DuPont Central Research and Development, United States.

2:00 PM EE10.5.02
Lessons Learned from the Use of Unconventional Materials for CO₂ Capture Jason F. Born; Univ of Alabama, United States.

2:15 PM EE10.5.03
High-Throughput Generation of Encapsulated Sorbents for Carbon Dioxide Capture Du T. Nguyen; Lawrence Livermore National Laboratory, United States.

2:30 PM *EE10.5.04
In Situ Structural and Dynamic Studies on Porous Capture Materials Martin Schröder; Univ of Manchester, United Kingdom.

3:00 PM BREAK

3:30 PM EE10.5.05
Nanoporous Polymers for Efficient CO₂ Capture and Separation Ali Coskun; KAIST, Korea (the Republic of).

3:45 PM EE10.5.06
New MOF-Nanofiber Nanocomposites for Moisture Swing Adsorption of Carbon Dioxide Mitchell Armstrong; Arizona State University, United States.

4:00 PM EE10.5.07
In Situ and In Operando Investigations of CO₂ Interactions with Shales Using USAXS/SAXS/WAXS for Sustainable Hydrocarbon Extraction and Permanent Storage of CO₂ Greeshma Gadikota¹; ²; ¹Columbia University, United States; ²National Institute of Standards and Technology, United States.

4:15 PM EE10.5.08
A Mechanism for the Effect of Hydration on the Reactivation of Sintered CaO Based Sorbent During Carbonation Mahmoud R. Reda; CanadaElectrochem, Canada.

4:30 PM EE10.5.09
Carbon Dioxide Absorption and Desorption of Calcined Dolomite and Calcite Investigated by TGA-MS Ekkehard Post; NETZSCH Gerätebau GmbH, Germany.
Caloric Materials for Renewable Energy Applications
March 28 - March 31, 2016

Chairs
Asaya Fujita, National Institute of Advanced Industrial Science and Technology (AIST Chubu)
Neil Mathur, University of Cambridge
Nini Pryds, Technical University of Denmark
Ichiro Takeuchi, University of Maryland

Symposium Support
ENVOHEAT-Denmark

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances).

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* Invited Paper

TUTORIAL
Caloric Materials—From Fundamental to Application
Monday Morning, March 28, 2016
8:30 AM - 12:00 PM
PCC North, 100 Level, Room 126 B

8:30 AM-10:00 AM
Part I: Antoni Planes
Part I provides a general introduction to caloric effects, followed by the development of a thermodynamic framework to deal with multicaoric effects in multiferroic (magnetoelectric and magnetostuctural) materials. It will be shown that giant caloric effects are expected to occur in the vicinity of phase transitions. Results will be illustrated for systems described by a Landau free energy with two coupled order parameters. Finally, the relevance of dissipative effects and hysteresis will be considered.

10:00 AM Break

10:30 AM-12:00 PM
Part II: Andrej Kitanovski
In recent years, several caloric technologies have been investigated for future refrigeration, heat pumping, air conditioning or even energy harvesting. Many of these technologies suggest the possibility for improvements in energy efficiency, compactness and noise level, as well as a reduction in environmental impacts. Therefore, they represent serious alternatives to the rather mature vapor-compression technology. Part II reviews the present status of these technologies, followed by the development of a thermodynamic framework to deal with multicaoric effects in multiferroic (magnetoelectric and magnetostuctural) materials. It will be shown that giant caloric effects are expected to occur in the vicinity of phase transitions. Results will be illustrated for systems described by a Landau free energy with two coupled order parameters. Finally, the relevance of dissipative effects and hysteresis will be considered.

1:45 PM *EE11.1.01
Magnetocaloric Effect: Where We Are Today and What Does the Future Hold Vitalij Pecharsky1, 2; 1Ames Laboratory, Iowa State University, United States; 2Iowa State University, United States.

2:15 PM EE11.1.02
Low Hysteresis Material for Future Applications Vijay K. Srivastava; GE Global Research, United States.

2:30 PM *EE11.1.03
Magnetocaloric Heat Pump Systems: An Overview Steven Russek; Astronautics Corporation of America, United States.

3:00 PM BREAK

3:30 PM *EE11.1.04
Challenges in Going from 2nd Order to 1st Order Materials in Magnetic Refrigeration Devices Christian Bahl; Technical University of Denmark, Denmark.

4:00 PM EE11.1.05
Advancements in Magnetocaloric Liquefaction Jamie Holladay; Pacific Northwest National Laboratory, United States.

4:15 PM *EE11.1.06
Caloric, Meet Regenerator: You Have a Volume Problem Andrew Rowe; Univ of Victoria, Canada.

SESSION EE11.2: Session II
Session Chairs: Asaya Fujita, Lluis Manosa, Vitalij Pecharsky and Andrew Rowe
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 127 A

8:45 AM *EE11.2.01
Electronic Phase Change and Entropic Functions in Transition Metal Oxides Hidenori Takagi1, 2; 1Max Planck Institute for Solid State Research, Germany; 2University of Tokyo, Japan; 3University of Stuttgart, Germany.

9:15 AM EE11.2.02
Non-Universal Scaling of the Magnetocaloric Effect as an Insight into Magnetic Phase Transitions Anders Smith; Technical University of Denmark, Denmark.

9:30 AM *EE11.2.03
Element-Resolved Thermodynamics of the Conventional Magnetocaloric System La-Fe-Si Markus E. Gruner1, 2; 1University of Duisburg-Essen, Germany; 2Technical University Munich, Germany.

10:00 AM BREAK

10:30 AM *EE11.2.04
In Situ XRD and 3D Imaging Techniques for the Study of Magnetocaloric Materials Anja Waske; IFW Dresden, Germany.

11:00 AM EE11.2.05
Entropic Features of Paramagnetic State in Some Itinerant Electron-Type Caloric Compounds Asaya Fujita; AIST Chubu, Japan.

11:15 AM EE11.2.06
La(Fe,Mn,Si)13H First Order Phase Transition Evaluated by XRD Methods Henrique N. Bez; DTU, Denmark.

11:30 AM EE11.2.07
First Principles Modeling of Magnetostuctural Transformations and Magnetocaloric Effect Durga Paudyal; Ames Laboratory, Iowa State University, United States.

11:45 AM EE11.2.08
Residual Stress Induced Stabilization of Martensite Phase and Its Effect on the Magneto-Structural Transformation in Mn Rich Ni-Mn-In/Ga Magnetic Shape Memory Alloys Sanjay Singh; Max-Planck Institute For Chemical Physics of Solids, Germany.
SESSION EE11.3: Session III
Session Chairs: Christian Bahl, Xavier Moya, Eckhard Quandt and Hidenori Takagi
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 127A

1:30 PM *EE11.3.01
DRREAM: Drastically Reduced Use of Rare Earths in Applications of Magnetocalorics Lesley F. Cohen; Imperial College, United Kingdom.

2:00 PM EE11.3.02
Exploring Magnetic Frustration in Antiperovskite Mn Nitrdes David Boldrin; Imperial College London, United Kingdom.

2:15 PM EE11.3.03
Cooperative Lattice Distortions in the Magnetostructural Compound AlFe2B2 with Magnetocaloric Potential Laura H. Lewis; Northeastern Univ, United States.

2:30 PM EE11.3.04
Some Aspects of Magnetocaloric and Elastocaloric Behavior of Metamagnetic Shape Memory Alloys Volodymyr Cherenenko1, 2; 1BCMateriats & University of Basque Country, Spain; 2 Ikerbasque, Basque Foundation for Science, Spain.

2:45 PM BREAK

3:15 PM *EE11.3.05
Electrocaloric Cooling: Present Advances and Future Perspectives Qiming Zhang; Pennsylvania State Univ, United States.

3:45 PM EE11.3.06
Calorimetric Studies of Electrocaloric Polymeric Films: Creating Material Requirements from Sub-Component Level Studies Joseph V. Mantese; United Technologies Res Ctr, United States.

4:00 PM EE11.3.07
Electrocaloric Heat Pump Design and Optimization David E. Schwartz; PARC, United States.

4:15 PM *EE11.3.08
Efficiency in Solid-State Cooling: Can Electrocaloric Materials Make a Difference Emmanuel Defay; Luxembourg Institute of Science and Technology, Luxembourg.

SESSION EE11.4: Poster Session
Session Chair: Asaya Fujita
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE11.4.01
Magnetocaloric and Transport Properties of Off-Stoichiometric GdNi5Mn40 In15 Alloys Parvaneh Aref; Southern Illinois Univ, United States.

EE11.4.02
Large Room Temperature Magnetocaloric Effect with Low Thermal Hysteresis in Polycrystalline Ni55Mn45In, Ga, Alloy Jose Luis Sanchez Llamazares; Instituto Potosino de Investigación Científica y Tecnológica A. C., Mexico.

EE11.4.05
Magnetocaloric Properties of Rapidly Solidified ErMn, Alloy Ribbons Jose Luis Sanchez Llamazares; Instituto Potosino de Investigación Científica y Tecnológica A. C., Mexico.

EE11.4.04
Growth of Epitaxial BaTi1_xZr_xO_3 Thin-Films for Electrocaloric Studies Stefan Engelhardt1, 2; 1IFW Dresden, Germany; 2TU Dresden, Germany.

EE11.4.05
Giant Reversible Inverse Magnetocaloric Effect in Ni50Mn35In15 Heusler alloys Abdiel Quetz; Southern Illinois University Carbondale, United States.
4:00 PM EE11.6.05
Electrocaloric Refrigeration in BaTiO$_3$ Based Lead-Free Ceramics Yang Bai; University of Science and Technology Beijing, China.

4:15 PM EE11.6.06
Electrocaloric Cooling in PVDF-Related Ferroelectric Polymers: First-Passage Monte Carlo Analysis Ying-Ju Yu; Carnegie Mellon University, United States.

4:30 PM EE11.6.07
Large Caloric Effects in Soft Materials Zdravko Kutnjak$^{1,2}$; $^{1}$Jozef Stefan Institute, Slovenia; $^{2}$The Jozef Stefan International Postgraduate School, Slovenia.

4:45 PM EE11.6.08
Structural and Ferroelectric Characterization of Freestanding 0.9 Pb(Mg$_{1/3}$Nb$_{2/3}$)O$_3$-0.1PbTiO$_3$ Thin-Films for Direct Measurements of the ECE Michael Mietschke$^{1,2}$; $^{1}$IFW Dresden, Germany; $^{2}$TU Dresden, Germany.
SYMPOSIUM EE12

Radiation Damage in Materials—A Grand Multiscale Challenge
March 29 - April 1, 2016

Chairs
Sharon Ashbrook, University of St Andrews
Jaime Marian, University of California, Los Angeles
Blas Pedro Uberuaga, Los Alamos National Laboratory
Karl Whittle, University of Liverpool

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION EE12.1: Ceramic Materials I
Session Chairs: Christina Trautmann and Thierry Wiss
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 127 C

1:30 PM EE12.1.01
Damage and Recovery in Perovskites Karl R. Whittle; University of Liverpool, United Kingdom.

1:45 PM EE12.1.02
Correlations between Amorphization Resistance and Disordering Energies in Spinel versus Pyrochlores Blas P. Uberuaga; Los Alamos National Laboratory, United States.

2:00 PM EE12.1.03
Helium Behavior in Pyrochlore Type Waste-Form Materials Over Near-Term Storage and Long-Term Geological Disposal Timescales Caitlin A. Taylor; Univ of Tennessee-Knoxville, United States.

2:15 PM EE12.1.04
Understanding the Influence of Chemistry and Disorder on Cation Transport in Pyrochlores Romain Perriot; Los Alamos National Laboratory, United States.

2:30 PM EE12.1.05

2:45 PM EE12.1.06
Ion Irradiations-Induced Microstructural Evolution in Inverse Spinel MgIn₂O₄ Ming Tang; Los Alamos National Laboratory, United States.

3:00 PM BREAK

3:30 PM *EE12.1.07
Materials Modification and Nanostructures Produced with Heavy Ions in the Electronic Stopping Regime Christina Trautmann; *GSI Helmholtzentrum, Germany; †Technische Universität Darmstadt, Germany.

4:00 PM EE12.1.08
Correlative and Dynamic in situ S/TEM Characterization of Heavily Irradiated Nanocrystalline Ceramics Terry G. Holesinger; Los Alamos National Laboratory, United States.

4:15 PM EE12.1.09
Characterisation and Electrical Properties of Ion Implanted and Neutron Irradiated High Temperature Superconductor for Fusion Applications Stella Pedrazzini; University of Oxford, United Kingdom.

4:30 PM EE12.1.10
Towards Understanding of the Multi Beam Irradiation Scenarios: Mono, Sequential and Simultaneous Beam Irradiation of Amorphous Silica Sylvain Peugnot; Laboratoire d’Étude des Matériaux et Procédés Actif, France.

10:00 AM BREAK

10:30 AM *EE12.2.05/EE13.2.05/MD8.3.05
Radiation Damages in Nuclear Waste Glasses: An NMR Point of View Thibault Charpentier; CEA, IRAMIS, NIMBE - UMR CEA-CNRS 3685, France.

11:00 AM EE12.2.06/EE13.2.06/MD8.3.06
Effects of Radiation Fields on Actinide-Containing Materials Steven D. Conradyon; Soleil, France.

11:15 AM EE12.2.07/EE13.2.07/MD8.3.07
How Well Can Electronic Structure Calculations Describe Uranium Dioxide Properties Marjorie Bertolus; CEA, DEN, France.

11:30 AM EE12.2.08/EE13.2.08/MD8.3.08
Development of a Multiscale Thermal Conductivity Model for Fission Gas in UO₂ Michael R. Tonks; Pennsylvania State Univ, United States.

11:45 AM EE12.2.09/EE13.2.09/MD8.3.09
Fission Gas Diffusion in UO₂ Nuclear Fuel by Extended Vacancy Cluster David Andersson; Los Alamos National Laboratory, United States.

SESSION EE12.3: Ceramic Materials II
Session Chairs: Marjorie Bertolus and Roger Smith
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 127 C

1:30 PM EE12.3.01
Pipe Diffusion of He in UO₂ Conor Galvin; Imperial College London, United Kingdom.

1:45 PM EE12.3.02
Interaction of Dislocations and Fission Gas Bubbles in UO₂ Paul C. Fossati; Imperial College London, United Kingdom.

2:00 PM EE12.3.03
Off-Stoichiometric Cluster Dynamics in Irradiated UO₂: The Effect of Small-Cluster Mobility on Defect Properties Sarah Khalil; University of Alexandria, Egypt, Egypt.

2:15 PM EE12.3.04
Alpha-Damage Formation in Mixed Americium-Uranium Compounds Thierry Wiss; European Commission - Joint Research Centre, Germany.

2:30 PM *EE12.3.05
Application of Semiconductor Process Simulation Methods to Radiation Damage Wolfgang E. Windl; Ohio State Univ, United States.
SESSION EE12.4: Fusion Materials I
Session Chairs: Philip Edmondson and Karl Whittle
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 127 C

8:00 AM *EE12.4.01
Cluster Dynamics Modeling of Mn-Ni-Si Precipitate Stability and Kinetics in Reactor Pressure Vessel Steels Dane Morgan; Univ of Wisconsin-Madison, United States.

8:30 AM *EE12.4.02
Plasma-Material Interactions in Radiation-Damaged Materials George R. Tyman; UC San Diego, United States.

9:00 AM EE12.4.03
Simulation of Radiation Damage in Beryllium Matthew L. Jackson1, 2; 1Imperial College London, United Kingdom; 2Culham Centre for Fusion Energy, United Kingdom.

9:15 AM *EE12.4.04
Multi-Scale Modeling of Plasma Facing Materials: Bottom-Up and Top-to-Bottom Approaches Ane Lasa Esquisabel; ORNL, United States.

9:45 AM EE12.4.05
On-Chip Tensile Testing of Free-Standing Copper Films under Ion Irradiation Pierre Lapouge; CEA Saclay, France.

10:00 AM BREAK

10:30 AM *EE12.4.06
Experimental and Computational Investigation of the Ion-Beam-Induced Amorphization and Recrystallization Processes in SiC Aurelien Debelle; Univ Paris-Sud, France.

11:00 AM EE12.4.07
In-Plane Swelling and Creep Behavior of CVD-SiC at 300°C Kurt Terrani; Oak Ridge National Laboratory, United States.

11:15 AM EE12.4.08
Dimensional Isotropy and Amorphization of Neutron Irradiated Alpha and Beta Silicon Carbide Lance Steele; Massachusetts Institute of Technology, United States.

11:30 AM EE12.4.09
Xenon Behavior in Nano-Polycrystalline Silicon Carbide Joffrey Baillet; CNRS, France.

11:45 AM EE12.4.10
Investigations of Radiation Effects in Nanocrystalline ZrC and ZrN Thin-Films Valentin Craciun; INFLRP, Romania.

SESSION EE12.6: Radiation Damage in Metallic Systems I
Session Chairs: Ane Lasa Esquisabel and Roger Stoller
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 127 C

3:30 PM *EE12.6.01
Melting, Shear Melting, Spot Melting and Potentials with Applications from Radiation Enhanced Diffusion to Machinable Titanium Alloys Graeme J. Ackland; The University of Edinburgh, United Kingdom.

4:00 PM EE12.6.02
On the Construction of Configurational Potentials for Fe and Other Metals from Atomistic Simulation Data Daniele Benaglia; University of California, Los Angeles, United States.

4:15 PM EE12.6.03
Anomalous Disordering and Nanostructuring of Ordered Alloys Induced by Point Defect Migration Calvin Leach; University of Illinois-Urbana-Champaign, United States.

4:30 PM EE12.6.04
Irradiation-Induced Structural Transformations and Properties of Nanostructured Metallic Materials Khuschatur Manukyan; University of Notre Dame, United States.

4:45 PM EE12.6.05
Radiation-Induced Local Electric Field - A New Origin for Radiation Damage Nan Jiang; Arizona State Univ, United States.
EE12.7.02
Sensitivity of Modulated Thermoreflectance Techniques to Measurement of Conductivity Reduction in Ion Beam Irradiated Materials Vinay S. Chauhan; The Ohio State University, United States.

EE12.7.03
Shape Modification of Ordered Arrays of Colloidal Silica Particles by MeV Si Ion Irradiation Juan-Carlos Cheang-Wong; Instituto de Fisica, Universidad Nacional Autónoma de México, Mexico.

EE12.7.04
Ab Initio Investigation of Helium in Vanadium Oxide Nanoclusters Thomas L. Danielson; Virginia Polytechnic Inst, United States.

EE12.7.05
Ionizing Radiation Damage on Flexible, Low-Voltage Organic Thin-Film Transistors Beatrice Fraboni; Univ of Bologna, Italy.

EE12.7.06
Radiation Effects on Tantalum Oxide Resistive Memory Switching and Material Properties Joshua Holt; SUNY Polytechnic, United States.

EE12.7.07
The Effects of Radiation on the In Vitro Bioactivity of Chitosan/Extract from Mimosa Tenuiflora/Multiwalled Carbon Nanotubes Scaffold Santos Adriana Martel Estrada; UACJ, Mexico.

EE12.7.08
Accelerated Growth of Metal Whiskers under High Energy Electron Beam Irradiation Dana Shvydko; University of Toledo, United States.

EE12.7.09
Low Degradation of Metal-Halide Perovskite Layers under X-Ray Irradiation Enables Synchrotron-Based Characterization Methods Michael Stuckelberg; Arizona State University, ECEE, Defect Lab, United States.

EE12.7.10
Investigation of Fission Gas Behaviors in Single Crystal Mo through a Multi-Atom Nucleation Approach Di Yang; Xi’an Jiao Tong University, China.

SESSION EE12.8: Radiation Damage in Metallic Systems II
Session Chairs: Peter Hosemann and George Tynan
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 230

8:30 AM *EE12.8.01
Progress on ab initio Non-Adiabatic Molecular Dynamics for Modeling the Initial Stages of Radiation Damage Alfredo A. Connor; Lawrence Livermore National Laboratory, United States.

9:00 AM EE12.8.02
Multiscale Modeling of Radiation Damage Evolution and Radiation Hardening in Reactor Pressure Vessel Steels Xiaoming Bai; Idaho National Laboratory, United States.

9:15 AM EE12.8.03
Cluster Dynamics Modeling of Microstructure Evolution in Ferritic Iron Chrome Alloys Aaron Kohnet; Univ of Tennessee, United States.

9:30 AM EE12.8.04
Radiation Damage in FCC Ni, NiFe and NiCr Alloys from Atomistic Simulations and Irradiation Experiments Dipen Seth S. Audy; Univ of Wyoming, United States.

9:45 AM EE12.8.05
α’ Precipitation under Electron and Ion Irradiation in a FeCr Alloy Olivier Tissier; 1, 2 CEA Saclay, France; 1 Université de Rouen, France.

10:00 AM BREAK

10:30 AM *EE12.8.06
Mobility and Coalescence of Stacking Fault Tetrahedra in Cu Enrique Martinez; Los Alamos National Laboratory, United States.

SESSION EE12.9: Radiation Damage in Metallic Systems III
Session Chairs: Jaime Marian and Simon Pimblott
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 230

1:30 PM *EE12.9.01
Radiation Induced Sensitisation of AGR Cladding Using a Particle Accelerator Simon M. Pimblott; The University of Manchester, United Kingdom.

2:00 PM EE12.9.02
Concurrent and Sequential Hydrogen Isotope Implantation and Self-Ion Irradiation in Nickel Britanny R. Muntifering1, 2; 1 Northwestern Univ, United States; 2 Sandia National Laboratories, United States.

2:15 PM EE12.9.03
Effects of Titanium and Niobium on Void Swelling of 15Cr/15Ni Austenitic Steels Irradiated at 600°C up to 180dpa with 2MeV Fe+ Baptiste Rouxel; CEA Saclay, France.

2:30 PM EE12.9.04
Analyzing the Ion Radiation-Induced Defects and Cavity Swelling Evolution in Representative PWR Internal Austenitic Steels Bertrand Michaut; CEA, DEN/DANS/DMR/SMR/IA2M, France.

2:45 PM EE12.9.05
Experimental Investigation and Mesoscale Modeling of Irradiation-Induced Grain Growth Fadi Abdeljawad; Sandia National Laboratories, United States.

3:00 PM BREAK

3:30 PM *EE12.9.06
Damage in Materials for Fission and Fusion Philip Edmondson; Oak Ridge National Laboratory, United States.

4:00 PM EE12.9.07
Irradiation Resistance of Model Oxide Dispersion Strengthened Steel Alloys Andrew J. London; University of Oxford, United Kingdom.

4:15 PM EE12.9.08
Ab Initio Investigation of He Bubbles at the Y2Ti2O7-Fe Interface in Nanostructured Ferritic Alloys Thomas L. Danielson; Virginia Polytechnic Inst, United States.

4:30 PM EE12.9.09
Modeling Radiation Induced Segregation in Quaternary Fe-Ti-Y-O Alloy Christopher Needle; Virginia Tech, United States.

4:45 PM EE12.9.10
On the Origin of the Effect of Yttrium Based Oxide Nano-Precipitate on the Properties of Oxide Dispersion Strengthened (ODS) Steels Mahmoud R. Reda1, 2; 1 CanadaElectrochem, Canada; 2 Kuwait University, Kuwait.
SYMPOSIUM EE13

Actinides—Fundamental Science, Applications and Technology
March 29 - April 1, 2016

Chairs
Ladia Havela, Charles University
Alexander Landa, Lawrence Livermore National Laboratory
Daniel Schwartz, Los Alamos National Laboratory
David Shuh, Lawrence Berkeley National Laboratory

Symposium Support
Lawrence Livermore National Laboratory

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* Invited Paper

SESSION EE13.1: Plutonium
Session Chairs: Alexander Landa and Per Soderlind
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 221 A

1:30 PM *EE13.1.01
Density-Functional Theory for Plutonium: Phase Stability, Elasticity, Phonons, and Magnetic Structure Per Soderlind; Lawrence Livermore National Laboratory, United States.

2:00 PM EE13.1.02
The Mixed-Valent Ground State of delta-Pu Probed by Inelastic Neutron Scattering Eric D. Bauer; Los Alamos National Laboratory, United States.

2:15 PM *EE13.1.03

2:45 PM BREAK

3:15 PM *EE13.1.04
Phase Transformations in PuGa 1at.% Alloy Brice Ravat; CEA-Valduc, France.

3:45 PM EE13.1.05
EXAFS Investigations of Radiation Damage in Plutonium Daniel Olive1, 2; 1Lawrence Berkeley National Laboratory, United States; 2Los Alamos National Laboratory, United States.

4:00 PM *EE13.1.06
Thermal Expansion of Delta-Phase Plutonium Jeremy N. Mitchell; Los Alamos National Laboratory, United States.

4:30 PM EE13.1.07
Time-Dependent Local and Average Structural Evolution of Pu-2at.%Ga Alloys Alice I. Smith; Los Alamos National Laboratory, United States.

SESSION EE13.2/EE12.2/MD8.3: Joint Session: Actinide Materials—Radiation Damage
Session Chairs: Gianguido Baldinozzi, Thibault Charpentier, Blas Pedro Uberanga and Gary Was
Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 106 BC

8:30 AM *EE13.2.01/EE12.2.01/MD8.3.01
Ion Irradiation for Studying Multiscale Radiation Effects in Structural Materials and Fuels Gary S. Was; University of Michigan, United States.

9:00 AM EE13.2.02/EE12.2.02/MD8.3.02
Radiation Induced Fission Gas Diffusion in UO2 Michael W. Cooper; Los Alamos National Laboratory, United States.

9:15 AM EE13.2.03/EE12.2.03/MD8.3.03
Small Angle X-Ray Scattering Study of Helium Bubbles in Plutonium Anthony W. Van Buuren; Lawrence Livermore National Lab, United States.

9:30 AM *EE13.2.04/EE12.2.04/MD8.3.04
He Bubble Structure Evolution and Effect on the Mechanical Properties of Metals Studied Using Novel Microscopy Techniques Peter Hosemann; University of California-Berkeley, United States.

10:00 AM BREAK

10:30 AM *EE13.2.05/EE12.2.05/MD8.3.05
Radiation Damages in Nuclear Waste Glasses: An NMR Point of View Thibault Charpentier; CEA, IRAMIS, NIMBE - UMR CEA-CNRS 3685, France.

11:00 AM EE13.2.06/EE12.2.06/MD8.3.06
Effects of Radiation Fields on Actinide-Containing Materials Steven D. Conradson; Soleil, France.

11:15 AM EE13.2.07/EE12.2.07/MD8.3.07
How Well Can Electronic Structure Calculations Describe Uranium Dioxide Properties Marjorie Bertolus; CEA, DEN, France.

11:30 AM EE13.2.08/EE12.2.08/MD8.3.08
Development of a Multiscale Thermal Conductivity Model for Fission Gas in UO2 Michael R. Tonks; Pennsylvania State Univ, United States.

11:45 AM EE13.2.09/EE12.2.09/MD8.3.09
Fission Gas Diffusion in UO2, Nuclear Fuel by Extended Vacancy Cluster David Andersson; Los Alamos National Laboratory, United States.

SESSION EE13.3: Nuclear Technology
Session Chairs: Stephane Gosses and Dennis Keiser
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 221 A

1:30 PM *EE13.3.01
Influence of Plutonium on the Thermodynamic Properties and Phase Equilibria in Corium Stephane Gosses; CEA, Centre de Saclay, France.

2:00 PM EE13.3.02
Sintering of (U,Pu)O2 Mixed Oxide with Cr Addition Jean-Marc Heintz1, 2; 1ICMCB CNRS, France; 2Bordeaux INP, France.

2:15 PM EE13.3.03
Novel Synthesis Routes and Properties of Nanostructured UO2 and ThO2 Compacts Marco Cologna; EC JRC Institute for Transuranium elements, Germany.

2:30 PM BREAK

3:00 PM *EE13.3.04
Effects of Irradiation on the Microstructure of U-Bearing Alloys Dennis D. Keiser; Idaho National Laboratory, United States.

3:30 PM EE13.3.05
EBSD Study of Uranium Alloys Daria Drozdenko; Charles University, Czech Republic.

3:45 PM EE13.3.06
Radiation Aging of Nuclear Glasses Due to Alpha Decays Accumulation Sylvain Peugeot; Laboratoire d’Étude des Matériaux et Procédés Actifs, France.
8:00 AM EE13.4.01
Structural and Electronic Breaks in Berkelium and Californium Thomas Albrecht-Schmitt; Florida State University, United States.

8:15 AM EE13.4.02
Innovative (U,Am)O₂ Synthesis Dedicated to Dustless Process for Americium Bearing Blankets Fabrication—Identification of the Chemical Steps through XRD and XAS Studies Marie Caissier; CEA Marcoule, France.

8:30 AM *EE13.4.03
Recent Investigations of Solid State Chemistry of Lanthanides and Actinides at Soochow University Shuao Wang; Soochow University, China.

9:00 AM *EE13.4.04
Unusual Temperature Dependence of Mössbauer Isomer Shift in NpF₄ Itzhak Halevy; NRCN, Israel.

9:30 AM *EE13.4.05
Phosphides: A Paradigm to Study Trends in Actinide Behavior Geng Bang Jin; Argonne National Laboratory, United States.

10:00 AM BREAK

10:30 AM *EE13.5.01
Thermal Evolution of the Heavy-Fermion Superconductor PuCoGa₅ Roberto Caciuffo; European Commission, Germany.

11:00 AM EE13.5.02
Tuning of the 5f-Magnetism in UNi(Zn,Al) and Their Hydrides Silvie Maskova; Charles University in Prague, Czech Republic.

11:15 AM EE13.5.03
Strong 5f Ferromagnetism in UH₃-Based Materials Ladislav Havela; Charles University, Czech Republic.

11:30 AM *EE13.5.04
NpFeAsO, NpPt₂In₇, Np₂PdIn₈ and Np₂MgIn₈: Recently Discovered Np-Based Compounds Tomasz Klimeczuk; Gdansk University of Technology, Poland.

1:00 PM EE13.6.01
Thermal Evolution of Vibrational Properties of α-U Johann Bouchet; CEA, France.

2:00 PM EE13.6.02
Metal-Ligand Hybridization and Core-Level Spectra in Actinide and Rare-Earth Compounds Jindrich Kolorenc; Institute of Physics, Czech Academy of Sciences, Czech Republic.

2:15 PM EE13.6.03
Defect Stability in Thorium Monocarbides: An Ab Initio Study Cheng Chenc; Shanghai Institute of Applied Physics, Chinese Academy of Sciences, China.

8:00 AM *EE13.8.01
Achieving Actinide Separation over Lanthanides by Aluminium Cathode Based Electrolysis in LiCl-KCl Eutectic Weiqun Shih; Institute of High Energy Physics, Chinese Academy of Sciences, China.

8:30 AM EE13.8.02
The Complexation of CyM₄-BTBP with Actinide Ions Guoxin Tian1, 2, 3; 1China Institute of Atomic Energy, China; 2Harbin Engineering University, China; 3Lawrence Berkeley National Laboratory, United States.

8:45 AM *EE13.8.03
Three Important Factors of the 5f-Element Ion Recognition with Ligand Tatsushi Yaitaz; Japan Atomic Energy Agency, Japan.

9:15 AM EE13.8.04

9:30 AM *EE13.8.05
Chelating f-Elements in Nanomaterials for Theranostic Applications Rebecca Abergel; Lawrence Berkeley National Laboratory, United States.

10:00 AM BREAK
SESSION EE13.9: Magnetism and Correlations II  
Session Chair: Ladia Havela  
Friday Morning, April 1, 2016  
PCC North, 200 Level, Room 221 A

10:30 AM EE13.9.01  
Investigation of Exotic Electronic Properties on Rare-Earth and Actinide Compounds under High Pressure  
Fuminori Honda; Institute for Materials Research, Tohoku University, Japan.

11:00 AM EE13.9.02  
Possible Demonstration of a Polaronic Bose-Einstein(-Mott) Condensate in UO$_2$  
Steven D. Conradson; Soleil, France.

11:15 AM EE13.9.03  
Novel 5f Electric Structure of Antiferromagnetic USb$_2$ Studied by Angle-Resolved Photoemission Spectroscopy  
Shiyong Tan; Institute of Materials, China Academy of Engineering Physics, China.

SESSION EE13.10: Forensics  
Session Chairs: Daniel Schwartz and Marianne Wilkerson  
Friday Afternoon, April 1, 2016  
PCC North, 200 Level, Room 221 A

1:30 PM EE13.10.01  
Probing Forensic Signatures of Nuclear Materials  
Marianne P. Wilkerson; Los Alamos National Laboratory, United States.

1:45 PM EE13.10.02  
Structural Characterization of Hydrolyzed Uranium Tetrafluoride Solids  
Michael A. DeVore; Savannah River National Laboratory, United States.

2:00 PM EE13.10.03  
XPS Investigation on Changes in UO$_2$ Speciation Following Exposure to Humidity  
Art J. Nelson; Lawrence Livermore National Lab, United States.

2:15 PM EE13.10.04  
Ruth Kips; LLNL, United States.

2:30 PM EE13.10.05  
Nuclear Forensics of a Non-Traditional Sample: Neptunium  
Jamie Doyle; Los Alamos National Laboratory, United States.

2:45 PM BREAK

3:15 PM EE13.10.06  
Investigation of Selected Material Properties as Nuclear Forensic Signatures  
Klaus Mayer; European Commission - Joint Research Centre, Germany.

3:45 PM EE13.10.07  
Forensic Analysis of Uranium Materials by Scanning Transmission X-Ray Microscopy  
Joseph Pacold; Lawrence Berkeley National Laboratory, United States.

4:00 PM EE13.10.08  
Advanced Microstructural Analysis Methods for Nuclear Materials Characterization and Technical Nuclear Forensics Applications  
Matthew Wellons; Savannah River National Laboratory, United States.

4:15 PM EE13.10.09  
Morphological Analysis of Uranium Ore Concentrate Particles for Forensics Purposes  
Daniel S. Schwartz; Los Alamos National Laboratory, United States.
SYMPOSIUM EE14

Titanium Oxides—From Fundamental Understanding to Applications
March 29 - April 1, 2016

Chairs
Yang Yang Li, City University of Hong Kong
Zhiqun Lin, Georgia Institute of Technology
Limin Qi, Peking University
Patrik Schmuki, University of Erlangen-Nuremberg

Symposium Support
City University of Hong Kong

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION EE14.1: TiO2 I
Session Chairs: Dong Ha Kim and Jong Hyeok Park
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 229 A

1:30 PM EE14.1.01
Nanostructured Hybrid TiO2 for Energy Conversion and Environmental Remediation Dong Ha Kim; Ewha Womans Univ, Korea (the Republic of).

2:00 PM EE14.1.02
Trapping and Dynamics of Excess Electrons at TiO2 Anatase Surfaces and Interfaces Annabella Selloni; Princeton Univ, United States.

2:30 PM EE14.1.03
Electrochemical Aspects of Conduction Band Engineering in Titanium Dioxide Ladislav Kavan; J. Heyrovsky Institute of Physical Chemistry, Czech Republic.

3:00 PM BREAK

3:30 PM EE14.1.04
TiO2-Based Materials for Photocatalytic Water Disinfection Jimmy Yu; The Chinese University of Hong Kong, Hong Kong.

4:00 PM EE14.1.05
Titanium Dioxide Nanostructures for Energy Conversion and Storage Jong Hyeok Park; Yonsei University, Korea (the Republic of).

4:30 PM EE14.1.06
Photocatalytic Mortars with Self-Cleaning and Depolluting Properties Sandra S. Lucas; University of Greenwich, United Kingdom.

4:45 PM EE14.1.07
Scalable Flame-Based Methods for the Synthesis of Advanced TiO2 Nanoparticles Nasir Memon1, 2; 1Qatar Env & Energy Res Inst, Qatar; 2HBKU, Qatar.

SESSION EE14.1.02: TiO2 II
Session Chairs: Xiaobo Chen and Zhiqun Lin
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 229 A

8:00 AM EE14.2.01
High-Dielectric Constant AlOx / TiO2 Nanolaminates for Next Generation Nanoscale Devices Orlando Auciello1, 2; 1University of Texas at Dallas, United States; 2University of Texas at Dallas, United States.

8:15 AM EE14.2.02
Doped TiO2 – Environmental Longevity or One Hit Wonder Nicholas P. Chadwick1, 2; 1University College London, United Kingdom; 2Bio Nano Consulting, United Kingdom.

8:30 AM EE14.2.03
TiO2 in Perovskite Solar Cells; Performance, Hysteresis and Stability Henry J. Snaith; University of Oxford, United Kingdom.

9:00 AM EE14.2.04
Constructions of Hierarchical Nanostructures of TiO2 for Enhancing Photoelectrocatalytic Activity Changjian Lin; Xiamen University, China.

9:30 AM EE14.2.05
Green TiO2 Nanophotocatalyst Xiaobo Chen; Univ of Missouri-Kansas City, United States.

10:00 AM BREAK

10:30 AM EE14.2.06
TiO2-Based Reversible Photocatalytic Color Switching System Yadong Yin; University of California, Riverside, United States.

11:00 AM EE14.2.07
Hierarchical Anatase TiO2 Nanowires for Efficient Solar Cells Dai-Bin Kuang; Sun Yat-sen University, China.

11:30 AM EE14.2.08
Heterostructured TiO2 Nanorod@Nanobowl Arrays for Efficient Photoelectrochemical Water Splitting Limin Qi; Peking Univ, China.

SESSION EE14.3: TiO2 III
Session Chairs: Limin Qi and Patrik Schmuki
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 229 A

1:30 PM EE14.3.01
Electron Trapping in Nanocrystalline Titanium Dioxide Keith McKeon; University of York, United Kingdom.

1:45 PM EE14.3.02
Co-Catalyst-Free Photocatalytic H2 Evolution from Defect-Engineered TiO2 Nanotubes Xuemei Zhou; University of Erlangen-Nuremberg, Germany.

2:00 PM EE14.3.03
Polymorph Engineering of TiO2: Demonstrating How Absolute Reference Potentials are Determined by Local Coordination David O. Scanlon; University College London, United Kingdom.

2:30 PM EE14.3.04
Titania-Coated Porous Silicon Composites Michael J. Sailor; Univ of California-San Diego, United States.

3:00 PM BREAK

3:30 PM EE14.3.05
Toward Efficient TiO2 Based Photocatalytic Materials Pingyun Feng; Univ of California-Riverside, United States.

4:00 PM EE14.3.06
Remarkable Enhancement of Photocatalytic Hydrogen Production in N2/Ar Plasma Treated Nanoporous TiO2 Films Doo Young Kim; Univ of Kentucky, United States.

4:15 PM EE14.3.07
Control over Anatase TiO2 Morphology and Carrier Concentration via Medium Range Order David E. Barlow; University of Illinois, United States.

4:30 PM EE14.3.08
High Performance Polydimethylsiloxane (PDMS) Sponge with TiO2 for Water Treatment Sanchati Chowdhury; New Mexico Tech, United States.

4:45 PM EE14.3.09
Comparison of the Photocatalytic Activity of Mesoporous, Codoped TiO2 Nanospheres John E. Mathis1, 2; 1Embry-Riddle Aeronautical Univ, United States; 2Oak Ridge National Laboratory, United States.
EE14.4.01
Atomic Layer Deposition of Titanium Oxide: Precursor and Temperature Dependence on Growth Rate and Materials Properties Wei Li; ASM America, United States.

EE14.4.02
Morphological Control Effect of Hierarchical Heterostructure α-Fe₂O₃/TiO₂ Nanotube for Photoelectrochemical Water Splitting Hyeonkyu Han; Palacky University, Czech Republic.

EE14.4.03
Quasi-1D Hydrogen-Treated Titanium Oxide Nanostructures for Photoelectrochemical Water Splitting Andrea Li Bassi 1, 2; Politecnico di Milano, Italy; 2Center for Nano Science and Technology - IIT@Polimi, Italy.

EE14.4.04
Ion Beam Driven Evolution of Degenerate States in Self-Assembled TiO₂ Nanorods on Si Pyramids Chetan P. Saini; Shiv Nadar University, India.

EE14.4.05
Microwave Assisted Synthesis of Mesoporous Titania and the Influence of the Oxidation State of Gold Atoms on the Catalytic Activity Mieke Meire; Ghent University, Belgium.

EE14.4.06
Anodic TiO₂ Nanotube Array Electrodes for High Energy Density and Power Density Li-ion and Na-ion Battery Applications Wei Wei; Uppsala University, Sweden.

EE14.4.07
Fabrication and Characterization of PVD Sputtered TiO₂/ZrO₂ Nanocomposite Films for Mechanical, Chemical and Radiological Behavior Abigrai M. Casey; Univ of Florida, United States.

EE14.4.08
Charge Carrier Density Modulation in Polycrystalline TiO₂ Electrolyte Gated Transistors Irina Valitova; Ecole Polytechnique de Montreal, Canada.

EE14.4.09
Modification of Rutile TiO₂ via Microwave Irradiation with H₂O₂ forest Hau; Inha University, Korea (the Republic of).

EE14.4.10
Advanced Characterization of Dopant-Diffusion in Photocatalytic TiO₂ Shiny Mathew; University College London, United Kingdom.

EE14.4.11
The Nature and Effects Sb Doping in TiO₂ Emily N. Glover; University College London, United Kingdom.

EE14.4.12
Resistive Tuning in Nanocrystalline TiO₂ Based Non-Volatile Memristive Devices Saurabh Srivastava; University of Waterloo, Canada.

EE14.4.13
Synthesis of TiC and TiB Nanoparticles from Carbothermal Reduction of Titanium Oxide Nanoparticles for High Temperature Corrosion Resistance Coatings on 304, 430, and 316L Steels Chung-Ying Tsai; Southern Illinois University, United States.

EE14.4.14
Synthesis and Characterization of Titanium Carbide Nanofibers from Electrosprun Titanium Oxide Nanofibers Using Carbothermal Reduction Process Chung-Ying Tsai; Southern Illinois Univ, United States.

EE14.4.15
Size-Dependent Scattering Effects of Mesoporous TiO₂ Scatters Analyzed by Low Coherence Interferometry Ling-Hsuan Tsai; National Taiwan University, Taiwan.
EE14.5.10
TiO₂ Nanotubes with Ultrathin Walls for Enhanced Solar Fuel Generation
Nageh K. Allam; American Univ in Cairo, Egypt.

1:30 PM EE14.6.01
Thermoelectric Graphene-Strontium Titanate Composites with High ZT and Wide Operating Window
Robert Freer; University of Manchester, United Kingdom.

1:45 PM EE14.6.02
N-Doped TiO₂ by GLAD and Reactive Magnetron Sputtering for Solar Cells Applications
Jonathan Dervaux, University of Mons, Belgium.

2:00 PM *EE14.6.03
The Versatility of Mesoscopic Solar Cells
Anders Hagfeldt, ISIC, Switzerland.

2:30 PM *EE14.6.04
Probing the Optical Property and Electronic Structure of Nanostructured TiO₂
Lawrence Berkeley National Laboratory, United States.

3:00 PM BREAK

3:30 PM EE14.6.05
Small TiO₂ Nanoparticles and Solar Energy Conversion: Down the (Self-)Trapping Cascade
Martin Zwijnenburg; University College London, United Kingdom.

3:45 PM EE14.6.06
Concise, Proaromatic NIR Organic Dyes for DSCs
Jared H. Delcamp; University of Mississippi, United States.

4:00 PM EE14.6.07
Solid-State Photoelectrochemical H₂ Generation with Gaseous Reactant
Michail Tsampas; FOM Institute DIFFER, Netherlands.

4:15 PM EE14.6.08
A New Perspective for Photoelectrochemical Water Splitting: Black TiO₂ Nanotubes
Xuemei Zhou; University of Erlangen-Nuremberg, Germany.

4:30 PM EE14.6.09
Self-Organized TiO₂ Nanotubes: Towards Improved Ordering
HannaSophia; University of Pardubice, Czech Republic.

4:45 PM EE14.6.10
Surface Composition of TiO₂–Zn Nanotubes by NanoSIMS
A New Perspective for Photoelectrochemical Water Splitting: Black TiO₂ Nanotubes
Indu B. Mishra; Arizona State University, United States.

SESSION EE14.7: Poster Session II
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EE14.7.01
Resistive Switching in Self-Organized TiO₂ Nano-Channels
Arabinda Barman; Shiv Nadar University, India.

EE14.7.02
Preparation of TiO₂/Carbon Composite and its Photocatalytic Properties
Fudan University, China.

EE14.7.03
Fabrication of Single Crystal Rutile Ti₁₋ₓSnₓO₂
Yong Zhihua; National University of Singapore, Singapore.

EE14.7.04
Observation of Resonant Exciton in anatase Ti₀.₇₁₇₁O₂-Effect of Strong Electronic Correlations
Yong Zhihua; National University of Singapore, Singapore.

EE14.7.05
First-Principles Calculation with 3D-RISM of Water/TiO₂(1 1 0) Interface
Kazuyuki Okazaki-Maeda; AdvanceSoft Corp, Japan.

EE14.7.06
Exceptionally Crystalline TiO₂ Mesocrystals with Enhanced Light Harvesting Characteristics for Dye-Sensitized Solar Cells
Ahmed M. Elsayed; American Univ in Cairo, Egypt.

EE14.7.07
Hierarchical MoS₂ Nanosheet@TiO₂ Nanotube Array Composites with Enhanced Photocatalytic and Photocurrent Performances
Lingxia Zheng; Fudan University, China.

EE14.7.08
Outstanding Field Emission Properties of Titanium Dioxide Coated Carbon Nanotube Based Field Emission Devices
Jinghuo Xu; Fudan University, China.

EE14.7.09
The Features of TiO₂ Films Structure Formation under Conditions of Electrochemical Anodizing by Direct Current with Variable Component Application
Serger M. Karabunov; Ryazan State Radio Engineering University, Russian Federation.

EE14.7.10
Formation of Ti_o Electrically Insulated Oxide Coatings in Mode of Alternating Current Application
Serger M. Karabunov; Ryazan State Radio Engineering University, Russian Federation.

EE14.7.11
Photocurrent Spectroscopy of Anatase TiO₂ Nanomaterials with Strong Texture and ⟨001⟩ Facets
Alexander Yong; San Francisco State University, United States.

EE14.7.12
Synthesis of Ag-TiO₂ Nanostructures from Fruit Waste and their Photocatalytic Properties
Flor E. Palomar; University of Nuevo Leon, Mexico.

EE14.7.13
Optical Properties of Multilayers TiO₂/SnO₂:F Thin Films
Elezic Ching-Prado; TU Panama, Panama.

EE14.7.14
Graphene Oxide-Templated TiO₂ Nanocomposites to Photocatalytically Convert CO₂ into Hydrocarbons
I-Hsiang Tseng; Feng Chia University, Taiwan.

EE14.7.15
Fabrication and Characterization of Photocatalytic Properties of Metal Doped Titania Nanofibers and Polymer-Titania Nanofiber Composites
Sohail Malekpour; Central Michigan University, United States.

EE14.7.16
Ropy Foam-Like TiO₂ Film Grown by Water-Based Process for Electron-Conduction Layer of Perovskite Solar Cells
Sarmad Alhasan; Central Michigan University, United States.

EE14.7.17
Hierarchical Titanium Dioxide Nanostructures for Photonic Applications
Fabio Di Fonzo; Istituto Italiano di Tecnologia, Italy.

EE14.7.18
Enhanced Ferromagnetism in Nanoscale Transition Metal-Doped TiO₂
Swati Naik; Central Michigan University, United States.

EE14.7.19
Electrochemical Doping of Anatase TiO₂ Nanotube Arrays and Their Energy-Environment-Related Applications
Yawen Zhan; City Univ of Hong Kong, Hong Kong.
EE14.7.20
Electrochemical Fabrication and Optical Properties of Porous Tin Oxide Films with Structural Colors Zeng Shanshan; City University of Hong Kong, Hong Kong.

EE14.7.21
Mechanical Attrition Treatment of TiO2 Zeng Shanshan; Center of Super-Diamond and Advanced Films (COSDAF), Hong Kong.

EE14.7.22

EE14.7.23
Facile Preparation of TiOx/SnOx Catalysts Using TiO2 as an Auxiliary for Gas Sensing and Advanced Oxidation Processes Satya P. Nehra; Deenbandhu Chhotu Ram University of Science and Technology, India.

EE14.7.24

SESSION EE14.8: TiO2 VI
Session Chairs: Toshihide Nabatame and Stefan Seeger
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 229 A

8:15 AM EE14.8.01
Dye Grafting on Nanoporous TiO2 Prepared by Combining GLAD and Reactive Magnetron Sputtering for Solar Cells Applications Jonathan Dervaux; University of Mons, Belgium.

8:30 AM EE14.8.02
Spectroelectrochemical Determination of Conduction Band Edge and Charge Distribution in Mesoporous TiO2 Photoanode Dhritabrata Mandal; Michigan State University, United States.

8:45 AM EE14.8.03
Investigation of Ag Nanoparticles Doped in TiO2-Graphene Oxide Nanocomposite Preparation for Photocatalytic Application Chanchana Thanachayanont; National Metal and Materials Technology Center, Thailand.

9:00 AM EE14.8.04
First-Principles Study of Oxygen Evolution Reaction on Doped and Undoped Lepidocrocite Titanium Dioxide Nanosheets Namhoon Kim; University of Illinois, United States.

9:15 AM EE14.8.05
Structural and Vibrational Properties of Transparent Conducting Nb- and Ta-Doped TiO2 Investigated by Raman Scattering Valeria Russo; Politecnico di Milano, Italy.

9:30 AM EE14.8.06
Effects of Modifying Nanoscale Interconnects in TiO2 Aerogels on Electron Lifetimes and Mobility: Consequences for Reductive and Oxidative Photocatalytic Activity Paul A. DeSario; Naval Research Laboratory, United States.

9:45 AM EE14.8.07
Infrared Reflection-Absorption Spectroscopy Study of the Interaction between O2 and Formic Acid on Rutile TiO2 (110) Surfaces Andreas Mattsson; Uppsala University, Sweden.

10:00 AM BREAK

10:30 AM EE14.8.08
Voltage-Controlled Reactive Magnetron Sputtering of Nb-Doped TiO2 Films: Electrical and Optical Properties Stefan Seeger; Optotransmitter-Umweltschutz-Technologie e.V., Germany.
**SYMPOSIUM EE15**

Materials for Sustainable Development—Integrated Approaches  
March 28 - March 31, 2016  

Chairs  
John Abelson, University of Illinois at Urbana-Champaign  
Ivana Aguiar, Universidad de la República  
Rae Ostman, Arizona State University  
Ashley White, Lawrence Berkeley National Laboratory

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

**TUTORIAL**  
Teaching the Role of Materials in Sustainable Development—Analytical Frameworks, Crossing Disciplines and Student Engagement  
Monday Afternoon, March 28, 2016  
1:00 PM - 5:00 PM  
PCC North, 100 Level, Room 123

Materials enable technologies and infrastructure that play a crucial role in worldwide development and that increasingly impact the earth’s climate, water and resources. To identify pathways towards sustainable development, students and researchers must appreciate the multiple factors involved using a systems perspective. What is the balance sheet of impacts considering material sourcing, manufacturing, operation and end of life? What are the direct, indirect and unintended consequences? Understanding these issues requires frameworks for analysis, insights across disciplines and effective means to engage participants in topics that are often outside their “comfort zone” of knowledge. This tutorial will present effective means to teach these approaches based on the extensive and complementary experience of the instructors. But in addition to educating the upcoming generation of materials researchers, this tutorial will appeal to today’s materials scientists, engineers and technology managers who seek to identify, articulate, and implement changes that improve sustainability while enhancing the bottom line of their organizations.

Software for a hands-on exercise will be provided in advance. Tutorial participants are encouraged to bring laptops that run Windows. This is not a requirement for participation.

1:00 PM - 3:00 PM  
Part I: Tatiana Vakhitova  
A Framework for Evaluating Sustainable Development—Five-Step Methodology

3:30 PM - 4:15 PM  
Part II: Kevin Jones  
Materials and Society—Engaging Learners

4:15 PM - 5:00 PM  
Part III: Richard LeSar  
Crossing Disciplinary Boundaries—Challenges and Successes

Instructors:  
Kevin Jones, University of Florida  
Richard LeSar, Iowa State University  
Tatiana Vakhitova, Granta Design Ltd.

The National Science Foundation has provided financial support for this tutorial.
**SESSION EE15.3: Industry Perspectives on Sustainability across the Supply Chain:**

**10:00 AM BREAK**

**10:30 AM *EE15.4.05**

NSF Opportunities in Sustainable Materials Research *Linda S. Sapochak; National Science Foundation, United States.*

**11:00 AM *EE15.4.06**

Materials and Sustainability: A Mexican Perspective *Julia Tagueuza Parra; Consejo Nacional de Ciencia y Tecnología, Mexico.*

**11:30 AM EE15.4.07**

DENANA – Design Criteria for Sustainable Nano Materials *Tim Huelsler; Institut für Energie- und Umwelttechnik e.V., Germany.*

**11:45 AM EE15.4.08**

Understanding Industrial Innovation *Alek J. Przib; The Dow Chemical Company, United States.*

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**SESSION EE15.5: Industry**

**1:30 PM *EE15.5.01**

The Fourth Wave: Sustainability, Management and the Age of the Anthropocene *Andrew Hoffman; University of Michigan, United States.*

**2:00 PM *EE15.5.02**

Consumers, Regulation and Sustainability *Nicole Darnall; Arizona State University, United States.*

**2:30 PM BREAK**

**3:00 PM PANEL DISCUSSION**

**Industry Perspectives on Sustainability across the Supply Chain:** Challenges and Opportunities

This session, featuring a panel discussion by industry representatives, is motivated by the recognition that sustainability will be improved only if industry takes a leading role in the development of better practices and innovative technologies. It will help materials researchers better understand the sustainability-oriented considerations and constraints of industry as well as identify critical areas of concern to industry that could benefit from innovative research. The panelists will discuss sustainable supply chains, including how companies consider factors like resource availability, environmental and human health risks, other life cycle impacts, financial considerations, and regulation. In this context, the panelists will also identify key areas of opportunity for materials research to help mitigate supply chain risks and create more sustainable product life cycles.

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**SESSION EE15.6: Poster Session II: Materials for Sustainable Development II**

**11:00 AM *EE15.6.01**

Material Design of Geopolymers for Sustainable Infrastructural Binders: Novel Experimental and Computational Techniques *Karanarayan Neithalath; Arizona State University, United States.*
EE15.6.02 Water Soluble Sacrificial Layer for Transfer Printing Process of Inorganic Semiconductor Based Electronics Jiyoon Nam; Kyungpook National University, Korea (the Republic of).

EE15.6.03 Towards Sustainable Production of Single-Walled Carbon Nanotubes: The Recycling of Oxide Supports and Regeneration of Active Catalysts Tianchi Chen; Tsinghua University, China.

EE15.6.04 Mechanical Properties of Concrete with Partial Replacement of Fly Ash and Nanostructured Silica Hiddelx L., Soto Toro; University of Puerto Rico, United States.

EE15.6.05 Discrepancy between Alite (C3S) to Belite (C2S) Ratio and Strength Development in OPC: Effect of Alternative Fuels Pozhhan Mokhtari; Sabancı University, Turkey.

EE15.6.06 Improvement of Thermal Conductivity by Surface Modification and Incorporation of PMMA Beads on the Cu/Epoxy Composites Sung-Ryong Kim; Korea National Univ. of Transportation, Korea (the Republic of).

EE15.6.07 Dry Plasma Reduction of Synthesizing Various Nanoalloy/Carbon Hybrid Materials for the Counter Electrode of Dye or Quantum-Dot Sensitized Solar Cells Ho Suk Choi; Chungnam National University, Korea (the Republic of).

EE15.6.08 Synthesis and Electrochemical Study of Gel Polymer Electrolyte Based on Cross-Linked PMMA Yuan Xue; University of Rochester, United States.

EE15.6.09 In Situ Polymerized Superhydrophobic and Superoleophilic Nanofibrous Membranes for Gravity Driven Oil–Water Separation Yan Li; Donghua University, China.

EE15.6.10 Electrospun Carbon Nanofibers with Surface Attached Zero Valent Iron Nanoparticles (ZVINPs@ECNFs) for Cr (VI) Remediation in Ground and Waste Water Nikhil Reddy Mucha; North Carolina A&T State University, United States.

EE15.6.11 Photoreduction of Cr(VI) in Aqueous Solutions with Nb2O5/CuO Heterostructures under UV and Visible Light RadiationAndre E. Nogueira; Brazilian Agricultural Research Corporation, Brazil.

EE15.6.12 Preparation and Characterization of Ca-Doped Zinc Oxide Nanoparticles for Heavy Metal Removal from Aqueous Solution Imed Ghiloufi1,2; 1Al Imam Mohammad Ibn Saud Islamic University (IMSU), College of Sciences, Riyadh, Saudi Arabia, Saudi Arabia; 2Laboratory of Physics of Materials and Nanomaterials Applied at Environment (LaPhyMNE), Faculty of Sciences, Gabes University, Tunisia, Tunisia.

EE15.6.13 Enhanced photocatalytic Activity of g-C3N4/Nb2O5 Heterostructures on Degradation of Organic Pollutants under Visible and Ultraviolet Irradiation Kees T. Carvalho; Empraba Instrumentação, Brazil.


EE15.6.15 Development of Novel Materials for Nanotechnology-Based Remediation of Petroleum Impurities from Water Boris I. Kharisov; UANL, Mexico.

EE15.6.16 Piezoelectric Potential Induced Catalytic Degradation of Organic Polluted Water in the Dark Sun Woong Han; Yonsei Univ, Korea (the Republic of).

EE15.6.17 A Three-Dimensional Graphene Architecture with Tunable Nanopores as Novel Capacitive Deionization Electrodes Hui Ying Yang; SUTD, Singapore.

EE15.6.18 Single-Layer Graphene and Hydrogenated Graphyne Membranes for Water Desalination and Selective Ion-Separation at Realistic Reverse-Osmosis Pressures Muralkrishna Raju; Stanford University, United States.

EE15.6.19 PAMAM Dendrimer Based Magnetic Aerogel and Membrane for Efficient Water Desalination Vivek Balachandran; Indian Institute of Technology Madras, India.

EE15.7.01 Breakthrough Water Purification Technologies Based on Nanofibrous Membranes Benjamin S. Hsiao; Stony Brook Univ, United States.

EE15.7.02 Green Synthesis of Polyvinyl Alcohol (PVA)–Cellulose Nanofibril (CNF) Hybrid Aerogels and Their Use as Supersorbents Defeng Zheng; University of Wisconsin-Madison, United States.

EE15.7.03 Synthesis of Fe-Al Mixed Metal Hydroxide Nanomaterial in W/O Microemulsion System and Its Application for Defluoridation in Water Treatment Amraddha S. Deshpande; Vishwakarma Institute of Technology, India.

EE15.7.04 Hydrophobic Graphene/Silica Aerogel Nanocomposites Danilo Loche; Universita di Cagliari, Italy.

EE15.7.05 Novel Antibacterial 2D Ti3C2Tx (MXene) as Efficient and Fouling Resistant Water Purification Membranes Khaled A. Mahmoud; Qatar Environment and Energy Research Institute, Hamad Bin Khalifa University, Qatar.

EE15.7.06 Development of High-Performance and Durable RO Membranes Based on Structural ANALYSES Kazuki Sato; Global Environment Res. Labs., Toray Industries, Inc., Japan.

EE15.7.07 Highly Efficient Capacitive Deionization Electrodes Based on Metal–Organic Framework-Derived Porous Carbon Wenhui Shi; Singapore University of Technology and Design, Singapore.

EE15.7.08 Underwater Superoleophobic Diatom-Based Porous Plate for Efficient Oil/Water Separation Yu-Hsiang Lo; National Tsing Hua University, Taiwan.

EE15.7.09 Sustainable Drinking Water Disinfection by a Reusable and Bio-Compatible Nano Diamond Material Abelardo Colon1,4,1; 1University of Puerto Rico Rio Piedras Campus, United States; 4University of Puerto Rico, United States; 1University of Puerto Rico Rio Piedras Campus, United States.

EE15.7.10 Advances in Photocatalytic Water Treatment Using a BiVO4, Photoanode under Solar Illumination Paula Perez Rodriguez; Delft University of Technology, Netherlands.
SYMPOSIUM EE16

Student-Run Energy Symposium—"Harnessing the Power of Solar"
March 28 - March 29, 2016

Chairs
Anna Beiler, University of South Dakota
Dayton J. Vogel, Arizona State University

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION EE16.1: Materials and Processes for Alternative Green Fuel
Monday Morning, March 28, 2016
PCC North, 100 Level, Room 129 B

8:45 AM *EE16.1.01
Title to be Determined Ellen B. Stachl; Arizona State University, United States.

9:30 AM *EE16.1.02
Chemistry at the Interface: Hybrid Materials for Solar Fuel Production
Gary Moore; Arizona State University, United States.

10:00 AM BREAK

10:30 AM *EE16.1.03
Electronic Processes in Low Bandgap Conjugated Polymers for Photovoltaic and Photocatalytic Applications Lin X. Chen; 1 Northwestern University, United States; 2 Argonne National Laboratory, United States.

11:00 AM EE16.1.04
Investigation of Photodegradation Mechanisms: Towards Intrinsically Photostable Conjugated Polymers Logan P. Sanow; South Dakota State University, United States.

11:15 AM *EE16.1.05
Pathways to Next-Generation Photovoltaics Stephen Goodnick; Arizona State University, United States.

SESSION EE16.2: Materials and Processes for Photovoltaics
Monday Afternoon, March 28, 2016
PCC North, 100 Level, Room 129 B

1:30 PM *EE16.2.01

2:00 PM *EE16.2.02
Hybrid Perovskite Solar Cells: Opportunities and Challenges Aditya Mohite; Los Alamos National Laboratory, United States.

2:30 PM BREAK

3:00 PM EE16.2.03
Metal Plating as an Alternative to Silver for Silicon Solar Cell Contacts Joseph Karas; Arizona State University, United States.

3:15 PM *EE16.2.04

4:00 PM *EE16.2.05
Spectroscopic Imaging of Surface Plasmon Polariton Enhanced Energy Transfer Upconversion in NaYF4:Yb,La Nanoparticles Steve Smith; South Dakota School of Mines and Technology, United States.

SESSION EE16.3: Poster Session
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

Abstracts for the EE16 poster session can be found online at http://www.mrs.org/spring-2016-program-ee16/
SYMPOSIUM EP1

Organic Excitonic Systems and Devices
March 28 - April 1, 2016

Chairs
Chihaya Adachi, Kyushu University
Marc A. Baldo, Massachusetts Institute of Technology
Malte C. Gather, University of St. Andrews
Sebastian Reineke, Technische Universität Dresden

Symposium Support
Angstrom Engineering Inc.
Universal Display Corporation

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

**TUTORIAL**

Organic Excitonic Materials and Devices—OLEDs and Lasers
Monday Morning, March 28, 2016
8:30 AM - 12:00 PM
PCC North, 100 Level, Room 125 B

The tutorial will introduce attendees to organic light-emitting diodes (OLEDs) and organic laser systems, both with high relevance to Symposium EP1. While both concepts make use of organic materials, the toolboxes to understand all the details are very different.

Part I: Chihaya Adachi
The first segment will discuss the key properties of organic molecules important for the use in electroluminescent devices, i.e., organic light-emitting diodes (OLEDs). The fact that about 75% of the excitons are formed in an energetically distinct, nonradiative triplet state urges materials designers to come up with innovative solutions. There will be a detailed discussion of a very recent excitonic scheme: thermally activated delayed fluorescence (TADF), which Professor Adachi and his research team recently pioneered.

Part II: Stéphane Kéna-Cohen
This segment will begin with a review of basic laser physics in the context of organic lasers, briefly surveying state-of-the-art organic lasers and their applications. Electrically pumped organic lasing remains one of the open challenges in the field of organic electronics and the main difficulties toward achieving this goal will be discussed. The second half will cover a new type of laser, dubbed a polariton laser, which has the potential to drastically lower organic laser thresholds. The physics behind such polaritons will be discussed and some of the fascinating physics that have been observed (ballistic propagation, spontaneous vortices, superfluidity) will be described.

Instructors
Chihaya Adachi, Kyushu University
Stéphane Kéna-Cohen, École Polytechnique de Montréal

SESSION EP1.1: Organic Light-Emitting Devices
Session Chairs: Andrew Monkman, Sebastian Reineke and Mark Thompson
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 227 A

1:30 PM *EP1.1.01
Enhanced Emission Efficiency for Organic LEDs
Mark Thompson; Augsburg University, Germany.

2:00 PM EP1.1.02
Fluorescence Enhancement of a High Charge Carrier Mobility Polymer Semiconductor System for Bright NIR OLEDs
David J. Harkins; University Of Cambridge, United Kingdom; Centre for Plastic Electronics, United Kingdom.

2:15 PM EP1.1.03
Intrinsic Degradation Mechanisms in UV and Blue OLEDs Probed by Optically and Electrically Detected Magnetic Resonance
Joseph Shinar; Ames Laboratory & Iowa State University, United States.

2:30 PM EP1.1.04
Device Stability Enhancement in TADF OLEDs via Host Engineering
Ping Kuen Daniel Tsang; Kyushu University, Japan.

2:45 PM EP1.1.05
Conventional Fluorescent OLED with 100% Triplet Harvesting
Hyeon-Gu Kim; Seoul National Univ, Korea (the Republic of).

3:00 PM BREAK

3:30 PM *EP1.1.06
Blue Phosphorescent OLEDs: Their Prospects in Displays and Lighting
Stephen R. Forrest; Univ of Michigan, United States.

4:00 PM EP1.1.07
Absence of Triplet Up-Conversion with Blue Fluorescent Molecules Having Spatially Orthogonal Two Anthracenes
Yong-Jin Pu; Yamagata University, Japan; JST, Japan.

4:15 PM EP1.1.08
Afterglow Organic Light Emitting Diode
Kyota Kabeh; Kyushu University, Japan; JST ERATO Adachi Molecular Exciton Engineering Project, Japan.

4:30 PM *EP1.1.09
Origin and Control of Emitting Dipole Orientation of Phosphorescent Dyes in Organic Light Emitting Diodes
Jang-Joo Kim; Seoul National university, Korea (the Republic of).

SESSION EP1.2: Organic Emitters
Session Chairs: Wolfgang Bruetting, Malte C. Gather and Jang-Joo Kim
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 227 A

8:30 AM EP1.2.01
Rational Design of Thermally Activated Delayed Fluorescence Materials: The Competition between Internal Conversion and Non-Radiative Decay Processes
Paul Kleine; Institut für Angewandte Photophysik, Germany.

8:45 AM EP1.2.02
Crystal Organic Light-Emitting Diodes with 39% External Quantum Efficiency and Perfectly Oriented Platinum Complex Emitting Layer
Kwon-Hyeon Kim; Seoul National University, Korea (the Republic of).

9:00 AM *EP1.2.03
Control of Interfacial Exciplex Emission by Electric Field and Measuring the Charge Separation Distance
Andrew Monkman; Durham Univ, United Kingdom.

9:30 AM EP1.2.04
Excited-State Deactivation Mechanism in Nickel-Tetra-Mesityl-Porphyrin
Julia Preiss; Friedrich-Schiller-University Jena, Germany.

9:45 AM EP1.2.05
Development of Tetradentate Pt Complexes for Efficient Stable and High Color Purity Blue OLEDs
Jian Li; Arizona State Univ, United States.

10:00 AM BREAK

10:30 AM *EP1.2.06
Control of Molecular Orientation in Organic Light-Emitting Diodes
Wolfgang Bruetting; Univ of Augsburg, Germany.
SESSION EP1.3: Organic Lasers
Session Chairs: Naomi Ginsberg, John Lupton and Sebastian Reineke
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 227 A

1:30 PM *EP1.3.01
Exploring Condensate Physics with Organic Polaritons Stephane Kena-Cohen; Polytechnique Montreal, Canada.

2:00 PM EP1.3.02
Tunable Narrow Linewidth Solution-Processed Solid-State Organic Laser Using a Transversally-Chirped Volume Bragg Grating Sebastien Chenais; 1; 1Universite Paris 13, France; 2C.N.R.S., France.

2:15 PM EP1.3.03
Design Strategies for Planar Integration of LED-Pumped Organic Lasers Based on Luminescence Concentration Thomas Gallinelli; 1; 1Universite Paris 13, France; 2C.N.R.S., France.

2:30 PM *EP1.3.04
Organic Microcavities: Control of Bloch Modes, Tamm States, and Embedded OLED Structures Robert Brueckner; 1; 1 TU Dresden, Germany; 2TU Dresden, Germany.

3:00 PM BREAK

3:30 PM *EP1.3.05
Self-Assembling Colloidal Conjugated Polymer Lasers Alexander J. Kuehne; DWI - Leibniz Institute for Interactive Materials, Germany.

4:00 PM EP1.3.06
Record Low Threshold Up-Converted Organic Laser Enabled by Star-Shaped Oligofluorenes with Tailored Strong Nonlinear Absorption Burak Guzelbuktur; Bilkent University, Turkey.

4:15 PM EP1.3.07
Strong Coupling in Organic Microcavities Laura Tropf; University of St Andrews, United Kingdom.

4:30 PM EP1.3.08
Solvent Nanoimprint Lithography of Conjugated Polymer Laser Guy L. Whitworth; University of St Andrews, United Kingdom.

4:45 PM EP1.3.09
Pronounced Photoluminescence Enhancement in Periodically Ordered Ag/Alq3:ZnPc/Ag Nanocavities Verena Kolb; University of Wuerzburg, Germany.

SESSION EP1.4: Excitons in Organic and Hybrid Systems I
Session Chairs: Malte C. Gather, William Tisdale and Graham Turnbull
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 227 A

8:30 AM *EP1.4.01
Mapping Nanoscale Exciton Migration in Heterogeneous Electronically Coupled Materials with Time-Resolved Ultrafast Super-Resolution Imaging Naomi S. Ginsberg; Univ of California-Berkeley, United States.

9:00 AM EP1.4.02
QM/MM Simulations of TADF Materials Piotr de Silva; Massachusetts Institute of Technology, United States.

9:15 AM EP1.4.03
Exciton Transport in an Organic Semiconductor Exhibiting Thermally Activated Delayed Fluorescence Russell J. Holmes; University of Minnesota, United States.

9:30 AM *EP1.4.04
Exciton Transport in Colloidal Quantum Dot Assemblies William Tisdale; MIT, United States.

10:00 AM BREAK

10:30 AM *EP1.4.05
Quantifying Exciton Processes in Organic Light Emitting Diodes Grayson Ingram; University of Toronto, Canada.

11:00 AM EP1.4.06

11:15 AM EP1.4.07
Spatial Confinement of Triplet Exciton in Amorphous Rubrene Thin-Film Chia-Hsuan Chen; Graduate Institute of Photonics and Optoelectronics and Department of Electrical Engineering, National Taiwan University, Taiwan R. O. C., Taiwan.

11:30 AM *EP1.4.08
Path of Least Resistance: How Multiple FRET Pathways Compensate for Inhomogenieties Paul D. Cunningham; US Naval Research Laboratory, United States.

9:30 AM EP1.5.01
Imaging Naotomi S. Ginsberg; Univ of California-Berkeley, United States.

10:00 AM BREAK

10:30 AM *EP1.5.02
Voltage-Controlled Coupling of Localised Near-Infrared Electroluminescence to Surface Plasmons Jana Zaumseil; Univ of Heidelberg, Germany.

11:00 AM EP1.5.03
Coherent Spin Oscillations in OLEDs John Lupton; Regensburg University, Germany.

11:15 AM EP1.5.04
Area Light-Emitting Transistors Based on High-Concentration Solution-Processable Phosphorescent Pt(II) Complexes Robert Wawrzinek; 1Centre for Organic Photonics and Electronics, The University of Queensland, Australia; 2The University of Queensland, Australia.

11:30 AM EP1.5.05
Manipulating Excitons with Plasmonic Nanoantennas Gleb M. Akselrod; Duke University, United States.

2:00 PM EP1.5.06
The Role of Stabilized Triplet-Pair States in Singlet Exciton Fission Hannah Stern; University of Cambridge, United Kingdom.

3:00 PM BREAK

3:30 PM *EP1.5.07
Mapping Nanoscale Exciton Migration in Heterogeneous Electronically Coupled Materials with Time-Resolved Ultrafast Super-Resolution Imaging Naomi S. Ginsberg; Univ of California-Berkeley, United States.
SESSION EP1.6: Poster Session: Organic Excitonic Systems and Devices
Session Chairs: Malte C. Gather and Sebastian Reineke
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EP1.6.01
Anisotropic Exciton Relaxation in Nanostructured Metal (Zn and F-Zn)-Phthalocyanine Hyeyoung Ahn; National Chiao Tung Univ, Taiwan.

EP1.6.02
Singlet Fission and Triplet Fusion Governed by Non-Adiabatic Energy Transfer in Amorphous Rubrene Thin-Film Chia-Hsun Chen; Graduate Institute of Photonics and Optoelectronics and Department of Electrical Engineering, National Taiwan University, Taiwan.

EP1.6.03
Inkjet Printing of Vertical External-Cavity Surface-Emitting Organic Lasers Sebastien Chenuel1, 2; 1Universite Paris 13, France; 2C.N.R.S., France.

EP1.6.04
Multiscale Optical Engineering to Achieve 100 % Absorption of Thin-Film Photovoltaic Cells Changsoo Che; KAIST, Korea (the Republic of).

EP1.6.05
CT Exciton Delocalization in Isoindigo Polymer Systems with Different Thiophene Length Jordania Constantinoiu; Univ of Florida, United States.

EP1.6.06
Highly Efficient, All-Solution Processed, Mechanically Flexible, Semi-Transparent Organic Solar Modules Jens Czolk; KIT, Germany.

EP1.6.07
Long-Term Stabilization of Organic Solar Cells by Active Layers Ternary Blended with Additives Vida Engmann; University of Southern Denmark, Denmark.

EP1.6.08
Exciton Formation and Diffusion in Organic Light Emitting Diodes Grayson Ingram; University of Toronto, Canada.

EP1.6.09
A “One-Shot” Method for the Determination of Reaction Rate in Donant Induced Solubility Control Patterning Ian Jacobs; Univ of California-Davis, United States.

EP1.6.10
Electroluminescence Efficiency beyond Spin Statistics in Fluorescent Polymeric Devices Dinesh Kabra; Indian Institute of Technology, India.

EP1.6.11

EP1.6.12
Transparent Organic Solar Modules Jens Czolk; KIT, Germany.

SESSION EP1.7: Advanced Organic Devices and Modeling
Session Chairs: Sebastian Reineke, Frank Wuerthner and Joel Yuen-Zhou
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 227 A

8:30 AM EP1.7.01
Adhesion and Failure in Stretchable Electronic Structures Oluwaseun K. Oyewole1, 2; 1Baze University, Nigeria; 2African University of Science and Technology, Nigeria.

8:45 AM  *EP1.7.02
Organic Memory Elements Klaus Meerholz; Universität zu Köln, Germany.

9:15 AM  *EP1.7.03
Modeling Exciton and Polaron Dynamics to Analyze Transient Electroluminescence from Organic Light-Emitting Devices Kyle W. Hershey; University of Minnesota, United States.

9:30 AM EP1.7.04
Nanostructure Photoluminescence in Organic Light Emitting Diodes and Its Impact on Their Efficiency and Lifetime Yufei Shen1, 2; 1The Pennsylvania State University, United States; 2The Pennsylvania State University, United States.

9:45 AM BREAK

10:15 AM  *EP1.7.05
Organic Semiconductor Light Sources for Visible Light Communications Graham A. Turnbull; Univ of St Andrews, United Kingdom.

10:45 AM EP1.7.06
A Simple and Accurate Method for Prediction of Interface Barrier between OLED Layers Sang Ho Jeon; Samsung Display, Korea (the Republic of).

11:00 AM EP1.7.07
Organic-Inorganic Hybrid Photovoltaic Using Rare-Earth Up-Conversion Composites Arul Varman Kesavank; Indian Institute of Science, India.

11:15 AM  *EP1.7.08
PbS Nanocrystal-Based Optoelectronic Devices Franky So; North Carolina State University, United States.

EP1.6.16
Characterization of Defects in Solution-Processed Small-Molecule Photovoltaic Thin-Films Tanvir Muntasir; Iowa State Univ, United States.

EP1.6.17
Method for Analyzing Energy Transfer Mechanisms in Multi-Dopant Organic Light Emitting Diodes Carmen Nguyen; University of Toronto, Canada.

EP1.6.18
Design and Engineering of Highly Sensitive and Flexible Near-Infrared Photocconductors Using Upconverting Nanocomposites Yi Tong; Singapore University of Technology and Design, Singapore.

EP1.6.19
High Performance Polymer Solar Cells Fabricated by Spray Coating in Air Tao Wang; Wuhan Univ of Technology, China.

EP1.6.20
Triplet Scavenging in Conjugated Polymer Lasers Guy L. Whitworth; University of St Andrews, United Kingdom.

EP1.6.21
Interfacial Exciton Dissociation at Metal/Organic Interface in Organic Solar Cells Fu Rong Zhu; HKBU, China.

EP1.6.22
The P3HT:PC61BM Photodetector Using Polyethyleneimine (PEIE) as Hole-Block Layer Yue Wang; Beijing Jiaotong University, China.

EP1.6.23
Improved Light-Emitting Properties of Luminescent Molecules Hosted within Porous Metal-Organic Frameworks Hiroaki Miwa; Kyushu University, Japan.
1:30 PM *EP1.8.01
Enhancing Exciton Dissociation Rate via Multiple Heterojunctions and Forster Exciton Transfer in Organic Photodiodes Max Shtein; Univ of Michigan-Ann Arbor, United States.

2:00 PM EP1.8.02
Charge Transfer State Transport in Organic Donor-Acceptor Blends Wendi Chang; MIT, United States.

2:15 PM EP1.8.03
Magnetic Field Modulation of Recombination Process in Organic Photovoltaic Edward P. Booker; University of Cambridge, United Kingdom.

2:30 PM EP1.8.04
Effect of Casting and Developing Solvents on the Sharpness of Additive Patterned P3HT Film Jun Li; Univ of California-Davis, United States.

2:45 PM EP1.8.05
Generation and Modulation of χ(2) Optical Nonlinearity in Organic Semiconductor Films via Oriented Intermolecular Charge Transfer States Yixin Yan; The Pennsylvania State Univ, United States.

3:00 PM BREAK

3:30 PM EP1.8.06
Printing Highly Efficient Solution Processed Solar Cells Stelios Choulis; Cyprus Univ of Technology, Cyprus.

3:45 PM EP1.8.07
Observation and Manipulation of Multiple Charge Transfer States in Ordered and Disordered Systems Michael A. Fusella; Princeton University, United States.
**SYMPOSIUM EP2**

Silicon Carbide—Substrates, Epitaxy, Devices, Circuits and Graphene
March 29 - March 31, 2016

**Chairs**
Camilla Coletti, Istituto Italiano di Tecnologia
Francesca Iacopi, Griffith University
Sei-Hyung Ryu, Cree Inc.
Stephen E. Saddow, University of South Florida
Carl-Mikael Zetterling, KTH Royal Institute of Technology

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* Invited Paper

**SESSION EP2.1: Circuits and Devices**
Session Chairs: Nance Ericson and Carl-Mikael Zetterling
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 228 A

1:30 PM OPENING REMARKS

1:45 PM *EP2.1.01
Wide Bandgap Integrated Circuits – The Potential for Low Voltage SiC
Nance Ericson; Oak Ridge National Laboratory, United States.

2:15 PM EP2.1.02
High Temperature Integrated Amplifier in Bipolar 4H-SiC
Raheleh Hedayati; KTH Royal Institute of Technology, Sweden.

2:30 PM EP2.1.03
SiO2-SiC Interface Modification Using Hydrogen Incorporation
Voshadhi P. Amarasinghe; Rutgers University, United States; Institute for Advanced Materials, Devices and Nanotechnology, United States.

2:45 PM EP2.1.04
Boron Passivation for Improved Channel Mobility in 4H-SiC MOSFETs
Tamara F. Isaacs-Smith; Auburn University, United States.

3:00 PM BREAK

3:30 PM *EP2.1.05
Robust Edge Termination for High-Voltage SiC Devices
Chih-Fang Huo; National Tsing Hua University, Taiwan.

4:00 PM EP2.1.06
In Situ Monitoring of V’t Degradation in SiC MOS During High Temperature Gate Switching
Daniel B. Habersat; U.S. Army Research Laboratory, United States.

4:15 PM EP2.1.07
Spin Dependent Charge Pumping in 4H-SiC MOSFETs
Mark Anders; Penn State University, United States.

**SESSION EP2.2: Poster Session**
Session Chairs: Stephen E. Saddow and Carl-Mikael Zetterling
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EP2.2.01
Sol-Gel Processed SiC Nanostructures for Hybrid Photovoltaics
Olivia Kettner; TU Graz, institute of solid state physics, Austria.

EP2.2.02
Evaluation of the Change in Defects and Properties Caused by Axial and Radial Temperature Gradients in Single Crystal SiC by Synchrotron White Beam X-Ray Topography
Jun Gyu Kim; Stony Brook University, United States.

EP2.2.03
Study on the Relaxation Process in 4H-SiC Homoepitaxy Growth
Jianqiu Guo; Stony Brook Univ, United States.

EP2.2.04
Optimising the Rectification Ratio of Schottky Diodes in n-SiC and n-Si
Patrick W. Leech; RMIT University, Australia.

EP2.2.05
Characterization of Free-Standing Thick Epitaxial 4H-SiC Wafer by Microwave Photoconductivity Decay Technique
Ishwara B. Bhat; Rensselaer Polytechnic Institute, United States.

EP2.2.06
SiC Nanopowders Effect of BaTiO3/4H-SiC Interface Prepared by Aerosol Deposition
Newonge Jang; Kwangwoon University, Korea (the Republic of).

EP2.2.07
Evaluation of Polishing-Induced Subsurface Damage of 4H-SiC (0001) by Cross-Sectional Electron Backscattered Diffraction and Synchrotron X-Ray Micro-Diffraction
Koji Ashida; Kwansei Gakuin University, Japan.

EP2.2.08
Optical Signal Processing for Indoor Positioning Using a-SiCH Technology
Manuela M. Vieira; ISEL, Portugal; 3FCT-UNL, Portugal.

EP2.2.09
1 by 5 Wavelength Division Multiplexer SiC Device with Channel Separation in the Visible Range
Ogyun Seok; Korea Electrotechnology Research Institute, Korea (the Republic of).

EP2.2.10
A Demonstration and Comparison of PiN Diodes on HPSI and VDSI SiC Substrates
Reina Miyagawa; Nagoya Institute of Technology, Japan.

EP2.2.11
Li Induced Effects in The Core Level and π-Band Electronic Structure of Graphene Grown on C-Face SiC
Chariya Jacobi; Linkoping University, Sweden.

EP2.2.12
GaN Growth on SiC Substrate with Femtosecond–Laser–Induced Periodic Nanostructure
Reiwa Maruyama; Nagoya Institute of Technology, Japan.

**SESSION EP2.3: Devices**
Session Chairs: Sei-Hyung Ryu and Siddarth Sundaresan
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 228 A

8:30 AM *EP2.3.01
Breakthrough Performance, Reliability and Robustness of SiC Junction Transistors
Siddarth Sundaresan; GeneSiC Semiconductor, United States.
9:00 AM EP2.3.02
Ali Implantated Vertical 4H-SiC p-i-n Diodes: Experimental and Simulated Forward Current-Voltage Characteristics Roberta Nipoti; CNR-IMM, Italy.

9:15 AM EP2.3.03
Optimization of Ion Implantation Processes for 4H-SiC DIMOFET Francesco La Via; IMM-CNRS, Italy.

9:30 AM *EP2.3.04
Buried Grid Technologies to Maximize the SiC JBS Diode Performance Adolf Schoner; Ascatron AB, Sweden.

10:00 AM BREAK

10:30 AM *EP2.3.05
Investigation of Co-Sputtered Pt-Ti for Simultaneous Ohmic Contacts to N- and P-Type 4H-SiC Robert Okojie; NASA Glenn Research Ctr, United States.

11:00 AM EP2.3.06
Effect of Surface Counter-Doping with Antimony on Channel Transport in Lateral 4H-SiC MOSFETs Yongju Zheng; Auburn University, United States.

11:15 AM EP2.3.07
SiC Ultraviolet Photodiodes Massimo Mazzillo; STMicroelectronics, Italy.

11:30 AM EP2.3.08
Transmission of Signals Using White LEDs for VLC Application Paula Louro Antunes1, 2; 1ISEL, Portugal; 2CTS-UNINOVA, Portugal.

SESSION EP2.4: Growth
Session Chairs: Francesca Iacopi and Francesco La Via
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 228 A

1:30 PM *EP2.4.01
Advances in Fast Crystal Growth of 4H-SiC Hidekazu Tsuchida; Central Research Institute of Electric Power Industry (CRIEPI), Japan.

2:00 PM EP2.4.02
Growth and Characterization of 200mm Silicon Carbide Xueping Xu; II-VI Incorporated, United States.

2:15 PM EP2.4.03
Conversion of BPDs in 4H-SiC Epilayers Grown on 2° Offcut Substrates Rachael Myers-Ward; Naval Research Laboratory, United States.

2:30 PM EP2.4.04
Characterise Defects, Stress and Dopants in SiC Wafers with Fast Raman Mapping Tim Batten; Renishaw plc, United Kingdom.

2:45 PM EP2.4.05
Assessment of Factors Controlling the X-Ray Penetration Depth in Studies of 4H-SiC Using Monochromatic and White Beam Synchrotron X-Ray Topography in Reflection Geometry Yu Yang; Stony Brook Univ, United States.

3:00 PM BREAK

3:30 PM *EP2.4.06
Wide Bandgap Materials for High Power and High Frequency Applications Olof C. Kordina; Linköping University, Sweden.

4:00 PM EP2.4.07
Reduction in Background Carrier Concentration for 4H-SiC C-Face Epitaxial Growth Kazutoshi Kojima; National Institute of Advanced Industrial Science and Technology (AIST), Japan.

4:15 PM EP2.4.08
High Growth Rate 3C-SiC Growth: From Hetero-Epitaxy to Homo-Epitaxy Francesco La Via; CNR-IMM, Italy.

4:30 PM EP2.4.09
Atomic Structures of Misfit Defects at 3C-SiC/Si (001) Interface Studied by Conventional and Aberration-Corrected High-Resolution Transmission Electron Microscopes Cai Wen1, 2; 1Southwest University of Science and Technology, China; 2Chinese Academy of Sciences, China.

SESSION EP2.5: Novel Integrated Applications
Session Chairs: Stephen E. Saddow and Feng Zhao
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 228 A

8:30 AM *EP2.5.01
Recent Development in 4H-SiC Microelectromechanical Devices Feng Zhao; Washington State Univ, United States.

9:00 AM *EP2.5.02
Lowly Stressed 3C-SiC Films for MEMS / NEMS Applications Marcin Zielinski; NOVASIC, France.

9:30 AM EP2.5.03
Residual Stress Effect on Silicon Carbide Micro-Resonators Static and Dynamic Performance Atieh Banibar Kermaniy1, 2; 1Griffith University, Australia; 2Griffith University, Australia.

9:45 AM EP2.5.04
Laser Irradiation Influence on Si/3C-SiC/Si Heterostructures for Subsequent 3C-SiC Membrane Elaboration Jean-Francois Michaud; University of Tours, France.

10:00 AM BREAK

10:30 AM EP2.5.05
APTES-Modified 4H-SiC Test Device Structures for Biomedical Applications Taejon Lee; Kwangwoon Univ, Korea (the Republic of).

10:45 AM EP2.5.06
Surface Functionalization of 3C SiC/Si Film via a Vapor Phase Silanization Approach for Glycan Binding Francesca Iacopi1, 2; 1Griffith University, Australia; 2Griffith University, Australia.

11:00 AM EP2.5.07
Robust 3C-SiC Implantable Neural Interfaces for Brain Machine Interfaces Evans K. Bernardin; University of South Florida, United States.

11:15 AM EP2.5.08
Continuous Glucose Monitoring by Passive Sensing of SiC Implant Fabiola Araujo Cespedes; University of South Florida, United States.

11:30 AM EP2.5.09
Electrochemical Study of Graphene Thin-Film Electrodes on 3C SiC/ Si for Symmetric Supercapacitors Francesca Iacopi1, 2; 1Griffith University, Australia; 2Griffith University, Australia.

SESSION EP2.6: Graphene
Session Chairs: Camilla Coletti and Francesca Iacopi
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 228 A

1:30 PM *EP2.6.01
Graphene and Hybrid Graphene-Metal Plasmons for Terahertz Modulation and Detection Michael Fuhrer1; 1Monash University, Australia; 2University of Maryland, United States.

2:00 PM *EP2.6.02
Recent Progress in the Epitaxial Graphene Formation on 3C-SiC/Si Substrates Maki Suemitsu; Tohoku Univ, Japan.

2:30 PM EP2.6.03
Correlation between Morphology and Transport Properties of Quasi-Free-Standing Monolayer Graphene Ying Min; NEST, Istituto Nanoscienze-CNRS and Scuola Normale Superiore, Italy.
2:45 PM EP2.6.04
Multi-Layer Graphene on SiC(000-1): Thermal Decomposition versus Chemical Vapor Deposition Camilla Coletti; Center for Nanotechnology Innovation @ NEST, Istituto Italiano di Tecnologia, Italy.

3:00 PM BREAK

3:30 PM EP2.6.05
Establishing the Growth Law of Graphene on SiC as a Function of Annealing Temperature Francesco Iacopi; Griffith University, Australia.

3:45 PM EP2.6.06
High-Quality Substitutional B,N Co-Doping of Graphene/SiC(0001) Pavel Jelinek; Institute of Physics of the CAS, Czech Republic.

4:00 PM EP2.6.07
Structural and Electronic Properties of Li Intercalated Graphene on 4H-SiC(0001): Experiment and Theory Leif I. Johansson; Linkoping University, Sweden.

4:15 PM EP2.6.08
Non-Contact Characterization of Epitaxial Graphene Using a Microwave Cavity Jan Obrzut; NIST, United States.

4:30 PM CONCLUDING REMARKS
SYMPOSIUM EP3
Perovskite-Based Photovoltaics and Optoelectronic Devices
March 28 - April 1, 2016

Chairs
Jinsong Huang, University of Nebraska-Lincoln
Maria Antonietta Loi, University of Groningen
Tsutomu Miyasaka, Toin University of Yokohama
Kai Zhu, National Renewable Energy Laboratory

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* Invited Paper

SESSION EP3.1: Device and Processing I
Session Chairs: Yabing Qi and Kai Zhu
Monday Afternoon, March 28, 2016
PCC North, 100 Level, Room 122 AB

1:30 PM *EP3.1.01
A Surface Science Approach to Perovskite Solar Cell Research Yabing Qi; Okinawa Institute of Science and Technology Graduate University (OIST), Japan.

2:00 PM *EP3.1.02
Hybrid Halide Perovskites beyond the Conventional Photovoltaic Devices Ivan More-Serv; University Jaume I, Spain.

2:30 PM EP3.1.03
Controlled Synthesis and Processing of Perovskite Films with In Situ X-Ray Diffraction for Organometal Halide Perovskite Photovoltaics Kai Xiao; Oak Ridge National Laboratory, United States.

2:45 PM EP3.1.04
Understanding Microstructural Evolution in Hybrid Perovskite Thin-Films for High-Efficiency Solar Cells Nitin P. Padture; School of Engineering, Brown University, United States.

3:00 PM BREAK

3:30 PM *EP3.1.05
Grand Challenges in Perovskite Solar Cells Yang Yang1, 2, 3; 1University of California, Los Angeles, United States; 2University of California, Los Angeles, United States; 3University of California, Los Angeles, United States.

4:00 PM *EP3.1.06
Certified Efficiency of 15.57% in Perovskite Solar Cells with Area > 1cm² Livyuan Han; NIMS, Japan.

4:30 PM EP3.1.07
Co-Planar Single-Crystal Hybrid Perovskite Solar Cells Qingfeng Dong; University of Nebraska Lincoln, United States.

4:45 PM EP3.1.08
Lead Acetate Based Perovskite Hybrid Solar Cells with Very Low Hysteresis and High Efficiency Trilok Singh; Toin University of Yokohama, Japan.

SESSION EP3.2: Device and Processing II
Session Chairs: Alex Jen and Tsutomu Miyasaka
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 224 B

1:30 PM *EP3.2.01
Perovskite Solar Cell: Stability, Efficiency and I-V Hysteresis Nam-Gyu Park; Sungkyunkwan Univ, Korea (the Republic of).

2:00 PM *EP3.2.02
Incorporating Perovskites into Tandem Solar Cells with Silicon and CIGS Michael D. McGehee; Stanford Univ, United States.

2:30 PM EP3.2.03
Fabricating Perovskite Solar Modules via Solution Processing Bin Fan; Weihua Solar, China.

2:45 PM EP3.2.04
Liquid Phase Epitaxial Growth of Organolead Halide Perovskite Heterojunctions Nathan T. Shewmon; NC State University, United States.

3:00 PM BREAK

3:30 PM *EP3.2.05
Incorporating Perovskites into Tandem Solar Cells with Silicon and CIGS Michael D. McGehee; Stanford Univ, United States.

4:00 PM *EP3.2.06
Certified Efficiency of 15.57% in Perovskite Solar Cells with Area > 1cm² Livyuan Han; NIMS, Japan.

4:30 PM *EP3.2.07
Incorporating Perovskites into Tandem Solar Cells with Silicon and CIGS Michael D. McGehee; Stanford Univ, United States.

4:45 PM EP3.2.08
Lead Acetate Based Perovskite Hybrid Solar Cells with Very Low Hysteresis and High Efficiency Trilok Singh; Toin University of Yokohama, Japan.

SESSION EP3.3: Poster Session I
Session Chairs: Tsutomu Miyasaka and Kai Zhu
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EP3.3.01
Carbazole-Based Hole-Transporting Materials for Perovskite Solar Cells: Increasing Stability and Performance Jonathan S. Tinkham; Colorado School of Mines, United States.

EP3.3.02
Highly Luminescence Colloidal Nanocrystals of Cesium Lead Halide Perovskites (CsPbX₃, X=Cl, Br, and I): The Path from Synthetic Methodologies to Lasing Studies Lorelada Protesescu1, 2; 1ETH Zurich, Switzerland; 2and Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland.

EP3.3.03
Ions and Defects Migration in Hybrid Perovskite CH₃NH₃PbI₃ Yecheng Zhou; The University of Melbourne, Australia.

EP3.3.04
Efficient Planar Heterojunction Perovskite Solar Cells Fabricated by Bar Coating Tao Wang; Wuhan Univ of Technology, China.
EP3.3.05 Room Temperature Fabrication of CH$_3$NH$_3$PbBr$_3$ by Anti-Solvent Assisted Crystallization Approach for High Performance Bromide-Based Perovskite Solar Cells Bo Chen; Virginia Tech, United States.

EP3.3.06 Interfaces in Graphene-Organolead Halide Nanohybrid Perovskite Solar Cells Examined by In Situ Spectroscopy Muge Acik; Argonne National Laboratory, United States.

EP3.3.07 Chemical Kinetics Understanding of CH$_3$NH$_3$PbI$_3$ Formation from Controlled Solid-Gas Reaction Approach Jian Mao; The University of Hong Kong, China.

EP3.3.08 Lead Halide Perovskite/Polymer Composite Material for Improved Moisture Stability: Synthesis and Characterization John P. Murphy; Montana Tech of the University of Montana, United States.

EP3.3.09 Effects of TiO$_2$ Properties on the Performance of a CH$_3$NH$_3$PbI$_3$ Perovskite Photovoltaic Cell Hasyiya K. Adli; Osaka University, Japan.

EP3.3.10 Role of Thin MgO Layer in Suppressing Interfacial Recombination Loss at FTO-TiO$_2$ Interface in Perovskite Solar Cells Ashish Kulkarni; Toho Univ of Yokohama, Japan.

EP3.3.11 Efficient Spray and Brush Fabrication Methods for Perovskite Solar Cells Ashwith Kumar Chilvery; Xavier Univ of Louisiana, United States.

EP3.3.12 Silane Linkers for Capping Layer Improvement of Planar Perovskite Based Solar Cell Robert Cotta; University of Texas at El Paso, United States.

EP3.3.13 Influence of Temperature-Dependent Phase Transition on Amplified Spontaneous Emission of Waveguides Based on Solution-Processed Perovskite Films Liang Qin; The Beijing Jiaotong University, China.

EP3.3.14 An Hydrophilic Anode Interlayer for Solution Processed Organohalide Perovskite Solar Cell Qianqian Lin; Univ of Queensland, Australia.

EP3.3.15 Promising Interface Modification of Nanostructured TiO$_2$/CH$_3$NH$_3$PbI$_3$ Heterojunction to Enhance Solar Cell Performance Yan-Chen Shih; National Taiwan University, Taiwan.

EP3.3.16 Performance Variations of Square-Centimetre Planar Mixed-Halide Perovskite Solar Cells Based on Humidity during Synthesis Harry M. Cronin*; 1; University of Surrey, United Kingdom; 2; DZP Technologies Ltd., United Kingdom.

EP3.3.17 The Role of Electrostatics and Avalanche Breakthrough in J-V Hysteresis Observed in Methylammonium Lead Halide Perovskite Films Martina Stumpp; Univ Giessen, Germany.

EP3.3.18 Inorganic-Organic Hybrid Perovskite Based Photodiodes with a Transparent Electrode Rahim Abdur; Kookmin University, Korea (the Republic of).

EP3.3.19 High-Throughput Calculations to Optimize Properties and Interfacial Chemistry of Piezoelectric Materials Jordan Barr; Pennsylvania State University, United States.

EP3.3.20 The Growth of the CH$_3$NH$_3$PbCl$_3$ Films and Its Application in Visible Blind Ultraviolet Photodetector Wenzhen Wang; School of Materials Science and Engineering, Shanghai University, China.

EP3.3.21 Interface Modification of Hierarchical TiO$_2$ Nanostructures in Lead Halide Perovskite Solar Cells Oscar A. Jaramillo-Quintero; Instituto de Energias Renovables-Universidad Nacional Autonoma de Mexico, Mexico.

EP3.3.22 Transparent Cathode Based Organic-Inorganic Hybrid Perovskite Solar Cell Md Abdul Kuddus Sheikh; Kookmin University, Korea (the Republic of).

EP3.3.23 Encapsulated Perovskite Based Photovoltaics Devices with High Stability Man Kwong Wong; The University of Hong Kong, Hong Kong.

EP3.3.24 Highly Flexible Perovskite Solar Cells on High-Performance Transparent Crystalline ITO/Metal NW Composite Electrode Film Hyeon-Gyun Im; KAIST, Korea (the Republic of).

EP3.3.25 Vacuum-Free Perovskite Solar Cells with Fully Slot-Die Coated Layers Jueng-Eun Kim*; 1; 2; GIST, Korea (the Republic of); 3; CSIRO, Australia.

EP3.3.26 Enhanced Photoluminescence in Formamidinium Lead Trihalide Thin Films Hong-Hua Fang; Univ of Groningen, Netherlands.

EP3.3.27 Air Stable (CH$_3$NH$_3$)$_3$Bi$_2$I$_9$ as Light Harvester for Solid State Sensitized Solar Cells Silvano Del Gobbo; KAUST, Saudi Arabia.

EP3.3.28 Tunable Tin-Based Organo-Halide Perovskite Light Emitting Diodes at Near-Infrared Emission May Ling Lai; University of Cambridge, United Kingdom.

EP3.3.29 Understanding the Structure-Performance Relationship of Perovskite Solar Cells by a Comprehensive Fluorescence Approach Zhilin Xu; Univ of Minnesota-Duluth, United States.

EP3.3.30 Time-of-Flight Electron and Hole Drift Mobility Measurements and Dispersive Transport in Perovskite Solar Cells Brian Maynard; Syracuse University, United States.

EP3.3.31 Beyond Efficiency: The Challenge of Stability in Mesoscopic Perovskite Solar Cells Yaoguang Rong; Huazhong University of Science and Technology, China.

EP3.3.32 Characterization and Critical Control of Intermediate Phase Transformation for Efficient Perovskite Photovoltaic Devices Yaoguang Rong*; 1; 2; Huazhong University of Science and Technology, China; 3; University of Houston, United States.

EP3.3.33 Effect of Low Thermal Budget Annealing on Solution Processed Organolead Halide Perovskite Semiconductors Santanu Bag*; 1; 2; Air Force Research Laboratory, United States; 3; National Research Council, United States.

EP3.3.34 3D ToF-SIMS Imaging of Perovskite/Titania/FTO in Humid Environments Wei-Chun Lin; Case Western Reserve University, United States.

EP3.3.35 Observation of CH$_3$NH$_3$PbI$_3$ Diffusion into the Titania Layer during Operation of Perovskite Solar Cells Wei-Chun Lin; Case Western Reserve University, United States.

EP3.3.36 Modulated Polarization and Electrical Measurements to Reveal the Nature of Hysteresis in Hybrid Perovskite Solar Cells Md Nadim Ferdous Houque; Texas Tech University, United States.

EP3.3.37 Acid Free Method for Conductivity Enhancement in PEDOT: PSS Thin Films as Flexible Transparent Electrodes in Perovskite Solar Cells Bjorn Vaagenes; South Dakota State University, United States.
<table>
<thead>
<tr>
<th>Session</th>
<th>Title</th>
<th>Authors</th>
<th>Affiliations</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP3.3.38</td>
<td>PJHT Nanocomposites as Hole Transport Materials for Improving the Performance of Perovskite Solar Cells</td>
<td>Fang-Chi Hsu</td>
<td>National United University, Taiwan.</td>
</tr>
<tr>
<td>EP3.3.39</td>
<td>Electric Field Induced Slow Transient Optoelectronic Response in MAPbI$_3$ Probed With Dynamic Photoluminescence</td>
<td>Daniel L. Jacobs</td>
<td>University of Utah, United States.</td>
</tr>
<tr>
<td>EP3.3.42</td>
<td>Differences of Perovskite Film Morphologies in Various Precursor Systems</td>
<td>Sehyun Lee</td>
<td>GIST, Korea (the Republic of).</td>
</tr>
<tr>
<td>EP3.3.43</td>
<td>Lead free (CH$_3$NH$_3$)$_2$Bi$_2$I$_9$ Perovskite for Optoelectronic Applications</td>
<td>Trilok Singh</td>
<td>Toin University of Yokohama, Japan.</td>
</tr>
<tr>
<td>EP3.3.44</td>
<td>Stable Semi-Transparent CH$_3$NH$_3$PbI$_3$ Planar Sandwich Solar Cells</td>
<td>Jin Hyuck He</td>
<td>Kyung Hee University, Korea (the Republic of).</td>
</tr>
<tr>
<td>EP3.3.45</td>
<td>Modulating Electron - Hole Interaction in a Hybrid Lead Halide Perovskite with Electric Field</td>
<td>Srinivasa Manuhi Ajay Ram Srinath Kandada</td>
<td>Istituto Italiano di Tecnologia, CNST, Italy.</td>
</tr>
<tr>
<td>EP3.3.48</td>
<td>The Effect of the Film Microstructure on the Light Soaking Effect in Hybrid Perovskite Solar Cells</td>
<td>Shuyan Shao</td>
<td>University of Groningen, Netherlands.</td>
</tr>
<tr>
<td>EP3.3.49</td>
<td>Controlled Crystallization of Hybrid Perovskite Thin Films for Efficient Planar Perovskite Solar Cells</td>
<td>Sampson Adjokatse</td>
<td>University of Groningen, Netherlands.</td>
</tr>
<tr>
<td>EP3.3.51</td>
<td>The Nucleation and Growth Evolution of the Perovskite Films by Dual-Source Thermal Evaporation</td>
<td>Haitao Xu</td>
<td>Shanghai University, China.</td>
</tr>
<tr>
<td>EP3.3.52</td>
<td>Flexibility of Perovskite as Investigated by Micro-Tensile Testing</td>
<td>Seung-min Ahn</td>
<td>UNIST, Korea (the Republic of).</td>
</tr>
</tbody>
</table>

**SESSION EP3.4: Device and Processing III**

**Session Chairs:** Jinsong Huang and Ivan Mora-Sero  
**Wednesday Morning, March 30, 2016**  
**PCC North, 200 Level, Room 224 B**

8:00 AM *EP3.4.01*

The Challenge of Printing and Processing Perovskite Solar Cells  
Trystan M. Watson  
SPECIFIC, Swansea University, United Kingdom.

8:30 AM *EP3.4.02*

An Integrated Approach Combining Compositional and Interfacial Material Engineering to Improve the Performance and Stability of Perovskite Solar Cells  
Alex K. Jen  
Univ of Washington, United States.

9:00 AM EP3.4.03

Metal Oxide Management for Low-Cost and Durable Lead Halide Perovskite Solar Cells  
Tsutomu Miyasaka  
Toin University of Yokohama, Japan.

9:15 AM EP3.4.04

Energy Disorder Correlated Open-Circuit Voltage in Hybrid Perovskite Solar Cells  
Yuchuan Shao  
Univ of Nebraska-Lincoln, United States.

9:30 AM EP3.4.05

Role of Charge Extracting Layers in the Stabilization of the J-V Characteristics of Inverted Hybrid Perovskite Solar Cells  
Mario Caironi  
Istituto Italiano di Tecnologia , Italy.

9:45 AM EP3.4.06

High Efficient Planar-Heterojunction Solar Cells Achieved by Using a Smooth CH$_3$NH$_3$PbI$_3$, Film via a New Approach of Forming the PbI$_2$, Nanostructure Together with Strategically High CH$_3$NH$_3$I Concentration  
Wallace C. Choy  
Univ of Hong Kong, China.

10:00 AM BREAK

10:30 AM *EP3.4.07*

Highly Efficient Hysteresis-Less Perovskite Solar Cells  
Sang Hyuk Im  
Kyung Hee University, Korea (the Republic of).

11:00 AM *EP3.4.08*

The Interplay of Nanostructure, Perovskite Film and Interface and Its Impact on Photovoltaic Performance  
Shihe Yang  
Hong Kong Univ of S&T, Hong Kong.

11:30 AM EP3.4.09

Experimental Screening of Mixed-Metal Perovskite Compositions for Improved Performance and Thermal Stability  
Matthew T. Klug  
Massachusetts Institute of Technology, United States.

11:45 AM EP3.4.10

Elimination of the Light Soaking Effect and Efficiency Enhancement in Perovskite Solar Cells by Using a High Dielectric Constant Fullerene Derivative as Electron Extraction Layer  
Shuyan Shao  
Zernike Institute for Advanced Materials, University of Groningen, Netherlands.

**SESSION EP3.5: Physics—Mechanism, Property and Theory I**

**Session Chairs:** Maria Antonietta Loi and Nitin Padture  
**Wednesday Afternoon, March 30, 2016**  
**PCC North, 200 Level, Room 224 B**

1:30 PM *EP3.5.01*

Lead Halide Complex Chemistry Influencing the Properties of Organic Lead Halide Perovskites  
Prashant Kamat  
Univ of Notre Dame, United States.

2:00 PM EP3.5.02

Slow Hot Carrier Cooling in Caesium Lead Iodide (CsPbI3) Perovskite  
Qing Shen  
Univ of Electro-Communications, Japan.

2:15 PM EP3.5.03

Charge Carrier Dynamics in Hybrid Metal Halide Perovskites  
Tiankai Zhang  
The Chinese University of Hong Kong, China.

**SESSION EP3.5: Imaging and Detection Technology I**

**Session Chairs:** Jinsong Huang and Ivan Mora-Sero  
**Wednesday Afternoon, March 30, 2016**  
**PCC North, 200 Level, Room 224 B**

2:30 PM *EP3.5.04*

...
SESSION EP3.5: Optoelectronic Properties of Inorganic-Organic Halide Perovskites
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 224 B

2:30 PM *EP3.5.04
Long-Range Diffusion and Recombination of Free Carriers in Perovskite CH$_3$NH$_3$PbBr$_3$ Single Crystals Takumi Yamada; Kyoto Univ., Japan.

2:45 PM *EP3.5.05
Probing the Electrical Transport of Individual Grains in Organic-Inorganic Perovskites Giovanni Azzellino; MIT, United States.

3:00 PM BREAK

3:30 PM *EP3.5.06
Rapid Photocarrier Trapping in CH$_3$NH$_3$PbI$_3$-Based Solar Cells as Revealed by Time-Resolved Photoluminescence Spectroscopy Yasuhiro Yamada; Chiba Univ., Japan.

3:45 PM *EP3.5.07
Electronic Interaction and Chemistry at Organic Inorganic Halide Perovskites Interfaces Philip Schulz; NREL, United States.

4:00 PM *EP3.5.08
Monitoring Chlorine by X-ray Absorption Spectroscopy of PbCl$_2$-Derived EP3.5.08

4:15 PM *EP3.5.09
Can Ferroelectric Polarization Explain the High Performance of Perovskite Solar Cells? Tejas Sherkar; University of Groningen, Netherlands.

4:30 PM *EP3.5.10
Influence of Capacitive Effect and Ion Migration on the J-V Hysteresis Behaviour in Perovskite Solar Cells Bo Chen; Virginia Tech, United States.

4:45 PM *EP3.5.11
Elucidating Fast Recombination in Low Temperature Phase of CH$_3$NH$_3$PbCl$_1$ Perovskite Thin Films Synthesized Using Continuous Liquid Interface Propagation Som Sarang; University of California Merced, United States.

SESSION EP3.6: Stability
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 224 B

8:00 AM *EP3.6.01
Fully Printable Mesoscopic Perovskite Solar Cells: From Cells to Modules Hongwei Han; Huazhong Univ of S&T, China.

8:30 AM *EP3.6.02
The Origin of Hysteresis in I-V Curve for Planar Structure Perovskite Solar Cells with Surface Boundary Induced Capacitance Model Satoshi Uchida; The University of Tokyo, Japan.

8:45 AM *EP3.6.03
Stabilizing Perovskite Structures by Tuning Tolerance Factor Zhen Li; National Renewable Energy Laboratory, United States.

9:00 AM *EP3.6.04
Crosslinkable Materials for Increased Thermomechanical Reliability of Perovskite Solar Cells Brian Watson; Stanford University, United States.

9:15 AM *EP3.6.05

9:30 AM *EP3.6.06
Reversible and Irreversible Performance Degradation in Perovskite Solar Cells Ajay Jena; Toin University of Yokohama, Japan.

9:45 AM *EP3.6.07
Water Infiltration in Methylammonium Lead Iodide: Fast and Inconspicuous Christian Mueller; TU Braunschweig, Germany; \(^1\) TU Braunschweig, Germany; \(^2\) Heidelberg University, Germany; \(^3\) InnovationLab GmbH, Germany.

10:00 AM BREAK

SESSION EP3.7: New Perovskite Materials
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 224 B

10:30 AM *EP3.7.01
Perovskite PV: Opportunities beyond CH$_3$NH$_3$PbI$_3$, David B. Mitzi; Duke Univ, United States.

11:00 AM *EP3.7.02
Inorganic Chemistry and Solar Cells of Inorganic-Organic Halide Perovskites Mercouri G. Kanatzidis; Northwestern Univ, United States.

11:30 AM *EP3.7.03
Graded Band Structure for Sn/Pb Binary Perovskite Solar Cells with Infrared Photoconversion Shuzi Hayase; Kyushu Inst of Technology, Japan.

SESSION EP3.8: Physics—Mechanism, Property and Theory II
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 224 B

1:30 PM *EP3.8.01
Optoelectronic Properties of 3D and Layered Hybrid Perovskites Jacky Even; INSA, France.

2:00 PM *EP3.8.02
The Relevance of Anions Migration on the Capacitive Anomalies and i-V Hysteresis Behavior of Methylammonium-Lead-Iodide Giuliano Gregori; Max Planck Institute for Solid State Research, Germany.

2:15 PM *EP3.8.03
Relation between Photoluminescence and Electrical Properties of Organic-Inorganic Halide Perovskites Martin Ledinsky; Institute of Physics, Academy of Sciences of the Czech Republic v.v.i., Czech Republic.

2:30 PM *EP3.8.04
Investigating Confinement Effects in Organo-Lead Tri-Halide Perovskite Nanoparticles Prashant Kumar; Jawaharlal Nehru Center for Advanced Scientific Research, India.

2:45 PM *EP3.8.05
CH$_3$NH$_3$PbI$_3$ Perovskite Single Crystals: Surface Photophysics and Its Interaction with the Environment Annamaria Petrozza; Istituto Italiano Tecnologia, Italy.

3:00 PM BREAK

3:30 PM *EP3.8.06
Structural Effects on the Bandstructure of Methylammonium Lead Iodide Marco Bernardi; California Institute of Technology, United States.

3:45 PM *EP3.8.07
Optoelectronic Properties of Micro-Crystalline Domains in Lead-Perovskite Solar Cells Holger Roehm; Karlsruhe Institute of Technology, Germany.

4:00 PM *EP3.8.08
Hybrid Organic-Inorganic Halide Perovskites Nanoclusters: Insights from First Principles Calculations Giacomo Giorgi; \(^1\) Univ of Tokyo, Japan; \(^2\) JST-CREST, Japan.

4:15 PM *EP3.8.09
Towards a Hybrid Perovskite-Based Spintronics-Theoretical Inspections Mikael Kepenekian; Institut des Sciences Chimiques de Rennes UMR 6226, France.
4:30 PM EP3.8.10  
Nanoscale Characterization of Organometal Trihalide Perovskite Using Photothermal Induced Resonance (PTIR) Technique  
Junseok Chae1,2;  
1CNST/NIST, United States; 2Maryland NanoCenter/UMD, United States.

4:45 PM EP3.8.11  
Temperature-Dependent Photocarrier Recombination Dynamics in Formamidinium Lead Iodide Perovskites  
Hong-Hua Fang; Univ of Groningen, Netherlands.

SESSION EP3.9: Poster Session II  
Session Chairs: Jinsong Huang and Maria Antonietta Loi  
Thursday Afternoon, March 31, 2016  
8:00 PM  
Sheraton, Third Level, Phoenix Ballroom

EP3.9.01  
Transient Fluorescence Spectroscopy and Long-Range Charge Transport of CH3NH3PbI3 Perovskite Thin Film  
Yu Li; Peking University, China.

EP3.9.02  
Photo-Physical Properties of Binary Metal Perovskite Semiconductors  
Aaditya Sadhunala; Univ of Cambridge, United Kingdom.

EP3.9.03  
The Improvement of Device Performance by Control of Morphology of Perovskite Film Prepared by Flash Evaporation  
Run Xu; Shanghai University, China.

EP3.9.04  
Space Environment Tolerance of Hybrid Perovskite Solar Cells Using Polymer Hole Transport Layers  
Yu Miyazawa; Japan Aerospace Exploration Agency (JAXA), Japan.

EP3.9.05  
Mixed Iodide-Bromide Methylammonium Lead Perovskite-Based Diodes for Light Emission and Photovoltaics  
Lidon Gil; University of Valencia, Spain.

EP3.9.06  
Novel Surface Passivation Technique for Low-Temperature Fabrication of Perovskite PV Cells  
Yasuhiro Shira; NIMS, Japan.

EP3.9.07  
Improving P-I-N Perovskite Solar Cells from Lead Acetate Precursor  
David Forsgacs; University of Valencia, Spain.

EP3.9.08  
Roles of Ray-Optics in Diverse Thin-Film Photovoltaic Systems  
Changseon Choc; Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of).

EP3.9.09  
Light Induced Trap States in Perovskite Solar Cell Devices  
Aminda J. Neukirch; Los Alamos National Laboratory, United States.

EP3.9.10  
Engineering the Interface between the Perovskite and the Hole Transport Material by an Interlayer  
Nazifah Islam; Texas Tech University, United States.

EP3.9.11  
Microstructure and Morphology of Lead Halide Solar Perovskites Revealed by Advanced Electron Microscopy  
Mary C. Scott1, 2; 1National Center for Electron Microscopy, United States; 2University of California, Berkeley, United States.

EP3.9.12  
2D TCAD Simulation of Planar Heterojunction Perovskite Solar Cell  
Aqeesh Alnajmi; Masdar Institute of Science and Technology, United Arab Emirates.

EP3.9.13  
Temperature-Dependent Optoelectronic Properties of Hybrid Perovskites and the Implications for Photovoltaic Performance  
Onkar Game; Brown University, United States.

EP3.9.14  
Interfacial Metal Oxide Modification for Controlled Growth of Hybrid Organic-Inorganic Perovskite Films  
James G. Stanfill; Univ of Arizona, United States.

EP3.9.15  
Perovskites under Pressure: Insights into the Reversibility of Solar Cell Performance  
Cristian Guo; Arizona State University, United States.

EP3.9.16  
Temperature-Dependent Polarization Effects in Methylammonium Lead Iodide Electronic Devices  
John G. Labram; Univ of California-S Barbara, United States.

EP3.9.17  
Modeling of the Hysteresis Effects in Hybrid Perovskite Solar Cells  
Kazimierz J. Plucinski; Military Univ of Technology, Poland.

EP3.9.18  
Charge Transport Study in Perovskite Solar Cells via Modification of Electrical Properties of Mesoporous TiO2 and Perovskite Layer  
Donghoe Kim; National Renewable Energy Laboratory, United States.

EP3.9.19  
Zinc Oxide Thin-Film Preparation by Single Solution Deposition for Perovskite Solar Cells  
Manuel F. Martinez; The University of Texas at El Paso, United States.

EP3.9.20  
Synthesis Route for a Stability-Focused Perovskite (CH3NH3PbI3-xClx)  
Marcos A. Cota; Universidad de Sonora, Mexico.

EP3.9.21  
Modeling Deposition of {6,6}-phenyl-C61-butyric Acid Methyl Ester Based Electron Transport Layer on Perovskite Crystal Surface  
Soumik Banerjee; Washington State Univ, United States.

EP3.9.22  
Photoelectrochemistry of CH3NH4PbI3 Perovskite Crystals in Contact with a Series of Metallocene Redox Couples in THF and Comparison with the Behavior of Si(111)  
Roghi E. Kalan; Worcester Polytechnic Institute, United States.

EP3.9.23  
Critical Control of Intermediate Phase Transformation for Efficient Perovskite Solar Cell  
Yun Yao; Univ of Houston, United States.

EP3.9.24  
Energetic Stability, Oxidation States, and Electronic Structure of Bi-Doped NaTiO2; First-Principles Hybrid Functional Study  
Paul H. Joo; UCSD, United States.

EP3.9.25  
Room Temperature Processed CuSCN Hole Transportation Layers for the Use in Perovskite Based Solar Cells  
Jose Galindo; University of Texas at El Paso, United States.

EP3.9.26  
Perovskite Enhanced Structural Stability: The Role of DMSO  
Cristiano F. Woellner; University of Campinas, Brazil.

EP3.9.27  
Local Structure Studies of Degradation in (MA)PbI3 Films and Devices  
Leila Jewell; Univ of California-Santa Cruz, United States.

EP3.9.28  
Toward Flexible Organic-Inorganic Perovskite Solar Cells via Inkjet Printing  
Anna Osherov; Massachusetts Institute of Technology, United States.

EP3.9.29  
Effects of Illumination Frequency on the Carrier Transport in Perovskite Solar Cells  
Jungseok Chae1, 2; 1National Renewable Energy Laboratory, United States.

EP3.9.30  
The Low Temperature Process Using Electrochemical Deposition in Perovskite Solar Cell  
Molanda Cai; National Institute for Materials Science, Japan.
EP3.9.43 Polytechnique Federale de Lausanne, Switzerland.
Antonio Abate; Ecole Novel Materials for Stable Perovskite Solar Cells
* EP3.9.42 Institute of Technology, Austria.
Conductivity for Use in Perovskite-Based Solar Cells
Electrodepsoited ZnO and AZO Layers with High Transparency and
EP3.9.41 Dinesh Kabra; Indian Institute of Technology Bombay, India.
Semiconductors
Mode Controlled Near-Infrared Laser Action Made with the Composites of
Solution Processed Lead Halide Perovskite and Dielectric Nanospheres
Packivarai Perumal; National Taiwan University, Taiwan.
EP3.9.51 Competing Broken Inversion Symmetry and Oxygen Octahedral Sliding
Phenomena in n=1 Ruddlesden Popper Derivative HRTIO$_4$ (R=Nd, Sm, Eu, Gd, and Dy) Family Forest Brown; Pennsylvania State University, United States.

SESSION EP3.10: Device and Processing IV
Session Chairs: Jacky Even and Shihe Yang
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 224 B

8:00 AM *EP3.10.01 Nano- and Single-Crystals of Lead Halide Perovskites: From Bright Light Emission to Hard Radiation Detection Maksym V. Kovalenko;* 1ETH Zurich, Switzerland; 2Empa-Swiss Federal Laboratories for Materials Science and Technology, Switzerland.

8:30 AM *EP3.10.02 Vacuum Deposited Perovskite Based Solar Cells Michele Sessolo; Univ de Valencia, Spain.

9:00 AM *EP3.10.03 Comparison of Solution and Vacuum Processed Perovskite Thin-Film Solar Cells Yanli Yan; Univ of Toledo, United States.

9:30 AM EP3.10.04 The Volume Expansion and Shrinkage Adjustable Deposition of High Performance Perovskite Film Yixin Zhao; Shanghai Jiao Tong Univ, China.


10:00 AM BREAK

10:30 AM EP3.10.06 Durability Study and Scale-Up of Carbon Based Perovskite Solar Cells Nancy Jiang; Dyesol Ltd, Australia.


11:00 AM EP3.10.08 Structured Organic-Inorganic Perovskite towards a Distributed Feedback Laser Michael Saliba; 1EPFL, United Kingdom; 2Oxford, United Kingdom.

11:15 AM EP3.10.09 Highly Efficient Methylammonium Lead-Iodide Perovskite Solar Cells by Metal Ions Doping Jacob Tse-Wei Wang; University of Oxford, Clarendon Laboratory, United Kingdom.


11:45 AM EP3.10.11 Efficient, Flexible and Low Temperature Perovskite Solar Cells on Industrially Applicable Metal Foils Joel Troughton; Swansea University, United Kingdom.
1:30 PM EP3.11.01
Solvent and Vapor Management towards Uniform CH$_3$NH$_3$PbI$_3$ and Highly Reproducible Perovskite Solar Cells Yongzhen Wu; National Institute for Materials Science, Japan.

1:45 PM EP3.11.02
Air Stability Improvement of CH$_3$NH$_3$PbI$_3$ Thin Film by Eliminating Residual Solvent Through Vacuum Annealing Mingzhu Long; Chinese Univ of Hong Kong, China.

2:00 PM EP3.11.03
Controlling the Surface Free Energy and Energetics of Compact TiO$_2$ Electrodes with Self-Assembled Monolayers to Optimize Crystallization and Charge Extraction in Hybrid Perovskite Solar Cells Richard C. Shallcross; The University of Arizona, United States.

2:15 PM EP3.11.04
High Power-per-Weight and Flexible Perovskite Solar Cells with Chromium Oxide-Metal Contacts for Improved Stability in Air Martin Kaltenbrunner; Johannes Kepler University, Austria.

2:30 PM EP3.11.05
Doctor-Blade Coating of Efficient Perovskite Solar Cells: A Scalable Fabrication Method with New Opportunities Yehao Deng; University of Nebraska Lincoln, United States.

2:45 PM EP3.11.06
Filterless Narrowband Visible Photodetector Qianqian Lin; The University of Queensland, Australia.

3:00 PM BREAK

3:30 PM EP3.11.07
Investigating Charge Transport in Hybrid Halide Perovskite through Field Effect Transistors Bingyan Yang; University of Cambridge, United Kingdom.

3:45 PM EP3.11.08
Wavelength-Tunable Nanowire Lasers of Lead Halide Perovskites with Low Lasing Thresholds and High Quality Factors Yongping Fu; Univ of Wisconsin-Madison, United States.

4:00 PM EP3.11.09
Bright Light-Emitting Diodes Based on Organometal Halide Perovskite Nanoplatelets Yichuan Ling; Florida State University, United States.

4:15 PM EP3.11.10
Fine Stoichiometric Tuning and Nanograin Engineering for Efficient Organic/Inorganic Hybrid Perovskite Light-Emitting Diodes Joo-Woo Lee; POSTECH, Korea (the Republic of).

4:30 PM EP3.11.11
Hybrid Perovskite Composite Thin Films with Enhanced Luminescence Properties Giulia Longo; University of Valencia, Spain.

4:45 PM EP3.11.12
SYMPOSIUM EP4
Emerging Silicon Science and Technology
March 28 - March 31, 2016

Chairs
Reuben Collins, Colorado School of Mines
Zachary Holman, Arizona State University
Olindo Isabella, Delft University of Technology
Adele Tamboli, National Renewable Energy Laboratory
Akira Terakawa, Panasonic Corporation

Symposium Support
Applied Physics Letters/AIP Publishing

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* Invited Paper

TUTORIAL
Silicon and Related Materials for Energy Conversion and Storage
Monday Morning, March 28, 2016
9:00 AM - 5:00 PM
PCC North, 100 Level, Room 124 B

9:00 AM –10:00 AM
Part I: Sumit Agarwal
Si Growth, Surface Chemistry, and Functionalization

10:00 AM–10:30 AM BREAK

10:30 AM–11:15 AM
Part II: Stefaan De Wolf
Basics of High-Efficiency Si Solar Cells

11:15 AM–12:00 PM
Part III: Sumit Agarwal
Thin Films for Si Solar Cells

12:00 PM–1:30 PM BREAK

1:30 PM–2:45 PM
Part IV: Stefaan De Wolf
Growth and Properties of Passivation Layers for Si Solar Cells

2:45 PM–3:15 PM BREAK

3:15 PM–4:00 PM
Part V: Stefaan De Wolf
Design, Materials, and Processes of Si Heterojunction Solar Cells

4:00 PM–5:00 PM
Part VI: Sumit Agarwal
Growth and Characterization of Si Nanostructures

Silicon and related thin films are widely used in solar cells and other electronic devices. The tutorial will introduce device preparation methods, materials properties, fundamental silicon surface chemistry, and device engineering. While the emphasis will be on silicon-related thin films and nanoscale structures, the fundamentals apply to other related materials as well. The presentations will survey several important chemical vapor deposition (CVD) techniques, including RF and VHF plasma-enhanced (PE), and hot-wire (HW) or Cat CVD. The techniques produce useful films ranging in structure from amorphous to nanocrystalline to polycrystalline. Thin-film solar cells and heterojunction solar cells based on crystalline silicon will be surveyed.

A special emphasis will be placed on ultrahigh efficiency silicon solar cell designs, including silicon-based tandem solar cells and the role and properties of thin-film passivation layers (such as nitride, alumina, a-Si:H). In this context, silicon heterojunction cells and passivated-contact solar cells will also be presented in detail. In conclusion, the tutorial will discuss the growth and characterization of silicon nanostructures and their potential applications in energy conversion and storage.

Instructors
Stefaan De Wolf, EPFL
Sumit Agarwal, Colorado School of Mines

SESSION EP4.1: New Silicon Materials
Session Chair: Adele Tamboli
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 224 A

1:30 PM *EP4.1.01
Recoverable High-Pressure Compounds and Allotropes for Solar Energy Conversion
Timothy Strobel, Carnegie Institution for Science, United States.

2:00 PM *EP4.1.02
Potential of Semiconducting BaSi, for Thin-Film Solar Cell Applications
Takashi Suemasu1, 2; 1University of Tsukuba, Japan; 2Japan Science and Technology Agency, Japan.

2:45 PM *EP4.1.04
Trisilane-Based Silicon Ink for Optoelectronic Device Fabrication
Andrew P. Cadiz Bedini, Forschungszentrum Julich, Germany.

SESSION EP4.2: Silicon Surfaces and Interfaces
Session Chair: Stefaan De Wolf
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 224 A

3:30 PM *EP4.2.01
Chemistry on Silicon Surfaces - From New Mechanisms, to Practical Applications
Jillian M. Buriak1, 2; 1Univ of Alberta, Canada; 2National Research Council, Canada.

4:00 PM *EP4.2.02
a-Si:H/c-Si Interface Passivation Characterization via TIDLS Analysis
Simone Bernardini, Arizona State University, United States.

4:45 PM *EP4.2.05
Novel Selective Monolayer Doping Technique for Future Silicon Solar Cells
Asha Tanpura, Rochester Institute of Technology, United States.
SESSION EP4.3: Solar Cells—Contacts and TCOs
Session Chair: Olindo Isabella
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 224 A

8:45 AM EP4.3.01
Passivating Electron- and Hole-Selective Materials for Crystalline Silicon: Interface Reactions and Passivation Alternatives Luis G. Gerling Sarabia1; 2; 3 Polytechnic University of Catalonia, Spain; 3Centre for Research in NanoEngineering, Spain.

9:00 AM EP4.3.02
Silicon Solar Cells with GaP on Passivation Layers Chaomin Zhang1; 4; 5 Solar Power Lab, United States; 5Arizona State University, United States.

9:15 AM EP4.3.03
Resistance Control of Nickel Oxide by Defect Doping through UV/Ozone Treatment Raisul Islam; Stanford University, United States.

9:30 AM EP4.3.04
Study of Nickel Silicide as a Copper Diffusion Barrier in Monocrystalline Silicon Solar Cells Abhijit Kale; Colorado School of Mines, United States.

9:45 AM EP4.3.05
The Limiting Electron Scattering Mechanisms in High Mobility Hydrogenated Indium Oxide Sebastian Husein; Arizona State Univ, United States.

9:45 AM EP4.4.04
Solar Stand-Alone Device for Photocatalytic Water Treatment Paula Perez Rodriguez; Delft University of Technology, Netherlands.

10:00 AM BREAK

SESSION EP4.4: Solar Cells—Devices
Session Chair: Zachary Holman
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 224 A

10:30 AM *EP4.4.01
Advances in Silicon Heterojunction Solar Cell Research Stefan De Wolf; EPFL, Switzerland.

11:00 AM *EP4.4.02
Materials Challenges in High Efficiency n-Cz Si Solar Cells Paul Stradins; National Renewable Energy Lab, United States.

11:30 AM EP4.4.03
Hybrid Multi-Junction PV Devices Based on Thin-Film a-Si:H, nc-Si:H, CIGS, Organic and c-Si Wafer Based Hetero-Junctions Arno H. Smets; Delft University of Technology, Netherlands.

11:45 AM EP4.4.04
Solar Stand-Alone Device for Photocatalytic Water Treatment Paula Perez Rodriguez; Delft University of Technology, Netherlands.

SESSION EP4.5: Solar Cells—TCOs and Metallization
Session Chair: Ivan Gordon
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 224 A

1:30 PM *EP4.5.01

2:00 PM EP4.5.02
Effectively Transparent Solar Cell Front Contacts Rebecca Saive; California Institute of Technology, United States.

2:15 PM EP4.5.03
Optical Characteristics of Reactive Silver Inks as Front Electrodes for High Efficiency Silicon Heterojunction Solar Cells April M. Jeffries; Arizona State University, United States.

2:30 PM EP4.5.04
Process Improvements in Laser Ablation and Light-Induced Plating for Silver-Free Silicon Solar Cell Contacts Joseph Karna; Arizona State University, United States.

2:45 PM EP4.5.05
The Formation Mechanism for Printed Silver-Contacts for Silicon Solar Cells Michael F. Toney; SLAC National Laboratory, United States.

3:00 PM BREAK

SESSION EP4.6: Thin Wafers
Session Chair: Mariana Bertoni
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 224 A

3:30 PM *EP4.6.01
Thin Epitaxial Silicon Foils Using Porous-Silicon-Based Lift-Off for Photovoltaic Application Ivan Gordon; IMEC, Belgium.

4:00 PM EP4.6.02
Exfoliated Ultra-Thin Silicon Wafer by Controlled Exfoliation Process Yong Hwan Lee; Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of).

4:15 PM EP4.6.03
Kerf-Free Crystalline Silicon Seed Detachment Approach Combining a Stressor Layer Deposition and Hydrogen Implantation Timothee Pingault; CEMTHI - CNRS, France.

4:30 PM EP4.6.04
Kerf-Less Production of Ultra-Thin (100)Si Substrates by MeV Hydrogen Implantation for Si-Based Solar Cells Sylvia Pokam; CEMHTI-CNRS, France.

4:45 PM EP4.6.05
Si Wafer Dicing by Subsurface Pulsed-Laser-Induced Modification Lachlan A. Smillie; The Australian National University, Australia.

SESSION EP4.7: Nano-Silicon and Light Management
Session Chair: Arno Smets
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 224 A

8:15 AM EP4.7.01
Low-Cost Solvent Based Synthesis of Crystalline Transition Metal Silicide and Germanide Nanostructures Martin Sheehan1; 2; 3 Materials and Surface Science Institute, Ireland; 3University of Limerick, Ireland.

8:30 AM EP4.7.02
Inverse Tapering of Silicon Nanowires by Catalyst Ostwald Ripening Steffen Strehle; Ulm University, Germany.

8:45 AM *EP4.7.03
Non-Thermal Plasma Synthesis of Silicon-Based Nanopowders Lorenzo Mangolini; Univ of California-Riverside, United States.

9:15 AM EP4.7.04
Combining Random and Periodic Nanostructures for Optimal Light Trapping in Thin-Film a-Si:H/a-Si, Ge:H Tandem Cells Colton R. Bukowsky; California Inst of Technology, United States.

9:30 AM EP4.7.05
Electrically-Aware Approach for Advanced Light Management in (thin) c-Si Solar Cell Olindo Isabella; Delft Univ of Technology, Netherlands.
9:45 AM EP4.7.06
Scalable Imprinting of 3D Optical Elements into Porous Silicon Bruno P. Azeredo; Univ of Illinois-Urbana-Champ, United States.

10:00 AM BREAK

SESSION EP4.8: Carrier Transport and Transistors
Session Chair: Reuben Collins
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 224 A

10:30 AM *EP4.8.01
Silicon Heterojunction Field-Effect Transistors for Large-Area and Flexible Electronics Bahman Hekmatshoar; IBM T.J. Watson Research Ctr, United States.

11:00 AM EP4.8.02
Quasi 2D Epitaxial Si-O Superlattices: Growth, Device Performance and Defect Analysis Susseendran Jayachandran1, 2; 1IMEC, Belgium; 2Katholieke Universiteit Leuven, Belgium.

11:15 AM EP4.8.03
Photo-Field Effect Carrier Mobility of Quantum Confined Mixed Phase a' ne-Si (Imeduda Airuoyo; Colorado School of Mines, United States.

11:30 AM EP4.8.04
Three-Dimensional Percolation Effects in Nanocrystal Thin Films Willi Aigner; Walter Schottky Institut, Germany.

SESSION EP4.9: Bulk Silicon Quality
Session Chair: Paul Stradins
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 224 A

1:30 PM *EP4.9.01
Photoluminescence Imaging for Quality Control in Silicon Solar Cell Manufacturing Thorsten Trupke1, 2; 1University of New South Wales, Manufacturing Photoluminescence Imaging for Quality Control in Silicon Solar Cell 1:30 PM *EP4.9.01; 2BT Imaging Pty Ltd, Australia.

2:00 PM EP4.9.02
Dissolving Oxygen Precipitate-Nuclei in N-Type, CZ Si Wafers by Flash Annealing Bhushan L. Sopori; National Renewable Energy Lab, United States.

2:15 PM EP4.9.03

2:30 PM EP4.9.04
Nanosopic Mechanism of Impurity Segregation at Grain Boundaries in Silicon Yujiro Okino; IMR, Tohoku Univ, Japan.

2:45 PM EP4.9.05
Deformation and Stress Analysis of Encapsulated Silicon Solar Cells by X-Ray Topography Xiaodong Meng; Arizona State University, United States.

3:00 PM BREAK

SESSION EP4.10: Microcrystalline Silicon Growth and Amorphous Silicon Crystallization
Session Chair: Keiichiro Masuko
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 224 A

3:30 PM *EP4.10.01
Laser-Assisted Crystallization of Silicon Nanostructures Costas Grigoropoulos; Univ of California-Berkeley, United States.

4:00 PM *EP4.10.02
Aluminum-Induced Crystallization of Silicon: New Substrates and Methods for Controlling Grain Morphology Joan M. Redwing; Pennsylvania State University, United States.

4:30 PM EP4.10.03
Microcrystalline Silicon Growth from Silicon Nanocrystal Seeds Joe V. Carpenter; Arizona State University, United States.

4:45 PM EP4.10.04
Microcrystalline Silicon from SiF4 vs. SiH4: Impact on Structure and Charge Collection Michael Stuckelberger1, 2; 1Arizona State University, ECEE, Defect Lab, United States; 2Ecole Polytechnique Fédérale de Lausanne, Switzerland.

SESSION EP4.11: Poster Session: Emerging Silicon Science and Technology
Session Chairs: Zachary Holman, Olindo Isabella, Monica Morales-Masis, Adele Tamboli and Miroslav Zeman
Thursday Afternoon, March 31, 2016
8:00 PM Sheraton, Third Level, Phoenix Ballroom

EP4.11.01
Micro and Nano-Hole Texturing Single-Crystalline Silicon Wafer for Solar Cell Applications: Effects of Hole Diameter and Distribution Hayriye S. Altinoluk1, 2; 1Center for Solar Energy Research and Applications (GUNAM), Turkey; 2METU, Turkey.

EP4.11.02
Probing the Surface Passivation and Selectivity of Contacts in Solar Cells Mathieu Boccard; Arizona State University, United States.

EP4.11.03
High-Mobility Hydrogenated Indium Oxide without Introducing Water during Sputtering Mathieu Boccard; ASU, United States.

EP4.11.04
Nature of Amorphous Silicon Carbide / Crystalline Silicon Interface Recombination Alice Jackson; Arizona State University, United States.

EP4.11.05
Flexible Si Nanowire Field-Effect Transistor with Ion-gel as a Gate Insulator Do Hoon Kim; Yonsei University, Korea (the Republic of).

EP4.11.06
Visualizing the Path of Light inside a Textured Silicon Solar Cell Salman Manzoor; Arizona State University, United States.

EP4.11.07
Large-Wavevector Phonon Population Anisotropy in Silicon Nanomembranes Kyle M. McElhinny; Univ of Wisconsin-Madison, United States.

EP4.11.08
Improvement of PEDOT:PSS/Crystalline Silicon Hybrid Solar Cell by Passivating Amorphous Silicon Thin Layer Joaquim Puidiudollers1, 2; 1Centre de Recerca en Nanoelectricitat (CrNE), Spain; 2Universitat Politecnica de Catalunya, Spain.

EP4.11.09
Calcination Condition Dependence of the Passivation Quality of Spin-Coated Alumina Passivation Films for Silicon Solar Cells Yosuke Watanabe; Seikei University, Japan.

EP4.11.10
Development towards an Integrated Combination of Thin-Film Silicon Multi-Junction Solar Cell and Lithium Ion Battery in Photo-electrochemical Application Solomon N. Agbo; Institute of energy and climate research (IEK-5)-Photovoltaics, Forschungszentrum Julich, Germany.

EP4.11.11
Laser Annealing of Hydrogenated Amorphous Silicon Below Crystalization Temperature W. Beyer1, 2; 1Helmholtz-Zentrum Berlin für Materialien und Energie, Germany; 2Forschungszentrum Jülich GmbH, Germany.

EP4.11.12
Full-Visible Emission from Silicon Quantum Dots in Oxide Matrix: Role of Quantum-Dot Size Ateet Dutt; UNAM, Mexico.
Hermetic Wet NanoBonding™: Optimizing Cross-Bonding at the Nano-Scale between Si and SiO₃ via Surface Energy Analysis Using Three Liquids Contact Angles Analysis (3 LCAA) Alex L. Brinnhall; Arizona State University, United States.

Conductance Tomography of Filamentation in Next-Generation Silicon Suboxide Intrinsic Resistive RAM Memories Using Conductive Atomic Force Microscopy Mark Buckwell; Univ College London, United Kingdom.

Induction-Based Local Annealing of Metals for low Resistance Contacts Jacob A. Clenney; Arizona State University, United States.

High Throughput, Room Temperature Synthesis of Cluster Assembled Nanocrystalline Silicon Films Fabio Di Fonzo; Center for Nano Science and Technology, Italy.

Tailoring a-Si Nanopillar Antenna Resonances for Angle-Insensitive Color Filters Katherine T. Fontaine1, 2; Northrop Grumman Aerospace Systems, United States; 2California Institute of Technology, United States.

Extending Electrical Scanning Probe Microscopy Measurements of Semiconductor Devices Using Microwave Impedance Microscopy Stuart L. Friedman; PrimeNano Inc, United States.

Highly Efficient and Economical Flexible Thin Film Transistors Based on High Mobility Single-Crystalline-Like Si by PECVD Ying Guo1, 2; Univ of Houston, United States; 2University of Houston, United States.

Low Temperature Spalling for Low Cost Silicon Wafers Pablo Guimerà Cell; Arizona State University, United States.

Multiscale Self-Assembly of Quantum Dots into an Anisotropic Three-Dimensional Random Network Serim Idlay; Bilkent University, Turkey.

Silicon Miro-Orgamis Hanqing Jiang; Arizona State Univ, United States.

Optically Excited Pulsed MOS Capacitor: A Promising Technique for Measuring Recombination Lifetime in Silicon Epitaxial Layers Zhao Zhao; Arizona State Univ, United States.

Random Texturing in Submicron Scale for Effective Light Trapping in Ultrathin c-Si Solar Cells Inho Kim; Korea Institute of Science and Technology, Korea (the Republic of).

Enhancement of Reliability Characteristics by Optimizing Active Air Gap Process for Sub-20 nm 2D NAND Flash Memory Devices Minchul Lee; SK Hynix, Korea (the Republic of).

Charge Transport in Germanium Nanoparticle Thin-Films for Solution-processed Electronics Zeynep Meric; Univ of Erlangen, Germany.

A Multiscale Modeling Approach to Study Transport in Silicon Heterojunction Solar Cells Pradyumna Muralidharan; Arizona State University, United States.

Impact of Morphology on Charge Transport in InₓOᵧ:H Alexander Niebraski; Arizona State University, United States.


Self-Organization of Metal Silicide Epilayers at Grain Boundaries in Silicon Yutaka Ohno; IMR, Tohoku Univ, Japan.

Mechanical Manipulation of Flexible a-Si:H Nanowire Solar Cells Minoli Pathirane; University of Waterloo, Canada.

Electron-Blocking Properties of Crystalline-Silicon/Cu O Heterojunctions for Photovoltaics Pramod Ravindra; Indian Institute of Science, India.

A New Dimension in Silicon: Functional Elements Buried in Silicon Onur Tokel; Bilkent University, Turkey.

A Simple Approach to Grow BaSi Thin Film on Foreign Substrates as an Absorber for High-Performance Thin Film Solar Cell Noritaka Usami1, 2; Nagoya University, Japan; 2CREST, Japan Science and Technology, Japan.

BaSi: An Alternative to Silicon for High-Performance Thin-Film Solar Cell Robin Vismara; Delft University of Technology, Netherlands.

Lower Temperature Thermal Silicon Nitride ALD on Si₁₋₋ₓGeₓ(110) Steven Wolf; University of California San Diego, United States.

Record Low Reflectivity for Silicon in High Lifetime Tapered Microwire Arrays for High Efficiency Photovoltaics Pramod Ravindra; California Institute of Technology, United States.

Si Radial p-i-n Heterojunction Nanowires for Photovoltaic Applications Jinkyoung Yoo; Los Alamos National Laboratory, United States.

Improving the Performance of Graphene/Bulk-Silicon Schottky-Junction Photodetectors by using Silicon Quantum Dots Ting Yu; Zhejiang University, China.

GaP Passivation for Silicon Photovoltaic Devices Chaomin Zhang1, 2; Solar Power Lab, United States; 2Arizona State University, United States.

Amorphization and Nanocrystallization of Silicon under Shock Compression Shiteng Zhao; University of California, San Diego, United States.

Strong Sub-Band Gap Absorption from Gold Hyperdoped Silicon beyond Cellular Breakdown Wenjie Yang; Australian National University, Australia.

Investigation of Molybdenum Oxsulfides Potential as Contacts for Silicon Solar Cells Laura Ding; Arizona State University, United States.
SYMPOSIUM EP5

Metal Oxide Hetero-Interfaces in Hybrid Electronic Platforms
March 29 - April 1, 2016

Chairs
Erin Ratcliff, University of Arizona
Fu Rong Zhu, Hong Kong Baptist University
Marjorie Langell, University of Nebraska
Martyn McLachlan, Imperial College London

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances).

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* Invited Paper

SESSION EP5.1: Metal Oxide/Organic Interfaces
Session Chairs: Oliver Monti and Natalie Stingelin
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 221 C

2:00 PM *EP5.1.01
Solution-Processed Metal Oxide Interlayers for Highly Efficient Organic and Hybrid Photovoltaics Aram Amassian; King Abdullah University of Science and Technology (KAUST), Saudi Arabia.

2:30 PM EPS.1.02
Metal Hydroxide Electron-Selective Interlayers for Solution-Processable Bulk Heterojunction Solar Cells Richard C. Shullcross; The University of Arizona, United States.

2:45 PM EP5.1.03
Trapped and Hybrid Charge Transfer Excitons at Organic-Inorganic Semiconductor Heterojunctions Anurag Panda; University of Michigan, United States.

3:00 PM BREAK

SESSION EP5.2: Controlling Metal Oxide Properties through Synthesis and Deposition
Session Chairs: Marjorie Langell and Erin Ratcliff
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 221 C

3:30 PM *EP5.2.01
Solution-Cast Oxide Films from Aqueous All-Inorganic Molecular Precursors: Solution Chemistry, Design Principles and Electronic Applications Shannon W. Hoetenger; University of Oregon, United States.

4:00 PM *EP5.2.02
Understanding Nucleation and Growth of Metal Oxides by Atomic Layer Deposit Stacey F. Bent; Stanford University, United States.

4:30 PM *EP5.2.03
Photo-Assisted Synthesis of 2D Nanosheet Based Hybrid Materials for Organic Electronics Emmanuel Stratakis; Foundation for Research and Technology Hellas, Greece.

SESSION EP5.4: Characterization of Physical and Electronic Structure of Metal Oxides
Session Chairs: Marjorie Langell and Erin Ratcliff
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 221 C

9:30 AM *EP5.4.01
Excited State Energy Transfer and Electron Drift Studies with Conducting Metal/Metal Oxide Interfaces and Multilayer Paul N. Stavrinou; Imperial College London, United Kingdom.

10:00 AM *EP5.4.02
Oxide-Metal-Oxide Layers for Flexible and See-Through Electronics Seunghyup Yoo; Korea Advanced Institute of Science and Technology (KAIST), Korea (the Republic of).

10:30 AM EP5.4.03
Transition Metal Aluminum Oxide Alloys; Physical and Electronic Structure Matthew Kast; Univ of Oregon, United States.

10:45 AM EP5.4.04
Electronically Passivated Hole-Blocking Titanium Dioxide/Silicon Heterojunction for Hybrid Silicon Photovoltaics Gabriel Mann; Princeton University, United States.

11:00 AM EP5.4.05
Structural Dynamics of Reconfigurable Organic-Metal Oxide Interfaces Kyle McElhinny; Univ of Wisconsin-Madison, United States.

11:15 AM EP5.4.06
In Operando Synchronous Time-Multiplexed O K-edge X-Ray Absorption Spectromicroscopy of Functioning Memristors Suhail Kumar; 1Hewlett Packard Labs, United States; 2Stanford University, United States.

11:30 AM *EP5.4.07
Resonant X-Ray Spectroscopies and Their Application to Electronic Coupling and Ultrafast Charge Transfer across Interfaces Dennis Nordlund; Stanford University, United States.
1:30 PM *EP5.5.01
Electrolyte-Gated, WO3, Thin Film Photo-Transistors Xiang Meng; Ecole Polytechnique Montreal, Canada.

1:45 PM *EP5.5.02
Hole Transport Processes in the Wide Band Gap Semiconductor Copper(I) Thiocyanate (CuSCN) Pichaya Pattanasatayavong1,2, Vidyasirimedu Institute of Science and Technology, Thailand; Imperial College London, United Kingdom.

2:00 PM *EP5.5.03
Flexible Memory Devices Based on Functional Polymer Blends and Structures Husam N. Alshareef; King Abdullah University of Science and Technology (KAUST), Saudi Arabia.

2:30 PM BREAK

SESSION EP5.6: Metal Oxide Interfaces at the Nanoscale
Session Chair: Joseph Berry
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 221 C

3:00 PM *EP5.6.01
Structural Evolution, Luminescence Dynamics and Light Induced Charge Transport at the Silicon Nanocrystal/SiO2 Interface Iain Crowe; The University of Manchester, United Kingdom.

3:30 PM *EP5.6.02
Solar-Blind Avalanche Photodetector Based on Single ZnO-Ga2O3 Core-Shell Microwire Bin Zhao; Fudan University, China.

3:45 PM *EP5.6.03
Characterization of Thermally Treated MgZnO Nanowire Alloys Synthesized by Vapor-Transport Technique Ebrahim Azhar; Arizona State Univ, United States.

4:00 PM *EP5.6.04
Synthesis of Novel CuO Nanorods Using Low-Temperature Facile Method and Its Application as a Hole Injection Layer in Flexible Inorganic LED Pranab Biswas; Department of Materials Science and Engineering, Yonsei University, Korea (the Republic of).

4:15 PM *EP5.6.05
Approaching Defect-Free Amorphous Silicon Nitride by Plasma-Assisted Atomic Beam Deposition for High Performance Gate Dielectric Shu-Ju Tsai; Center for Micro/Nano Science and Technology, National Cheng Kung University, Tainan 70101, Taiwan, United States.

4:30 PM *EP5.6.06
Efficient and UV Durable Inverted Organic Solar Cells Based on an Al-Doped ZnO Transparent Cathode Fu Rong Zhu; HKBU, China.

SESSION EP5.7: Hybrid Lead-Halide Perovskites Interfaces
Session Chair: Jacek Jasieniak
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 221 C

10:00 AM *EP5.7.01
Revealing Fundamental Mechanisms to Control Magneto-Optic, Photovoltaic, and Thermoelectric Functions in Ferroelectrically Semiconducting Organic-Inorganic Perovskites Bin Hu; University of Tennessee, United States.

10:30 AM *EP5.7.02
Photophysical versus Structural Properties in Hybrid Lead-Halide Perovskites Annamaria Petrozza; Istituto Italiano Tecnologia, Italy.
**SYMPOSIUM EP6**

*Integration of Heterovalent Semiconductors and Devices*

**March 29 - March 30, 2016**

**Chairs**
Jacek Furdyna, University of Notre Dame  
Henri Mariette, Institut Néel-CNRS  
Maria Tamargo, The City College of New York  
Yong-Hang Zhang, Arizona State University

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

**SESSION EP6.1: Heterovalent II-VI/III-V Semiconductor Integration I**

**Session Chairs:** Isaac Hernandez-Calderon and Sergey Ivanov  
Tuesday Afternoon, March 29, 2016  
PCC North, 200 Level, Room 228 B

1:30 PM *EP6.1.01*
First-Principles Study of Stability and Band Alignment of Lattice-Matched II-VI/III-V Semiconductor Interfaces  
Su-Huai Wei1, 2; 1Beijing Computational Science Research Center, China; 2Microsystem and Terahertz Research Center, China.

2:00 PM *EP6.1.02*
Band Alignment of Hydrogen-Plasma Cleaned MBE CdTe on InSb (001)  
Xingye Wang; Arizona State Univ, United States.

2:15 PM *EP6.1.03*
Band Engineered Coherent “Hetero-crystalline” Bi2Se3/II-VI Heterostructures  
Thor A. Garcia1, 2; 1The City College of New York, United States; 2The Graduate Center of CUNY, United States.

2:30 PM *EP6.1.04*
6.1Å III-V/II-VI Heterovalent Structures for Optoelectronics and Spintronics  
Sergey Ivanov; Ioffe Institute, Russian Federation.

**SESSION EP6.2: Poster Session**

**Tuesday Afternoon, March 29, 2016**  
**8:00 PM**  
Sheraton, Third Level, Phoenix Ballroom

**EP6.2.01**
GaN Nanowire Arrays by a Patterned Metal-Assisted Chemical Etching  
Guodong Yuan; Chinese Academy of Sciences, China.

**EP6.2.02**
High-Performance Wrap-Gated InGaAs Nanowire Field-Effect Transistors with Sputtered Dielectrics and Surface Passivation  
Lifan Shen; City Univ of Hong Kong, Hong Kong.

**EP6.2.03**
High Hole Mobility of GaSb Nanowires for Next-generation Nanoelectronics  
Dapan Li; City Univ of Hong Kong, Hong Kong.

**EP6.2.04**
Fabrication and Energy Band Diagram of AlOx/AlGaN/GaN MOS Capacitors  
Min-Woo Ha; Myongji University, Korea (the Republic of).

**EP6.2.05**
Thermal Deactivation of Tellurium Doping in InxGa1-xAs Grown by MOCVD  
Ethan Kennon; University of Florida, United States.

**EP6.2.06**
Lateral Epitaxial Overgrowth of High Quality AlN on Patterned h-BN Using Metal Organic Chemical Vapor Deposition  
Cuong V. Tran1, 2; 1School of Semiconductor and Chemical Engineering, Korea (the Republic of); 2University of Science, Vietnam National University Ho Chi Minh City, Viet Nam.

**EP6.2.07**
Variation of Vertical Direction Breakdown Voltage of the AlGaN/GaN HEMTs on AlN/Si Template Substrate as a Function of the Growth Temperature of the Initial Al Layer  
Yuva Yamakou1, 2; 1Taiyo Nippon Sanso Corp., Japan; 2Nagoya Institute of Technology, Japan.

**EP6.2.08**
Migration Enhanced Molecular Beam Epitaxy Growth of Heterovalent Systems for High Speed Electronic Device Applications  
Maxwell B. Lassise1, 2; 1Arizona State University, United States; 2Arizona State University, United States.

**EP6.2.09**
Optoelectronic and Stability Studies of CdTe/Mg Cd 1-x Te Double Heterostructures Featuring Barrier Layers with over 46% Mg Composition Grown by Molecular Beam Epitaxy on InSb(001) Substrates  
Cali M. Campbell1, 2; 1Arizona State University, United States; 2Arizona State University, United States.

**SESSION EP6.3: Heterovalent II-VI/III-V Semiconductor Integration II**

**Session Chair:** David Smith  
Wednesday Morning, March 30, 2016  
PCC North, 200 Level, Room 228 B

8:30 AM *EP6.3.01*
Low Temperature Metalorganic Chemical Vapor Deposition of Semiconductor Thin Films for Surface Passivation of Photovoltaic Devices  
Ishwara B. Bhat; Rensselaer Polytechnic Institute, United States.

9:00 AM *EP6.3.02*
CdSe/ZnSe Ultra-Thin Quantum Wells on GaAs(001) for Photovoltaic Applications  
Isaac Hernandez-Calderon; Physics Department - Cinvestav, Mexico.

9:30 AM *EP6.3.03*
Heterovalent Interface GaAs/ZnSe: Effect of MBE Growth and Annealing on Chemical and Physical Properties  
Tatiana A. Komissarova; Ioffe Institute, Russian Federation.
9:45 AM EP6.3.04
Optical Properties of Strain-Balanced InAs/InAsSb Superlattices Grown With and Without Bi as a Surfactant Preston Webster1, 2; 1Arizona State University, United States; 2Center for Photonics Innovation, United States.

10:00 AM BREAK

SESSION EP6.4: III-Nitride/Si Integration
Session Chair: Ishwara Bhat
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 228 B

10:30 AM *EP6.4.01
Transmission Electron Microscopy Investigation of the Microstructure of Group III-N Nanowires and Their Interfaces with Si Substrates Esperanza Luna; Paul-Drude-Institute, Germany.

11:00 AM EP6.4.02
Low-Temperature Template-Assisted Fabrication of Hollow GaN Nanocylinders on Si Substrates Mehmet Yilmaz; Bilkent University, Turkey.

11:15 AM EP6.4.03
Elastic and Plastic Stress Relaxation in Highly Mismatched SiGe/Si Crystals Fabio Ias; ETH Zurich, Switzerland.

11:30 AM EP6.4.04
Growth and Strain Engineering of Ge Nanowires in an InAlAs Host by Spontaneous Phase Separation Daehwan Jung; Yale University, United States.

1:30 PM *EP6.5.01
II-VI Material Integration with Silicon for Detector and PV Applications Sivalingam Sivananthan; Univ of Illinois-Chicago, United States.

2:00 PM *EP6.5.02
Enabling High-Efficiency III-V/Si Tandem Cells through Dislocation Engineering Minjoo L. Lee; Yale Univ, United States.

2:30 PM EP6.5.03
Ultrafast and Valence Sub-Band Dependent Auger Recombination in InGaN Quantum Wells Kristopher Williams; Columbia University, United States.

2:45 PM EP6.5.04
InGaN-Based Strained Quantum Well Laser with Etched Structure Analized by X-Ray Diffraction and Fluorescence of Indium Using High-Resolution Micro-Beam Toshiya Yokogawa; Yamaguchi University, Japan.

3:00 PM BREAK

SESSION EP6.5: Heterovalent Integration on Si for Device Application
Session Chair: Thomas Myers
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 228 B

3:30 PM *EP6.6.01
Two Dimensional Electron Gas in CdTe/PbTe Heterojunction Huizhen Wu; Zhejiang University, China.

4:00 PM EP6.6.02
Epitaxial Integration of NiVO2 Heterostructures on Si (001) Srinivasa Rao Singamaneni; North Carolina State Univ, United States.

4:15 PM EP6.6.04
Insight into Group V Dopant Incorporation in Polycrystalline CdTe via 3-D TOF-SIMS Tomography Steven P. Harvey; National Renewable Energy Lab, United States.
SYMPOSIUM EP7
Material and Device Frontiers for Integrated Photonics
March 29 - April 1, 2016

Chairs
Brian Corbett, Tyndall National Institute
Juejun Hu, Massachusetts Institute of Technology
Yasuhiko Ishikawa, The University of Tokyo
Shinichi Saito, University of Southampton
Chee Hing Tan, The University of Sheffield

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* Invited Paper

SESSION EP7.1: Si Photonics—State-of-the-Art
Session Chair: Yasuhiko Ishikawa
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 222 A

1:30 PM *EP7.1.01
Photonic Integration on the Silicon Platform: Past, Present and Future
Lionel C. Kimerling; MIT, United States.

2:00 PM *EP7.1.02
Microring Resonators and Silicon Photonics Fernando R. Manzano; University of Trento, Italy.

2:30 PM EP7.1.03
Co-Integrated Ge and Si Photodiodes by Direct Wafer Bonding Brian Corbett; Tyndall National Institute, Ireland.

SESSION EP7.2: Si Photonics—Advanced Devices and Materials
Session Chairs: Yasuhiko Ishikawa and Shinichi Saito
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 222 A

3:15 PM *EP7.2.01
Applications of Magneto-Optical Materials for Si Photonics Tetsuya Mizumoto; Tokyo Inst of Technology, Japan.

3:45 PM *EP7.2.02
Graphene-Based Optoelectronics for On-Chip Optical Interconnects Ren-Jye Shiue; Massachusetts Institute of Technology, United States.

4:15 PM EP7.2.03
Er Rare-Earth Silicates: Material Synthesis and Applications to Hybrid Silicon Photonics Hideo Iishiki; The Univ of Electro-Communications, Japan.

SESSION EP7.3: Si Photonics—Emerging Devices and Sensors
Session Chair: Yasuhiko Ishikawa
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 222 A

8:00 AM *EP7.3.01
Subwavelength Engineered Optical Materials for Photonic Integration and Sensing Pavel Cheben; National Research Council, Canada.

8:30 AM *EP7.3.02
Photonic Quantum Computing Jeremy O’Brien; University of Bristol, United Kingdom.

9:00 AM EP7.3.03
Scalable Integrated Optical System for Measuring Small Vibrations for Sensing Applications Nirmal Govindaraju; Oklahoma State Univ, United States.

9:15 AM EP7.3.04
Optical Coupler Devices and Materials to Implement the Hybrid Optical Interconnect Plane Architecture in Si VLSI Chip Donghwan Ahn; Kookmin University, Korea (the Republic of).

9:45 AM EP7.3.05
Growth and Properties of Amorphous MoSi Superconductor for Single Photon Detectors David Bosworth; University of Cambridge, United Kingdom.

10:00 AM BREAK

SESSION EP7.4: III-V Photonics—Lasers on Si
Session Chair: Chee Hing Tan
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 222 A

10:30 AM *EP7.4.01
Progress of III-V Membrane Photonic Devices on Si toward On-Chip Interconnection Nobuhiko Nishiyama; Tokyo Institute of Technology, Japan.

11:00 AM *EP7.4.02
Heterogeneous III-V-on-Silicon Photonic Integrated Circuits for Communication and Sensing Applications Gunther Roelkens; Ghent Univ IMEC, Belgium.

11:30 AM EP7.4.03
Transfer Printing of Thin-Film Microscale GaAs Lasers on Silicon with a Thermally Conductive Interface Xing Sheng; Tsinghua University, China.

11:45 AM EP7.4.04
Technologies for Transfer Printing of InP Based Etched Facet Lasers Ruggero Loi; Tyndall National Institute, Ireland.

SESSION EP7.5: Ge for Si Photonics—GeSn Based Light Sources
Session Chair: Shinichi Saito
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 222 A

1:30 PM *EP7.5.01
Group IV Epitaxial Layers on Si for Photonic Devices Erich Kasper; 1PEK Scientific Consulting, Germany; 2University of Stuttgart (retired), Germany.

2:00 PM EP7.5.02
Group-IV Infrared Light Emitting Diodes on Si James Gallagher; Arizona State University, United States.
2:15 PM EP7.5.03
Tuned Ge\textsubscript{x}Sn\textsubscript{1-x} Diode Designs for Investigating the Effect of Strain Relaxation on Electroluminescence
Charutha L. Senaratne; Arizona State University, United States.

2:30 PM EP7.5.04
Toward a Direct Bandgap Ge\textsubscript{x}Sn\textsubscript{1-x} Alloy by Ion Implantation and Pulsed Laser Melting
Tuan T. Tran, Australian National University, Australia.

2:45 PM BREAK

SESSION EP7.6: Ge for Si Photonics—Novel Devices and Processes
Session Chair: Juejun Hu
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 222 A

3:15 PM *EP7.6.01
Ge on Si Photonics for Mid-Infrared Sensing Applications
Douglas J. Paul, University of Glasgow, United Kingdom.

3:45 PM EP7.6.02
NIR Laser Annealing Process for Dark Current Suppression in Selectively-Grown Ge Photodiodes on Si
Yasuhiro Ishikawa; Univ of Tokyo, Japan.

4:00 PM EP7.6.03
Silicon-Germanium Engineering and Integration for Photonic and Electronic Applications
Frederic Gardes; University of Southampton, United Kingdom.

4:15 PM EP7.6.04
Edge Coupled SiGe Mach-Zehnder Modulators
Xiaochen Sun, LaXense Inc., United States.

4:30 PM EP7.6.05
Novel Electro-Absorption Modulator with Germanium Fins Evanescently Coupled to Silicon Waveguide
Shinichi Saito; University of Southampton, United Kingdom.

SESSION EP7.7: Novel Materials for Integrated Photonics
Session Chair: Chee Hing Tan
Wednesday Afternoon, March 30, 2016
Sheraton, Third Level, Phoenix Ballroom

8:30 AM *EP7.8.01
Recent Progress in Extreme Metastructures
Nader Engheta, Univ of Pennsylvania, United States.

9:00 AM EP7.8.02
Electric Field Induced Structural Colour Tuning of a Silver/Titanium Oxide Nanoparticle One Dimensional Photonic Crystal
Eduardo Aluicio-Sarduv; 1-3Istituto Italiano di Tecnologia (IIT), Italy; 2Politecnico di Milano (PolIMi), Italy.

9:15 AM EP7.8.03
Tunable Local Field Enhancement from Hybrid Optical Devices Based on Siliccon-on-Nothing Photonic Crystals and Nanoantenna Arrays
Devon Jensen, Univ of Utah, United States.

9:30 AM EP7.8.04
Coupling Nanocube Patch-Antennas to Photonic Waveguides: Towards an Integrated Sensing Platform
Alexander Powell; University of Oxford, United Kingdom.

9:45 AM EP7.8.05
Enhanced Optical Sensing in Mixed Porous-Solid Photonic Stacks
Wendy J. Nimens; University of Utah, United States.

10:00 AM BREAK

SESSION EP7.9: III-V Photonics—Heterogeneous Integration
Session Chair: Chee Hing Tan
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 222 A

10:30 AM *EP7.9.01
Heterogeneous Integration of HIV on Silicon for Photonics
Erik Norberg, Aurrion Inc., United States.

11:00 AM *EP7.9.02
Flexible, Heterogeneously Integrated Micro-VCSELs as a New Materials Platform for Wearable Optoelectronics
Jongsung Yoon, Univ of Southern California, United States.

11:30 AM EP7.9.03
InGaAsP Variable Optical Attenuator with Lateral PIN Junction Formed by Ni-InGaAsP and Zn Diffusion on III-V on Insulator Wafer
Jin-Kwon Park; University of Tokyo, Japan.

11:45 AM EP7.9.04
Composition Graded InGaAsP Alloys Nanowires Grown by Dual Gradient Chemical Vapor Deposition
Seyed Ebrahim Hashemi Amiri; 1-3Arizona State University, United States; 2Arizona State University, United States.
SESSION EP7.10: Ge for Si Photonics—Ge Light Sources
Session Chair: Shinichi Saito
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 222 A

1:30 PM *EP7.10.01
Direct Band Gap Germanium with Silicon Nitride Stressor Layers Philippe Boucaud; CNRS - University Paris Sud, France.

2:00 PM EP7.10.02
Enhanced Photoluminescence of Heavily n-Doped Germanium Processed by Phosphosilicate Glass Diffusion Doping Chan-Hyuck Park; Kookmin University, Korea (the Republic of).

2:15 PM EP7.10.03
Fluorine and Phosphorus Co-Implantation for High Electrical Activation of N-Type Germanium Corentin P. Monmeyran; Massachusetts Institute of Technology, United States.

2:30 PM EP7.10.04
Record-Low Resistivity in n-Type Ge by In Situ Doping Chi Xu; Arizona State University, United States.

2:45 PM BREAK

SESSION EP7.11: Mid-IR Applications
Session Chair: Juejun Hu
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 222 A

3:15 PM *EP7.11.01
Chalcogenide Glasses for Nonlinear Optics and Mid Infrared Science Barry Luther-Davies; Australian National Univ, Australia.

3:45 PM EP7.11.02
Quantitative Study of Sb Segregation in InAs/InAs1-xSbx Type-II Superlattices for IR Photodetectors Jing Lu; Arizona State University, United States.

4:00 PM EP7.11.03
Silicon Nitride Mid-Infrared Photonic Circuits for Label-Free Biochemical Sensing Pao T. Lin; Texas A&M University, United States.

4:15 PM EP7.11.04
Low Loss Chalcogenide Glass Thin Film Photonics Qingyang Du; MIT, United States.

4:30 PM EP7.11.05
InAs-QDIP Hybrid Broadband Infrared Photodetector Chee Hing Tan; The Univ of Sheffield, United Kingdom.

9:00 AM EP7.12.04
Facile and Robust Approach to Fully-Flexible Polymer/Polymer-Inorganic Hybrid One Dimensional Photonic Bandgap Structures via In Situ Production of Metal Chalcogenide Nanoparticles Gary P. Kashtan; U.S. Naval Research Laboratory, United States.

9:15 AM EP7.12.05
Observation of Strongly Enhanced Photoluminescence from Inverted Cone-Shaped Silicon Nanostuctures Sebastian Schmitt1,2; 1MPI for the Sci of Light, Germany; 2Helmholtz Zentrum für Materialien und Energie, Germany.

9:30 AM EP7.12.06
Enhanced Colloidal Quantum Dot Luminescence from Nanobeam Photonic Crystal Cavities Thomas Mahony; MIT, United States.

9:45 AM BREAK

SESSION EP7.13: Ge for Si Photonics—Growth and Strain-Engineering
Session Chair: Shinichi Saito
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 222 A

10:15 AM EP7.13.01
Design and Fabrication of Grown-in-Reverse Ge Rib Structure for Efficient Lasing Motoki Yako; Univ of Tokyo, Japan.

10:30 AM EP7.13.02
Biaxial and Uniaxial Strained Cavities in Suspended Ge Layers Using Strain Redistribution in 200 mm GeOI Wafers for Laser Applications Kevin Guilloy; CEA INAC, France.

10:45 AM EP7.13.03
Strain Dependence of the Direct Bandgap in Highly Strained Germanium Micro-Membranes Kevin Guilloy; CEA INAC, France.

11:00 AM EP7.13.04
Near-Infrared Ge Avalanche Photodiodes on Si Using SiGe/Heterojunction Multiplication Layer Yuji Miyasaka; Univ of Tokyo, Japan.

11:15 AM EP7.13.05
Effects of Post-Growth Annealing on Photoluminescence Intensity for n'-Ge on Si Covered with a Barrier Layer Preventing Out-Diffusion of Phosphorous Dopants Naoki Higashitarumizu; Univ of Tokyo, Japan.

8:00 AM *EP7.12.01
Hybrid Photonic Crystal Membrane Photonics Weidong Zhou; Univ of Texas-Arlington, United States.

8:30 AM EP7.12.02
Electromechanically Controlled On-Chip Flat Optical Devices Tanashree Roy1,2; 1Argonne National Laboratory, United States; 2Harvard University, United States.

8:45 AM EP7.12.03
Photonic Crystal Nanocavity with Atomically Flat Si (111) Interfaces Alyssa Pramusinto; University of Southampton, United Kingdom.
**SYMPOSIUM EP8**

Resonant Optics—Fundamentals and Applications  
March 29 - April 1, 2016

**Chairs**  
Stephanie Larouche, Duke University  
Regina Ragan, University of California, Irvine  
Jason Valentine, Vanderbilt University

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* Invited Paper

**SESSION EP8.1: Nonlinear and Tunable Resonant Optics**  
Session Chair: Regina Ragan  
Tuesday Afternoon, March 29, 2016  
PCC North, 200 Level, Room 222 B

1:30 PM *EP8.1.01  
**Light-Matter Interactions in Engineered Optical Media** Natalia M. Litchinitser; University at Buffalo, The State University of New York, United States.

2:00 PM EP8.1.02  
**Mid-Infrared Beamsteering with Tunable Graphene-Gold Metasurfaces** Michelle C. Sherrert, California Institute of Technology, United States.

2:15 PM *EP8.1.03  
**Nonlinear Optical Metasurfaces** Joel Broner; 1, 2 Sandia National Labs, United States; 3 Center for Integrated Nanotechnologies, United States.

2:45 PM BREAK

3:15 PM *EP8.1.04  
**Breaking Reciprocity with Non-Linear Resonant Optical Metamaterials** Andrea Alu; The University of Texas at Austin, United States.

3:45 PM EP8.1.05  
**Dynamic 3D Photonic Crystals Formed Using Tunable 3D Microplasma Array** Runyu Zhang; University of Illinois-Urbana Champaign, United States.

4:00 PM EP8.1.06  
**Gate Tunable Spontaneous Emission Decay Rate of InP Quantum Dots** Yu-Jung Lu; California Institute of Technology, United States.

4:15 PM EP8.1.07  
**Gate-Tunable Conducting Oxide Metasurfaces** Ho Wai (Howard) Lee; 1, 2 California Institute of Technology, United States; 3 Baylor University, United States.

4:30 PM EP8.1.08  
**Millivolt-Scale Dynamic Reflectance Modulation in Gate-Tunable Fano Resonant Metasurfaces** Krishnan Thayagaraj; 1, 2 California Institute of Technology, United States; 3 California Institute of Technology, United States.

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**SESSION EP8.2: Energy Harvesting and Control**  
Session Chair: Jason Valentine  
Wednesday Morning, March 30, 2016  
PCC North, 200 Level, Room 222 B

8:00 AM *EP8.2.01  
**Metasurfaces for Selective Control of Thermal Emission** Peter Bermel; Purdue University, United States.

8:30 AM EP8.2.02  
**Resonant Optical Metamaterials for Generation of Hot Plasmonic Electrons** Alexander O. Govorov; Ohio University, United States.

8:45 AM EP8.2.03  
**Resonant Waveguide Modes in Sparse III-V Nanowire Arrays for Tunable, Broadband Perfect Absorption from the Ultraviolet to the Mid-Infrared** Katherine T. Fountain; 1, 2 Northrop Grumman Aerospace Systems, United States; 3 California Institute of Technology, United States.

9:00 AM EP8.2.04  
**Resonant and Non-Resonant Metamaterials as Antireflection Coatings for Solar Cells** Emanuele Francesco Pecora; Stanford University, United States.

9:15 AM EP8.2.05  
**Flexible Polymer Metamaterials for Passive Local Thermo-Regulation** Svetlana V. Boriskina; MIT, United States.

9:30 AM BREAK

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**SESSION EP8.3: Resonant Optics for Sensing**  
Session Chair: Stephanie Larouche  
Wednesday Morning, March 30, 2016  
PCC North, 200 Level, Room 222 B

10:00 AM EP8.3.01  
**High-Quality-Factor Plasmonic Cup Resonator for Sensing at Visible Wavelengths** Wenqi Zhu; 1, 2 NIST, United States; 3 University of Maryland, United States.

10:15 AM EP8.3.02  
**Metamaterial-Based Microorganism Sensors Fabricated by Electrohydrodynamic (EHD) Jet Printing** Avoda P. Tenggara; Sungkyunkwan University, Korea (the Republic of).

10:30 AM EP8.3.03  
**Mechanically Self-Assembled, Three-Dimensional Graphene-Gold Hybrid Nanostructures for Advanced Nanoplasmonic Sensors** Joo Young Leem; University of Illinois at Urbana Champaign, United States.

10:45 AM EP8.3.04  
**Whispering-Gallery Nanocavity Plasmon-Enhanced Raman Spectroscopy** Jinxing Li; 1, 2 University of California-San Diego, United States; 3 Fudan University, China.

11:00 AM EP8.3.05  
**A Near-Field Antenna Enabled by Plasmonic Colloidal Nanocrystals** Tyler J. Dill; University of California-San Diego, United States.

11:15 AM EP8.3.06  
**Wafer-Scale Plasmonic and Photonic Crystal Sensors for Label-Free and Fluorescence Based Detection** Matthew C. George; Moxtek, Inc., United States.

11:30 AM EP8.3.07  
**3 Dimensionally Stacked Surface Enhanced Raman Scattering (SERS) Substrates with PICO-Molar Sensitivity: Experimental and Simulation Studies** Daesung Yang; California Institute of Technology, United States.

11:45 AM EP8.3.08  
**Incident Angle-Tuning of Infrared Antenna Array Resonances for Molecular Sensing** Tobias Mass; RWTH Aachen University, Germany.

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**SESSION EP8.4: Fabrication of Resonant Optic Systems**  
Session Chair: Regina Ragan  
Wednesday Afternoon, March 30, 2016  
PCC North, 200 Level, Room 222 B

1:30 PM *EP8.4.01  
**Raman Nanospectroscopy Using Colloidal Nanocrystals as Scanning Probes** Andrea R. Tao; University of California, San Diego, United States.
2:00 PM EP8.4.02
3D Nanoprinting of Plasmonic Gold Structures beyond Current Limitations Harald Plank1, 2; 1Graz University of Technology, Austria; 2Graz Centre for Electron Microscopy, Austria.

2:15 PM EP8.4.03
The Hole-in-One Structure: A Self-Assembled Gap-Plasmon Supporting Sensing Element Peter G. Kik; University of Central Florida, United States.

2:30 PM EP8.4.04
Self-Assembled Single-Mode Micro-Lasers of “Giant” CdSe/Cds Core/Shell Quantum Dots Chen Liang; Advanced Photonic Center, Southeast University, China.

2:45 PM EP8.4.05
The Hybrid Electrothermoplasmic Nano tweezers: A New Paradigm in Nanomanipulation Justus C. Ndubuisie; Purdue University, United States.

3:00 PM BREAK

SESSION EP8.5: Computational Approaches for Resonant Optics
Session Chair: Regina Ragan
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 222 B

3:30 PM *EP8.5.01
Light Emission in Nanogaps: Overcoming Quenching Philippe Lalanne; Université Bordeaux, CNRS, France.

4:00 PM *EP8.5.02
Dynamics of Non-Equilibrium Carriers in Plasmonic Nanostructures Prineha Narang; California Institute of Technology, United States.

SESSION EP8.6: Poster Session
Session Chairs: Stephane Larouche and Jason Valentine
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EP8.6.01
Electronically Controlled Plasmonic Structure by Overlaying Liquid Crystals on Aluminum Hole Arrays Younghin Lee; Daegu Gyeongbuk Institute of Science and Technology (DGIST), Korea (the Republic of).

EP8.6.02
The Application of a Superabsorber in FePt HAMR Media Chunchao Deng; Shanxi Normal University, China.

EP8.6.03
Dielectric Metasurface Filters for Backside Illuminated CMOS Image Sensors Seungho Han1, 2; 1Samsung Electronics, Korea (the Republic of); 2California Institute of Technology, United States.

EP8.6.04
Plasmon Gap-Mode Resonance for Large-Area Chemical Detection Matthew Rozin; University of California-San Diego, United States.

EP8.6.05
Fine-Tuning and Individual Addressing of mid-IR Nanoantennas Resonances by Reversible Optical Switching of Ge,Se,Te Thin-Films Ann-Katrin U. Michel; RWTH Aachen, Germany.

EP8.6.06
Narrowband Color Filters for CMOS Image Sensors Based on Plasmonic Guided Mode Resonances Ragip Pala; California Institute of Technology, United States.

SESSION EP8.7: Metasurfaces and 2D Materials
Session Chair: Stephane Larouche
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 222 B

8:00 AM *EP8.7.01
Metal Film Devices Constructed from Resonant High-Index Nanostructures Mark L. Brongersma; Stanford University, United States.

8:30 AM EP8.7.02
Infrared Metasurfaces Fabricated with Microsphere Photolithography Edward Kinzel; Missouri University of Science and Technology, United States.

8:45 AM EP8.7.03
Dispersionless Optical Metasurfaces in IR and Visible Bands Hossein Mosallaei; Northeastern University, United States.

9:00 AM EP8.7.04
Extraordinary Optical Transmission in Nanopatterned Ultrathin Metal Film without Holes Akshit Peer1, 2; 1Iowa State University, United States; 2Ames Laboratory, United States.

9:15 AM EP8.7.05
An Ultrathin Cloak for 3D Objects of Arbitrary Shape Zi Jing Wong; University of California Berkeley, United States.

9:30 AM *EP8.7.06
High Quality Factor Fano Metasurfaces Michael B. Sinclair; Sandia National Laboratories, United States.

10:00 AM BREAK

10:30 AM *EP8.7.07
Gap Plasmon Resonators for Radiation Control Sergey I. Bozhevolnyi; University of Southern Denmark, Denmark.

11:00 AM EP8.7.08
Graphene-Based Active Tuning of Plasmonic Resonance through Charge Injection and Related Applications Ming Lin; UC Riverside, United States.

11:15 AM EP8.7.09
Local Stimulation of Hyperbolic Phonon Modes in hBN Nanocones Using Photothermal Induced Resonance (PTIR) Lisa V. Brown1, 2; 1National Institute of Standards and Technology, United States; 2University of Maryland, United States.

11:30 AM EP8.7.10
Plasmon Resonances in Self-Assembled Two-Dimensional Au Nanocrystal Metamolecules Nicholas Greubel; University of Pennsylvania, United States.

11:45 AM EP8.7.11
Quantitative Analysis of the Surface Plasmon Polariton Polariton Modes in a Free-Standing Silver Nanowire Ruoxue Yan; University of California-Riverside, United States.

SESSION EP8.8: Dielectric Resonant Optics and New Plasmonic Materials
Session Chair: Jason Valentine
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 222 B

1:30 PM *EP8.8.01
Aluminum Plasmonics Peter Nordlander; Rice University, United States.

2:00 PM EP8.8.02
Direct Imaging of Hybridized Eigenmodes in Coupled Silicon Nanoparticle Jorik Van De Groep; FOM Institute AMOLF, Netherlands.

2:15 PM EP8.8.03
Conductive Zinc Oxides for Mid- and Long-Wave Infrared Plasmonics Justin W. Cleary; Air Force Research Laboratory, United States.
Comparison of Plasmonic and Dielectric Platforms for Surface-Enhanced Spectroscopies and Emission Management

Stefan A. Maier; Imperial College London, United Kingdom.

3:00 PM BREAK

On-Chip Nanophotonics with Nitrides and Oxides

A. Boltasseva; Purdue University, United States.

Substrate-Independent Light Confinement in Bioinspired Photonic Crystal Slabs

Emma C. Regan; Wellesley College, United States.

Measuring and Predicting the Polarization Dependent Near-Field Coupling of Individual Gold Nanorod Optical Antennas to Single Fluorescent Emitters

Benjamin P. Isaacoff; University of Michigan, United States.

SESSION EP8.9: Enhanced Optical Processes

Session Chair: Regina Ragan
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 222 B

Bound State in the Continuum Optical Cavities and Sources

Boubacar Kante; University of California at San Diego, United States.

Gyroid Photonic Crystal with Weyl Points: Synthesis and Mid-Infrared Photonic Characterization

Siying Peng; California Institute of Technology, United States.

Hyperbolic Phonon Polaritons for Near-Field Optical Imaging, Focusing and Waveguiding

Peining Li; RWTH Aachen University, Germany.

Surface Phonon Polaritons for Low-Loss, Infrared and THz Nanophotonics and Metamaterials

Joshua D. Caldwell; US Naval Research Lab, United States.

10:00 AM BREAK

The Science and Applications of Photonic Topological Insulators

Gennady Shvets; The University of Texas at Austin, United States.

Molecular Polaritonics: Strongly-Coupled Vibronic-Photonic States, Novel Ways to Control Energy Transfer and Reactivity

Joel Yuen-Zhou; University of California San Diego, United States.

Dielectric Photonic Crystal Resonator Design with Extreme Subwavelength Mode Confinement

Shuren Hu; Vanderbilt University, United States.
Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

### SESSION EP9.1: NLO Materials for Biological Applications

#### Session Chair: Marek Samoc

**Tuesday Afternoon, March 29, 2016**

**PCC North, 200 Level, Room 230**

**2:00 PM *EP9.1.01***

**Organic and Inorganic Nanoparticles for Two-Photon Induced Photodynamic Therapy**

Olivier Mongin

1. University of Rennes 1, France; 2. CNRS, France.

**2:30 PM *EP9.1.02***

**Nonlinear Chromophores with NIR Properties for Applications in Biology and Defense**

Chantal Andraud

ENS-Lyon, France.

**3:00 PM BREAK**

**3:30 PM *EP9.1.03***

**Molecular Probes for Nonlinear Optical Cellular Imaging**

Koen Clays


**4:00 PM *EP9.1.04***

**Nonlinear Optical Studies of Water-Soluble Photoactive Molecules as a New Class of Photochromic DNA Binders**

Katarzyna Matczyszyn

Wroclaw University of Technology, Poland.

### SESSION EP9.2: Organic NLO Materials and Applications

#### Session Chairs: Joseph Perry and Wenfang Sun

**Wednesday Morning, March 30, 2016**

**PCC North, 200 Level, Room 230**

**8:30 AM * EP9.2.01***

**Linear and Third-Order Nonlinear Optical Properties of Polymethine Dyes**

Seth R. Marder

Georgia Institute of Technology, United States.

**9:00 AM *EP9.2.02***

**Polymethine Materials with Large Figures-of-Merit for All-Optical Signal Processing and Compensation of Self-Phase Modulation**

Joseph W. Perry

Georgia Tech, United States.

**9:30 AM * EP9.2.03***

**Singlet Diradicaloids as Nonlinear Optical Materials**

Kenji Kamada

Nagoya Institute of Technology, Japan.

**10:00 AM BREAK**

**10:30 AM *EP9.2.04***

**Platinum Organometallic Complexes and Polymers for Non-Linear Absorption and Solar Cell Applications**

Kirk S. Schanze

University of Florida, United States.

**11:00 AM EP9.2.05***

**Syntheses and NLO Properties of Organometallic Stars and Trees**

Mark Humphrey

Australian National University, Australia.

**11:15 AM EP9.2.06***

**Increasing the Triplet Lifetime of Cationic Bis-Cycloometalated Ir(III) Complexes by Tuning Ligand π-Conjugation for Application as Reverse Saturable Absorbers**

Chengzhe Wang

North Dakota State University, United States.

**11:30 AM EP9.2.07***

**Photophysical Properties of Nonlinear Dyes in Solid Host Matrices**

Joy E. Haley

Air Force Research Laboratory, United States.

**11:45 AM EP9.2.08***

**Investigating Nonlinear Absorption of CW Lasers in Doped Sol-Gel Glasses**

Hampus Lunden


**SESSION EP9.3: Organic/Organometallic Reverse Saturable Absorbers**

#### Session Chair: Mark Humphrey

**Wednesday Afternoon, March 30, 2016**

**PCC North, 200 Level, Room 230**

**1:30 PM *EP9.3.01***

**Iridium(III) Diamine Complexes with Extended-Band Reverse Saturable Absorption**

Timothy M. Pritchett

1. RDECOM Forward Element Command-Americas, Argentina; 2. US Army Research Laboratory, United States.

**2:00 PM EP9.3.02***

**Synthesis, Characterization and Reverse Saturable Absorption of a Series of Trisbidentate Heteroleptic Ruthenium (II) Complexes**

Li Wang

NDSU, United States.

**2:15 PM EP9.3.03***

**Large Reverse Saturable Absorption under Weak Continuous Incoherent Light**

Shuzo Hirata

Tokyo Institute of Technology, Japan.

**2:30 PM EP9.3.04***

**Reverse Saturable Absorption and Photophysics of Cationic Ir Complexes Bearing Different Degrees of π-conjugated Diimine (N^N) and Cyclometalating (C^N) Ligands**

Bingqing Liu

NDSU, Department of Chemistry and Biochemistry, United States.

**2:45 PM EP9.3.05***

**Design and Synthesis of Iridium Complexes Containing B-Diketonate Ligands with Reverse Saturable Absorption (RSA) Properties**

Jianmin Shi

U.S. Army Research Lab, United States.

**3:00 PM BREAK**

**SESSION EP9.4: Theoretical Calculation and Simulation of NLO Materials**

#### Session Chair: Seth Marder

**Wednesday Afternoon, March 30, 2016**

**PCC North, 200 Level, Room 230**

**3:30 PM *EP9.4.01***

**Nonlinear Optical Properties of Room-Temperature Ionic Liquids**

Mark Gordon

Iowa State University, United States.

**4:00 PM *EP9.4.02***

**First-Principles Simulations of Two-Photon Absorption Spectra of Molecules: Review, Development and Applications**

H. Agren

Royal Institute of Technology, Sweden.

**4:30 PM EP9.4.03***

**Examining Non-Linear Optical Response and Functionalities in Organic Co-Crystals: A Computational Study**

Rakesh K. Behera

Georgia Institute of Technology, United States.

**4:45 PM EP9.4.04***

**Design Rules for Quasi-One Dimensional Nonlinear Optical Materials**

Richard Lytel

Washington State University, United States.
SESSION EP9.5: Poster Session  
Wednesday Afternoon, March 30, 2016  
8:00 PM  
Sheraton, Third Level, Phoenix Ballroom

**EP9.5.01**  
The Fluorescence of a Chelating Two-Photon-Absorbing Dye is Enhanced with the Addition of Transition Metal Ions but Quenched in the Presence of Acid  
Stephanie Long; Air Force Research Laboratory, United States; Southwestern Ohio Council for Higher Education, United States.

**EP9.5.02**  
Syntheses and Nonlinear Optical Properties of Star-Shaped Oligo(Phenyleneethynylene)-Bridged Ruthenium Alkynyl Complexes  
Marie Cifuentes; Australian National University, Australia.

SESSION EP9.6: Novel NLO Phenomena and Structures  
Session Chair: Eric Van Stryland  
Thursday Morning, March 31, 2016  
PCC North, 200 Level, Room 230

8:30 AM *EP9.6.01  
Field Induced Lattice Distortion and Nonlinear Optical Responses of Blue-Phase Liquid Crystals  
Iam-Choon Khoo; Pennsylvania State University, United States.

9:00 AM *EP9.6.02  
Ultrafast Laser Induced Subwavelength Periodic Surface Structures on Semiconductors/Dielectrics/Metals and Application to SERS Studies  
Narayana R. Desai; University of Hyderabad, India.

9:30 AM EP9.6.03  
Exotic Nonlinear Optical Effects of a Solution of Noninteracting Molecules  
Joel Yuen-Zhou; University of California San Diego, United States.

9:45 AM EP9.6.04  
Pattern-Controlled and Size-Tunable Growth of Arrayed Hierarchical Silver Mesostructures for Surface-Enhanced (Resonance) Hyper Raman Scattering  
Guanrong He; HKUST, Hong Kong.

10:00 AM BREAK

SESSION EP9.7: Second-Order NLO Crystals  
Session Chair: Thomas Cooper  
Thursday Morning, March 31, 2016  
PCC North, 200 Level, Room 230

10:30 AM *EP9.7.01  
Progress in Searching for New IR Nonlinear Optical Materials with High Laser Damage Threshold from Halides  
Jingui Qin; Wuhan University, China.

11:00 AM EP9.7.02  
Second Harmonic Generation of 3D Nonlinear Waveguide Beam Splitters Produced by Direct Femtosecond Laser Writing  
Peng Chen; Shandong University, China.

11:15 AM EP9.7.03  
Terahertz Laser Generator: Mid/Far Infrared Nonlinear Optical Material  
SuGaSe; Wen-Dan Cheng; FIRSM, China.

11:30 AM EP9.7.04  
High-Efficiency Broadband High-Harmonic Generation from a Single Nonlinear Crystal  
Hao-Qin Chen; South China University of Technology, China.

SESSION EP9.8: NLO Characterization and Spectroscopic Techniques  
Session Chair: Iam-Choon Khoo  
Thursday Afternoon, March 31, 2016  
PCC North, 200 Level, Room 230

1:30 PM *EP9.8.01  
Molecular 3-Level Model for Determining of Spectra of Nonlinear Absorption and Refraction  
Eric W. Van Stryland; University of Central Florida, United States.

2:00 PM *EP9.8.02  
Nonlinear Absorption and Refraction in Phthalocyanines and Porphyrins  
Steven R. Flom; Naval Research Laboratory, United States.

2:30 PM EP9.8.03  
Obtaining Spectra of Nonlinear Absorption and Refraction by Z-Scan and f-Scan  
Marek Samoc; Wroclaw University Tech, Poland.

2:45 PM EP9.8.04  
Degenerate Frequency Two Beam Coupling in Organic Solutions Using Nanosecond Laser Pulses  
Jonathan Slagle; Air Force Research Laboratory, United States.

3:00 PM EP9.8.05  
Low Power Thermo-Optical Nonlinearity: Comparison between Experiment and Theory  
Reji Philip; Raman Research Institute, India.
**SYMPOSIUM EP10**

Optoelectronic Devices of Two-Dimensional (2D) Materials  
March 29 - March 31, 2016

**Chairs**  
Seung Hyun Hur, University of Ulsan  
Coskun Kocabas, Bilkent University  
Barbaros Oezylmaz, National University of Singapore  
Jang Ung Park, Ulsan National Institute of Science and Technology

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* Invited Paper

Session Chairs: Seung Hyun Hur and Coskun Kocabas  
Tuesday Afternoon, March 29, 2016  
PCC North, 200 Level, Room 222 C

1:30 PM *EP10.1.01  
Substrate and Disorder Effects on the Optoelectronic Properties of Layered Transition-Metal Dichalcogenides Michael Fuhrer1, 2; 1University of Maryland, United States; 2Monash University, Australia.

2:00 PM EP10.1.02  
Effect of Underlying Boron Nitride (BN) Thickness on Photoresponse in Molybdenum Disulfide (MoS2) BN Heterostructures Milinda P. Wasala; Southern Illinois University, United States.

2:15 PM EP10.1.03  
Synthesis and Properties of MoSe2 Nanosheets with Controllable Se Deficiency Masoud Mahjouri-Samani; Oak Ridge National Laboratory, United States.

2:30 PM EP10.1.04  
Temperature and Field Effect Tunable Multi-Featured Perfect Absorber with High Conductivity Silicon Engin Durgun; Bilkent University - UNAM, Turkey.

2:45 PM EP10.1.05  
Strain Modulation in Graphene/ZnO Nanorods Film Schottky Junction for Enhanced Photosensing Performance Shao Liu; University of Science & Technology Beijing, China.

3:00 PM BREAK

3:30 PM *EP10.1.06  
Point Defects in Two-Dimensional Materials and Their Impact on Optical, Structural, and Electronic Properties Sefaattin Tongay; Arizona State University, United States.

4:00 PM EP10.1.07  
Multilayer Stacks of WSe2 Grown on Epitaxial Graphene and Their Novel Charge Transports Yu-Chuan Lin; Pennsylvania State University, United States.

4:15 PM EP10.1.08  
Bottom-Up Synthesis of WSe2 on Templated Monolayer EG/SiC(0001) Luke Nyakiri1, 2; 1Texas A&M University, United States; 2Texas A&M University-Galveston, United States; 3US Naval Research Laboratory, United States.

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*EP10.1.09  
Investigation of Nonlinear Optical Properties of Exfoliated 2D Materials Nitesh Dhasmana; College of Optics and Photonics (CREOL), University of Central Florida, United States.

4:45 PM EP10.1.10  
Tunable Optoelectronic Properties of Graphene by Charge Doping: A First-Principles Study Deniz Kecik; Bilkent University, Turkey.

Session Chair: Sefaattin Tongay  
Wednesday Morning, March 30, 2016  
PCC North, 200 Level, Room 222 C

8:30 AM *EP10.2.01  
Investigation of Optoelectronic Properties of 2D Materials by Ab Initio Methods Engin Durgun; Bilkent University - UNAM, Turkey.

9:00 AM EP10.2.02  
Quantum-Confined Stark Effect in Two-Dimensional Materials Kan-Heng Lee; Cornell University, United States.

9:15 AM EP10.2.03  
Magneto-Optic Characterization of CNT Sheets Using Parallel and Transverse Magnetic Fields Muarri Saeed; Rose-Hulman Institute of Technology, United States.

9:30 AM EP10.2.04  
Strong Enhancement of TERS Response of 2D Carbon through Nanopatterning Andrey Kravey; AIST-NT Inc, United States.

9:45 AM BREAK

10:15 AM EP10.2.06  
Low-Temperature Growth of Continuous Monolayer Graphene Films from Benzene via Ambient-Pressure Chemical Vapor Deposition Myungwoo Son; Gwangju Institute of S&T, Korea (the Republic of).

10:30 AM *EP10.2.07  
A Platform for Growth of Very High Quality Graphene, hBN, and Other Materials Rodney S. Ruoff; UNIST, Korea (the Republic of).

11:00 AM EP10.2.08  
Electronic and Optoelectronic Property Characterization of Graphene and 2D Transition Metal Di-Chalcogenides Dalal Fadil1, 2; 1University of Texas El Paso, United States; 2University of Texas El Paso, United States.

11:15 AM EP10.2.09  
Electronic Transport and Photo-Current Generation in Few Layer n-Type CuInSe2 Field Effect Transistor Sujoy Ghosh; Southern Illinois University, United States.

11:30 AM EP10.2.10  

11:45 AM EP10.2.11  
Graphene Quantum Rings Doped PEDOT:PSS Based Composite Layer for Efficient Performance of Optoelectronic Devices Monica Samal; Gachon University, Korea (the Republic of).

Session Chairs: Coskun Kocabas and Barbaros Oezylmaz  
Wednesday Afternoon, March 30, 2016  
PCC North, 200 Level, Room 222 C

1:30 PM *EP10.3.01  
Flat Photonics on Graphene: Widely Tunable Plasmonics Metasurfaces for High Performance Detectors and Modulators Federico Capasso; Harvard University, United States.
2:00 PM EP10.3.02
Gate Tunable Mid-Infrared Optical Response of (Bi1-xSbx)2Te3 Topological Insulators William S. Whitney1, 4; 1California Institute of Technology, United States; 4California Institute of Technology, United States.

2:15 PM EP10.3.03
Thermal Camouflage with Graphene Shahnaz Aas; Bilkent University, Turkey.

2:30 PM EP10.3.04
Ultra-Broadband and High Responsivity Graphene Infrared Photodetector and Imaging Array Che-Hung Liu; University of Michigan-Ann Arbor, United States.

2:45 PM EP10.3.05
Hybrid, Gate-Tunable, van der Waals p-n Heterojunctions from Pentacene and MoS2 Deep M. Jariwala, Northwestern University, United States.

3:00 PM BREAK

3:30 PM *EP10.3.06
Ultra-Fast and Nanoscale Opto-Electronic Phenomena in 2D Material Heterostructures Frank Koppens; ICFO - The Institute of Photonic Sciences, Spain.

4:00 PM EP10.3.07
Electrically Gated Graphene Plasmon Modulated Erbium Emission Jeremy Brouillet; California Institute of Technology, United States.

4:15 PM EP10.3.08
Gate Tunable Coherent Terahertz Absorption in Graphene Nurbek Kakenen; Bilkent University, Turkey.

4:30 PM EP10.3.09
Engineering the Charge Transfer in Two-Dimensional Heterostructures for Photodetector Application Adrien Robin1, 2; 1ESPCI ParisTech, France; 2Nexdot, France.

4:45 PM EP10.3.10
Electric and Photovoltaic Behavior of Novel Few Layer α-MoTe2 / MoS2 Dichalcogenide Heterojunction Active Pezhshki; Yonsei University, Korea (the Republic of).

SESSION EP10.4: Poster Session: Synthesis and Optical Characterization of 2D Materials
Wednesday Afternoon, March 30, 2016
8:00 PM Sherraton, Third Level, Phoenix Ballroom

EP10.4.01
Using Water Soluble Conjugated Polyelectrolyte/Reduced Graphene Oxide as Hole Injection Layer Afsoon Fallahi1, 2, 3; 1Harvard-MIT Division of Health Science and Technology, United States; 2Amirkabir University of Technology, Iran (the Islamic Republic of); 3INST, Sharif University, Iran (the Islamic Republic of).

EP10.4.02
Amino-Functionalized Reduced Graphene Oxide as a High-Efficiency Counter Electrode in Dye-Sensitized Solar Cells Ce Hao; State Key Laboratory of Fine Chemicals, School of Chemistry, Dalian University of Technology, China.

EP10.4.03
Synthesis of Single Crystal Monolayer Graphene Islands on Germanium Substrate by Hot Filament Chemical Vapor Deposition Tes B. Limbu1, 2; 1Institute for Functional Nanomaterials, United States; 2University of Puerto Rico, Rio Piedras, United States.

EP10.4.04
Effect of Silicon Oxide Current Distribution Layers on the Performance of GaN-Based Vertical LED Power Chips Yi Chun Chou1, 2; 1National Chung Hsing University, Taiwan; 2High Power Optoelectronics Inc, Taiwan.

EP10.4.05
Fabrication of Triangular Shaped ZnO Nanostructure on Graphene Oxide Seung Hyun Hur; University of Ulsan, Korea (the Republic of).

EP10.4.06
Controlling the Space Distribution of Composition and Electronic Structure in Two Dimensional Layered Semiconductor Xidong Duan; Hunan University, China.

EP10.4.07
Hybrid MoS2–CdSe Nanocrystal Phototransistors with Ultrafast Photosresponse Hyoung Soo Ra; DGIST, Korea (the Republic of).

EP10.4.08
Ultraviolet Light Sensor Based on Graphene Quantum Dots/Reduced Graphene Oxide Hybrid Film Tran Van Tam; University of Ulsan, Korea (the Republic of).

EP10.4.09
Triboelectricity-Assisted Transfer of Graphene for Flexible Optoelectronic Application Shuo Lu; University of Science & Technology Beijing, China.

EP10.4.10
Large-Scale Atomically Thin 2D Van der Waals p-n Heterojunction Devices for Optoelectronics Chandan Biswas; University of Texas at El Paso, United States.

EP10.4.11
Novel One-Pot Route for Growth of Graphene/Amorphous Carbon Heterostructure via Chemical Structure Control Beomjin Park; POSTECH, Korea (the Republic of).

EP10.4.12
Monolayer Graphene/ Epitaxial Grown Germanium on Silicon Heterostructure Based Infrared Photodetector Khurelbaatar Zagarzusem1, 2; 1Chonbuk National University, Korea (the Republic of); 2Mongolian University of Science and Technology, Mongolia.

EP10.4.13
High Performance Near-Infrared Photodetector Based on MoS2/Black Phosphorus/WSe2 Heterojunction Hao Li; Chinese University of Hong Kong, Hong Kong.

EP10.4.14
Synthesis of Surfactant Free SnS Nanoplates and Morphology Control in an Aqueous Solution Heesung Yang; Yonsei University, Korea (the Republic of).

EP10.4.15
High Quality AlGaN Nanowires for Deep UV-LED Using MOCVD Growth Technique San Kang; Chonbuk National University, Korea (the Republic of).

EP10.4.16

EP10.4.17
Tunable MoS2 Quantum Dots Based Optoelectronics Devices on Silicon Platform Subhrajit Mukherjee; IIT Kharagpur, India.

EP10.4.18
Growth of Layered InSe Nanosheet Directly on Graphene Surface Fan Yang; SUNY Polytechnic Institute CNSE, United States.

SESSION EP10.5: Optoelectronic Devices of 2D Materials II
Session Chair: Engin Durgun
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 222 C

8:30 AM EP10.5.01
Broadband Near-Unity Absorption in Monolayer MoS2 Heterostructures: Towards Ultrathin Photovoltaics in Transition Metal Dichalcogenides Michelle C. Sherrott; California Institute of Technology, United States.

8:45 AM *EP10.5.02
Self-Assembled Growth of Transition Metal Dichalcogenide Wires and Their Heterostructures Jong-Hyun Ahn; Yonsei University, Korea (the Republic of).
Graphene-Enabled Active Microwave Devices **Osman Balci**, Bilkent University, Turkey.

High Photosensitivity and Broad Spectral Response of Multi-Layered Germanium Sulfide Transistors **Rajesh Kumar Ulaganathan**, National Taiwan University, Taiwan.

Substrate Temperature Induced Band Gap Tuning of MgZnO via Pulsed Metal Organic Chemical Vapor Deposition (PMOCVD) **Fikadu Alema**, Agnitron Technology, United States.

Defect Controlled Synthesis of Emissive 2D Materials through Intercalation **Seokwoo Jeon**, KAIST, Korea (the Republic of).

Effect of Vacuum Annealing and Chemical Doping on the Optical, Electrical and Valley Properties in Monolayer MoS₂ **Daeyoung Lim**, KHU, Korea (the Republic of).

Spontaneous and Strong Graphene n-Doping via Soda-Lime Glass and Its Application in Graphene-Semiconductor Junctions **Ahsan Ashraf** 1, 2; 1Brookhaven National Laboratory, United States; 2Stony Brook University, United States.

Engineering van Hove Electronic Structure in Small-Angle Twisted Bilayer Graphene **Lujie Huang**, Cornell University, United States.

Transparent Healthcare Devices Using Functionalized Graphene **Dae-Hyeong Kim** 1, 2; 1Seoul National University, Korea (the Republic of); 2Center for Nanoparticle Research, Institute for Basic Science, Korea (the Republic of).


Laser Material Interactions for Flexible and Nanomaterial Applications **Keon Jae Lee**, KAIST (Korea Advanced Institute of Science and Technology), Korea (the Republic of).

Stretchable Graphene Photodetector with Enhanced and Strain-Tunable Photoresponsivity **SungWoo Nam**, University of Illinois-Urbana, United States.

Ultra-Thin Layered Ternary Semiconductor: For High Performance Photo-Transistor on Rigid and Flexible Substrate **Packiyaraj Perumal**, National Taiwan University, Taiwan.

Photoconductive Characteristics of Copper Phthalocyanine-Stacked MoS₂ Field Effect Transistors **Jinsu Pak**, Seoul National University, Korea (the Republic of).
SYMPOSIUM EP11

Novel Materials for End-of-Roadmap Devices in Logic, Power and Memory
March 28 - March 31, 2016

Chairs
Martin M. Frank, IBM
Andrew C Kummel, University of California, San Diego
Masaaki Niwa, Tohoku University
John Robertson, Cambridge University

Symposium Support
Applied Materials, Inc.

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION EP11.1: Carbon Channels and Memory
Session Chairs: Andrew C Kummel and John Robertson
PCC North, 100 Level, Room 126 A

1:30 PM EP11.1.01
Exfoliation of Solution-Synthesized Chevron Graphene Nanoribbons onto H:Si(100) and Detailed Electron Characterization via Scanning Tunneling Spectroscopy
Adrian Raducea, University of Illinois-Urbana Champ, United States.

1:45 PM EP11.1.02
Preparation and Characterization of High-Quality, Grain Boundary-Free Graphene Monolayer
Ji Soo Roh, Hanyang University, Korea (the Republic of).

2:00 PM EP11.1.03
Scaling of Device Variability and Subthreshold Swing in Ballistic Carbon Nanotube Transistors
Qing Cao, IBM T.J. Watson Research Ctr, United States.

2:15 PM EP11.1.04
Direct-Write Patterning and Dynamic Doping of Monolayer Graphene Using Focused Electron Beam Induced Processing (FEBIP)
Songkil Kim, Georgia Institute of Technology, United States.

2:30 PM EP11.1.05
End-Bonded Contacts for Carbon Nanotube Transistors with Low, Size-Independent Resistance
Qing Cao, IBM T.J. Watson Research Ctr, United States.

2:45 PM EP11.1.06
Room Temperature Static Doping of 2D Crystals Using an Ion-Locking Electrolyte
Erich Kinder, University of Notre Dame, United States.

3:00 PM BREAK

3:30 PM *EP11.1.07
Strategies for Selective Deposition of Metal Oxides
Stacey F. Bent, Stanford University, United States.

4:00 PM *EP11.1.08
Novel High Performance NV-Working Memory with Spintronics and Vertical MOSFET Technology
Tetsuo Endoh, Tohoku University, Japan; JST-ACCEL, Japan.

4:30 PM EP11.1.09
Compressible Organic Thin-Films for Tunneling Nanoelectromechanical Switches
Farnaz Niroui, Massachusetts Institute of Technology, United States.

4:45 PM EP11.1.10
Rapid, Scalable and Designable Inorganic-Nanowire-Digital-Alignment Technique and Its Application on Cross-Shaped Cu-Nanowire Memristors with One-Step Reduction
Wentao Xu, Pohang University of Science and Technology (POSTECH), Korea (the Republic of).

SESSION EP11.2: III-V Channels including GaN
Session Chairs: Debdeep Jena and Andrew C Kummel
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 223

1:30 PM *EP11.2.01
Advantages of PEALD Dielectrics on GaN Materials
Robert J. Nemanich, Arizona State University, United States.

2:00 PM EP11.2.02
Oxide Charge Modification using N2 Plasma Enhanced Atomic Layer Deposition to Produce E-Mode Al2O3/GaN Device Operation
Muhammad Adi Negro, Stanford University, United States.

2:15 PM *EP11.2.03
Border Trap Passivation in InGaAs MOS Gate Stacks
Paul C. McIntyre, Stanford University, United States.

2:45 PM EP11.2.04
Chemical Passivation of III-V Semiconductors Using Alkanethiolate Layers
Anthony J. Muscat, University of Arizona, United States.

3:00 PM BREAK

3:30 PM EP11.2.05
Treatment and Characterization of InN (0001) Surface
Jong Youn Choi, University of California - San Diego, United States.

3:45 PM *EP11.2.06
Prospects and Materials Challenges for Nitride Tunneling Transistors
Debdeep Jena, Cornell University, United States.

4:15 PM EP11.2.07
Self-Limiting CVD of an Air Stable Silicon Oxide Bilayer on InGaAs(001)-(2x4) in Preparation for Subsequent Silicon or Gate Oxide ALD
Mary E. Edmonds, University of California-San Diego, United States.

4:30 PM EP11.2.08
Kinetic Monte Carlo Studies of Silicon Dopant Diffusion in InGaAs
Mardochee Revell, Cornell University, United States.

4:45 PM EP11.2.09
Metal Antimonide ALD by Silyl Halide Elimination Reactions
Jacob H. Woodruff, ASM America, United States.

SESSION EP11.3: Transition Metal Dichalcogenides
Session Chairs: Andrew C Kummel and Stephen McDonnell
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 223

8:00 AM EP11.3.01
ZrS/S: A New Stable Non-Toxic 3D Dirac Semimetal
Schoon Leslie, Max Planck Institute for solid state research, Germany.

8:15 AM EP11.3.02
Van der Waals Materials Benchmarked for End of Roadmap FETs
Somaia S. Sylvia, University of California Riverside, United States.

8:30 AM *EP11.3.03
Electronic Properties and Scaling Aspects of Transition Metal Dichalcogenide and Black Phosphorus Field-Effect Transistors
Jörg Appenzeller, Purdue University, United States.

9:00 AM *EP11.3.04
Electronics in Flatland: Novel Analog, Logic and Memory Devices in 2D Materials
Sanjay K. Banerjee, University of Texas-Austin, United States.

9:30 AM BREAK
SESSION EP11.7: High K/Metal Gate
Session Chairs: Martin M Frank and Shariq Siddiqui
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 223

9:15 AM *EP11.7.05
Passivation, Functionalization, and Nucleation of TiO₂ on SiGe(110) for MIS Structure
Sang Wook Park; University of California-San Diego, United States.

9:30 AM BREAK

SESSION EP11.8: High K/Metal Gate and Ferroelectrics
Session Chairs: Takashi Ando and Paul McIntyre
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 223

10:00 AM *EP11.8.01
BTI Reliability of High-Mobility Channel Devices with High-k Dielectric Stacks: SiGe, Ge, and InGaAs
Jacopo Franco; imec, Belgium.

10:30 AM *EP11.8.02
GeO₂ Free Interfacial Layer Formation and Its Impact on Physical & Electrical of Metal/High-k/ SiGe₊ₓ Gate Stack
Shariq Siddiqui; Global Foundries USA Inc., United States.

11:00 AM EP11.8.03
Grain-Boundary Effect in Ferroelectric Field-Effect Transistor
Jaehyo Park; Department of Material Science and Engineering, Seoul National University, Korea (the Republic of).

11:15 AM EP11.8.04
TiN-Gated Ferroelectric BaTiO₃ Devices on Si and Si₁₋ₓGeₓ
Martin M. Frank; IBM T. J. Watson Research Center, United States.

11:30 AM EP11.8.05
Sub-60 mV/decade Subthreshold Swing in Negative Capacitance FinFET Devices
Asif I. Khan; UC Berkeley, United States.

11:45 AM EP11.8.06
Lock Coupled Polarization/Charge Coupling in Pt/BiFeO₃/DyScO₃/Si
Shojan P. Pavunny; University of Puerto Rico, United States.

SESSION EP11.9: Memory
Session Chairs: Andrew C Kummel and John Robertson
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 223

1:30 PM *EP11.9.01
Theoretical Studies of the Switching Mechanism of the Topological Switching Memory (TRAM) Using Superlattice GeTe/Sb2Te3 Phase Change Memories
Kenji Shiraishi; Nagoya University, Japan.

2:00 PM EP11.9.02
Characterizing and Modeling Write Noise in TaOₓ and TaOₓ/Al₂O₃ Resistive Memories for Neuromorphic Applications
David Hughart; Sandia National Laboratories, United States.

2:15 PM EP11.9.03
Simulation Study on Reproducing Resistive Switching Effect by Soret and Fick Diffusion in Resistive Random Access Memory
Kentarō Kinoshita1, 2; 1Tottori University, Japan; 2Tottori Integrated Frontier Research Center, Tottori University, Japan.

2:30 PM EP11.9.04
Formation Mechanism of Conducting Path in Resistive Random Access Memory by First Principles Calculation Using Practical Model Based on Experimental Results
Takumi Moriyama1, 2; 1Tottori University, Japan; 2Tottori Integrated Frontier Research Center, Tottori University, Japan.

2:45 PM EP11.9.05
Identifying and Engineering the Electronic Properties of the Resistive Switching Interface: A Screened Exchange Hybrid Functional Study
Huanglong Li; Tsinghua University, China.

3:00 PM BREAK
3:30 PM EP11.9.06
Co-Existing and Tuning of Analog and Digital Resistive Switching in FeO\textsubscript{x} Based Electronic Synapse Changhong Wang; Singapore University of Technology and Design, Singapore.

3:45 PM EP11.9.07
Formation and Study of Nanotube Structure in Chalcogenide Glass Films to Improve Speed, Reliability and Lifespan of Conductive Bridge Memory (CBRAM) Maria Mitkova; Boise State University, United States.

4:00 PM EP11.9.08
Improvement of Performance and Reliability in 3D NAND Flash Memory Using Novel Process of Polycrystalline Silicon Channel Eunyoung Park; SK Hynix, Korea (the Republic of).

4:15 PM EP11.9.09
The Charge-Trapping Memory Device Based on the Defect States Generated at the Interface of Coupled High-K Oxides Jiang Yin; Nanjing University, China.

4:30 PM EP11.9.10
Ion-Dependent Frequency Selectivity and Learning of Semiconducting Polymer/Electrolyte Composites Fei Zeng; Tsinghua University, China.

4:45 PM EP11.9.11
Study of Critical Parameters of Titanium Oxide Based Resistive Switching Device: Role of Dopant and Stacking Sequence Krishan K. Saini; CSIR – National Physical Laboratory, New Delhi, India.
SYMPOSIUM EP12
Materials Frontiers in Semiconductor Advanced Packaging
March 29 - March 31, 2016

Chairs
Karlheinz Bock, TU Dresden
Jianwei Dong, Dow Electronic Materials
Johan Liu, Chalmers University of Technology
Daniel Lu, Henkel China
Nancy Stoffel, GE Global Research

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Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION EP12.1: Future of Semiconductor Advanced Packaging
Session Chairs: Jianwei Dong and Nancy Stoffel
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 226 A

1:30 PM *EP12.1.01
The Future of Advanced Packaging Rozalia Beica: Yole Development, France.

2:00 PM *EP12.1.02
System Scaling as New Electronic Systems Frontier with Frontier Material Rao R. Tummala; Georgia Institute of Technology, United States.

2:30 PM *EP12.1.03
Material Challenges and Opportunities for Wafer-Form Advanced Packaging Technology Kuo-Chung Yee; Taiwan Semiconductor Manufacturing Company, Taiwan.

3:00 PM BREAK

3:30 PM *EP12.1.04
Sustainable Materials: From Nanoelectronics to the Cloud Carol A. Handwerker; Purdue University, United States.

4:00 PM *EP12.1.05
Material Technologies for Advanced Semiconductor Packaging Itsuo Watanabe; Hitachi Chemical Co. America, Ltd., United States.

Session Chairs: Johan Liu and Katsuaki Saganuma
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 226 A

9:00 AM *EP12.2.01
Chip Embedding - The Key for Efficient Power Electronics Solutions Rolf Aschenbrenner; Fraunhofer IZM, Germany.

9:30 AM *EP12.2.02
Silver Sinter Joining for WBG Die-Attach Katsuki Saganuma; Osaka University, Japan.

10:00 AM *EP12.2.03
Frequency and Temperature Dependence of the Complex Permittivity of Engineered Dielectric Fluids Ya Gao; Auburn University, United States.

10:15 AM BREAK
Session Chairs: Jianwei Dong and Nancy Stoffel
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EP12.4.01
Impact of Processing Parameters on Resistivity and Morphology of Printed Low-Temperature Copper Inks
Anoosha Murella; Arizona State University, United States.

EP12.4.02
Low Dielectric Constant and Loss Siloxane-Based Polymer Matrix for High Frequency Copper Clad Laminates
Yong Ho Kim; KAIST, Korea (the Republic of).

EP12.4.03
Pattern and Thermal Durability of Flexible Copper Clad Laminate Depends on the Ternary Tie-Coating Material
Si Myeong Kim; Korea University of Technology and Education, Korea (the Republic of).

EP12.4.04
Improvement in Solubility and Molecular Assembly of PCDT-BT via Side Chain Engineering
Jungho Lee; Georgia Institute of Technology, United States.

EP12.4.05
New Precursor Design for Low-Cost CVD Graphene Growth
Fan Yang; SUNY Polytechnic Institute CNSE, United States.

SESSION EP12.5: Organic, Flexible and Wearable Electronics
Session Chairs: Rozalia Beica and Nancy Stoffel
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 226 A

8:30 AM *EP12.5.01
Progress in Polymer Semiconductor Materials and Processes for Printed Transistors
Beng S. Ong; Hong Kong Baptist University, Hong Kong.

9:00 AM *EP12.5.02
Reliable Interfaces and Encapsulations for Ultrathin Organic Devices
Takao Someya; University of Tokyo, Japan.

9:30 AM EP12.5.03
Novel Silver-Polymer Blend with High Conductivity and Stretchability for Flexible Interconnects
Jignesh Vanjaria; Arizona State University, United States.

9:45 AM EP12.5.04
Highly Conductive, Stretchable, Polyurethane/Polyaniline-Based Adhesives for Wearable Electronic Applications
Bo Song; Georgia Institute of Technology, United States.

10:00 AM BREAK

10:30 AM *EP12.5.05
Introduction to NextFlex: America’s Flexible Hybrid Electronics Manufacturing Institute
Benjamin Leever; Air Force Research Laboratory, United States.

11:00 AM *EP12.5.06
Silica Sheets in Novel Format for Flexible Electronics
Dan Hawtof; Corning, Inc., United States.

11:30 AM EP12.5.07
Drop-on-Demand Printing of SiO, Dielectrics from Sol-gel Chemistries
Yiwen Huang; Arizona State University, United States.

11:45 AM EP12.5.08
Inkjet Printed Serpentine Stretchable Electronics Using Reactive Ink Chemistries
Avinash Mamidanna; Arizona State University, United States.
1:30 PM *EP13.1.01
From Dust to Devices: Focused Ion Beam Microfabrication for Superconductor Research Philip Moll; Max Planck Institute, Germany; ETH Zurich, Switzerland.

2:00 PM EP13.1.02
Tuning the Jc/Anisotropy in Thick YBCO Films on Technical Templates by Artificial BaHfO and Ba2T(Nb/Ta)O6 Pinning Centers Ruben Huehne; IFW Dresden, Germany.

2:15 PM EP13.1.03
Deconvolution of Vortex Pinning and Grain Boundary Blocking Effects in Biaxially Aligned Bi-2212 Round Wires Yavuz Oz; Applied Superconductivity Center, United States; National High Magnetic Field Laboratory, United States; Florida State University, United States.

2:30 PM *EP13.1.04
Optimal, Nanodefect Configurations via Strain-Mediated Assembly for Optimized Vortex-Pinning in High-Temperature Superconducting Wires in a Wide Operating Temperature Regime from 4.2K-77K Amit Goyal; SUNY - Buffalo, United States; Oak Ridge National Laboratory, United States.

3:00 PM BREAK

3:30 PM EP13.1.05
Large Pinning Forces and Matching Effects in YBa2Cu3O7 Thin Films with Ba2T(Nb/Ta)O6 Nano-Precipitates Jens Haenisch; Karlsruhe Institute of Technology, Germany.

3:45 PM *EP13.1.06
Doubling In-Field Critical Current in HTS Coated Conductors by a Roll-to-Roll Ion Irradiation Process Qiang Li; Brookhaven National Lab, United States.

4:15 PM EP13.1.07
Two-Step Buffer Aided Top Seeded Infiltration and Growth Process: A New Fabrication Technique for Producing Large, Single Grain (RE) BaCuO Bulk Superconductors Devendra K. Namburi; University of Cambridge, United Kingdom.

4:30 PM EP13.1.08
Evidence for Strong Variation of Chemical Composition and Superconducting Properties in Low Angle Ca-Doped YbBa2Cu3O7 Grain Boundaries Fumitake Kametani; Florida State University, United States.

8:30 AM *EP13.2.01
Tailoring the Superconducting Properties of AEFe3As5 by the Epitaxial Strain and the Field-Induced Carrier Doping Takafumi Hatano; Nagoya University, Japan.

9:00 AM EP13.2.02
Physical Properties of Superconducting Boron-Doped Diamonds Taisuke Kageura; Waseda University, Japan.

9:15 AM EP13.2.03
Growth and Study of Superconducting Properties of FeTe0.5Se0.5Sx (x = 0, 0.05 and 0.10) Single Crystals Ghanshyam D. Varmas; IIT Roorkee, India.

9:30 AM *EP13.2.04
Spectromicroscopy of Phase-Separated Iron-Based Superconductors Susannah C. Speller; University of Oxford, United Kingdom.

10:00 AM BREAK

10:30 AM EP13.2.05
Trapped Magnetic-Field Properties of Dense MgB2 Bulks Synthesized by Infiltration-Capsule Method Tomoyuki Naito; Iwate University, Japan.

10:45 AM *EP13.2.06
Josephson Junctions with Iron-Based Superconductors Paul Seidel; Friedrich-Schiller University Jena, Germany.

11:15 AM EP13.2.07
Bias Sputtered Few-Nanometer-Thick Niobium Nitride for Superconducting Devices Andrew Dame; Massachusetts Institute of Technology, United States.

11:30 AM EP13.2.08
Superconductors for Single Photon Detectors: Crystalline or Amorphous David Bosworth; University of Cambridge, United Kingdom.

11:45 AM EP13.2.09
Designing 2D SQIF Arrays Using YBCO Step-Edge Junctions Emma Mitchell; CSIRO, Australia.

1:30 PM *EP13.3.01
REBCO Coated Conductors with Excellent Performance in High Magnetic Fields Venkat Selvamanickam; University of Houston, United States.

2:00 PM *EP13.3.02
Development of Application-Oriented DI-BSCCO Wires Takayoshi Nakashima; Sumitomo Electric Industries, Japan.

2:30 PM EP13.3.03
Fabrication of REBCO/STO/REBCO Trilayer Structure on Buffered Metal Substrates by Pulsed Laser Deposition Yijie Li; Shanghai Jiao Tong University, China.

2:45 PM BREAK
SESSION EP13.4: Modeling
Session Chair: Kazumasa Iida
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 226 B

3:15 PM *EP13.4.01
Quasiparticle Interference in Strongly Coupled Multiband Superconductors
Alexander A. Golubov1; 2; University of Twente, Netherlands; 3Moscow Institute of Physics and Technology, Russian Federation.

3:45 PM EP13.4.02
Superconductivity Near the Metal-Insulator Transition Michael S. Ososky:
Naval Research Lab, United States.

4:00 PM EP13.4.03
Application of Metamaterial Nanoengineering for Increase of Superconducting Critical Temperature
Vera N. Smolyaninova; Towson University, United States.

4:15 PM *EP13.4.04
Modelling of Bulk Superconductor Magnetization
Mark Ainslie; University of Cambridge, United Kingdom.

SESSION EP13.5: Tailoring Materials II
Session Chairs: Qiang Li and Susannah Speller
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 226 B

9:00 AM *EP13.5.01
Vortex Pinning in the Fe-Based 122 and 1111 Phases
Chiara Tarantini; Florida State University, United States.

9:30 AM EP13.5.02
Highly Textured Oxypnictide Superconducting Thin Films on Metal Substrates
Kazumasa Iida1; 2; Nagoya University, Japan; 3IFW Dresden, Germany.

9:45 AM EP13.5.03
NbN and Nb1-xTixN Thin Films Growth by HTCVD: Structural and Superconducting Properties
Nikolaos Tsavdaris1, 2; 1Univ. Grenoble Alpes, France; 2CNRS,SiMaP, France.

10:00 AM BREAK

10:30 AM *EP13.5.04
Laura Gorzelino1; 2; Politecnico di Torino, Italy; 3INFN - Sezione di Torino, Italy.

11:00 AM EP13.5.05
Clean Superconductivity in Electron Doped Pr1−xCe2+CuO4: Transport Study
Ari Ikeda; NTT Basic Research Laboratories, Japan.

11:15 AM EP13.5.07
High-Temperature Superconducting REBCO Conductors for Undulators in X-Ray Sources
Ibrahim Kessgin; Argonne National Laboratory, United States.

11:30 AM EP13.5.08
Novel Superconducting Joints for Persistent Mode Magnet Applications
Susannah C. Speller; University of Oxford, United Kingdom.

11:45 AM EP13.5.09
Electromechanical Energy Conversion in System with Bulk High-Temperature Superconductor
Ekaterina Kurbatova; National Research University “Moscow Power Engineering Institute”, Russian Federation.

SESSION EP13.6: Tailoring Materials III
Session Chairs: Anna Palau and Chiara Tarantini
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 226 B

1:30 PM *EP13.6.01
Development of Iron-Based Wires and Tapes for High-Field Applications
Yanwei Ma; Institute of Electrical Eng CAS, China.

2:00 PM *EP13.6.02
Superconductivity and Crystal Structures in Hydrothermally Synthesized FeX and [(Li,Fe)O]OH|FeX (X = S, Se)
Ursula Pachmayr; LMU Muenchen, Germany.

2:30 PM EP13.6.03
Stability of (Ba−xK)xFeAs, in Contact with Water Vapor and Oxygen
Yessusa Collantes; National High Magnetic Field Lab, Florida State University, United States.

2:45 PM EP13.6.04
The Conditions for Achieving High Self-Field Critical Current Densities at 77 K in 25 mol.% Zr-Added (Gd,Y) Ba2Cu3O7−δ Superconductor Tapes
Meysam Heydari Gharahcheshmeh; University of Houston, United States.

3:00 PM BREAK

3:30 PM *EP13.6.05
Light-Ion Modification and Masked Ion Beam Structuring of YBa2Cu3O7−δ Thin Films
Johannes D. Pedarnig; Johannes Kepler University, Austria.

4:00 PM EP13.6.06
NanoComposite YBa2Cu3O7−δ Thin Films Using Chemical Solution Deposition and Preformed Nanocrystals
Isabel Van Driessche; Ghent University, Belgium.

4:15 PM *EP13.6.07
New Strategies for Engineering Pinning Landscapes in CSD YBCO Nanocomposites
Anna Palau; Institut de Ciencia de Materials de Barcelona, Spain.

SESSION EP13.7: Tailoring Materials IV
Session Chairs: John Durrell and Kazumasa Iida
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 226 B

8:30 AM *EP13.7.01
Progress on Pinning Enhancement in AMSC's 2G HTS Wire
Martin W. Rupich; American Superconductor Corp, United States.

9:00 AM *EP13.7.02
Correlated Study of Local Ic Variation and Microstructural Disorder in a Bi-2223 Long Tape by Use of Hybrid Microscopy: Scanning Hall-Probe Microscopy and X-Ray Tomography
Takanobu Kiss; Kyushu University, Japan.

9:15 AM EP13.7.03
Magnetization Relaxation and E-J Characteristics in a REBCO Coated Conductor with BaHFO2 Artificial Pinning Centers
Yuta Onodera; University of Tokyo, Japan.

9:30 AM *EP13.7.04
Roebel Assembled Coated Conductor (RACC) Cables as Candidate for Future Accelerator Magnet HTS Inserts – Expectations and Requirements
Anna Kario; KIT, Germany.

9:45 AM BREAK

10:30 AM *EP13.7.05
The Strain Irreversibility Cliff in Nb3Sn RRP® Wires, Its Origins, and Its Implications
Najib Cheggour; University of Colorado/NIST, United States.

11:00 AM EP13.7.06
Practical HTS 2G Wire: Performance, Price & Utilizing Ways
Seung-Hyun Moon; SuNAM Co., Ltd, Korea (the Republic of).
**SYMPOSIUM EP14**

Materials for Next-Generation Displays
March 29 - April 1, 2016

**Chairs**
Seokwoo Jeon, Korea Advanced Institute of Science and Technology
Moonsub Shim, University of Illinois
Peter Trefonas, Dow Electronic Materials

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

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* Invited Paper

SESSION EP14.1: Materials and Devices for Flexible Displays
Session Chairs: Jong-Hyun Ahn and Seokwoo Jeon
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 226 C

1:30 PM *EP14.1.01
Silicon Nanomembranes for Flexible Electronic Applications Jong-Hyun Ahn; Yonsei University, Korea (the Republic of).

2:00 PM EP14.1.02
Periodic Lattices for Flexible Displays Created by Nonlinear Laser Lithography Oezguen Yavuz; Bilkent University, Turkey.

2:15 PM *EP14.1.03
New Materials and Printing Processes for Flexible Electronics Daniel Frisbie; University of Minnesota, United States.

2:45 PM BREAK

3:15 PM EP14.1.04
Preparation of Metallic PEDOT:PSS with a Conductivity of Higher Than 2000 S/cm through a Treatment with Organic Solutions of Organic Salts and Their Application as the Transparent Electrode of Optoelectronic Devices Jianrong Ouyang; National University of Singapore, Singapore.

3:30 PM EP14.1.05
High Hole Mobility in Pseudo-Single-Crystalline Germanium Films on Flexible Substrates Hidenori Higashi; Osaka University, Japan.

3:45 PM *EP14.1.06
Graphene-Enabled Display Devices on Paper Coskun Koeabas; Bilkent University, Turkey.

4:15 PM EP14.1.07
Flexible Low-Voltage Organic Thin-Film Transistors Based on High Performance SiO2/TiO2/Polymer Nanohybrid Sol-Gel Dielectrics Yonghwa Baek; POSTECH, (the Republic of).

4:30 PM EP14.1.08
High-Performance Strained Single-Crystal Si FETs on Plastic Substrates Wonho Lee; Yonsei University, (the Republic of).

Session Chairs: Jake Joo, Moonsub Shim and Dmitri Talapin
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 226 C

8:30 AM *EP14.2.01
Fundamentals of High Color Gamut Quantum Dot Display Jake Joo; The Dow Chemical Company, United States.

9:00 AM EP14.2.02

9:15 AM EP14.2.03
Heterostructured Nanorods for Optoelectronics Moonsub Shim; University of Illinois, United States.

9:30 AM *EP14.2.04
Colloidal Quantum Rods and Wells for Display and Lasing Applications Dmitri V. Talapin; University of Chicago, United States.

10:00 AM BREAK

10:30 AM *EP14.2.05
Quantum Dots for Liquid Crystal Displays Seth Coe-Sullivan; QD Vision, Inc., United States.

11:00 AM EP14.2.06
Organometal Halide Perovskite Quantum Dots for Display Applications Haizheng Zhong; Beijing Institute of Technology, China.

11:15 AM EP14.2.07
Organometal Halide Perovskite Quantum Dots for Display Applications Kazumichi Kishino1, 2; 1University of Illinois, United States; 2Los Alamos National Laboratory, United States.

11:30 AM *EP14.2.08
Heavy Metal-Free Quantum Dots for Next-Generation Displays Nigel L. Pickering; Nanoco Technologies, Ltd., United Kingdom.

SESSION EP14.3: Quantum Dots and Related Materials for Displays II
Session Chairs: Margaret Hines, Hunter McDaniel and Moonsub Shim
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 226 C

1:30 PM *EP14.3.01
High Efficiency Quantum Dot LEDs for Next Generation Displays Jake Hyvonen; NanoPhotonica, Inc., United States.

2:00 PM EP14.3.02
Bright and Efficient Blue Quantum Dot Light-Emitting Diodes with Mixed Hole Transport Layer Heeyoung Jung; Seoul National University, Korea (the Republic of).

2:15 PM EP14.3.03
Double-Heterojunction Nanorod Light-Emitting Devices with Novel Functionality Nuri Oh; University of Illinois at Urbana-Champaign, United States.

2:30 PM *EP14.3.04
Highly Luminescent “Giant” Nanocrystal Quantum Dots for Light-Emitting Applications Won Ki Bae; KIST, Korea (the Republic of).

3:00 PM BREAK

3:30 PM *EP14.3.05
“Giant” Toxic Metal-Free CuInS2/ZnS Quantum Dot Light-Emitting Diodes Hunter McDaniel1, 2; 1QD, LLC, United States; 2Los Alamos National Laboratory, United States.

4:00 PM EP14.3.06
Colloidal Quantum-Dot Light-Emitting Diodes for Next-Generation Flexible Displays Tae-Ho Kim; Samsung Advanced Institute of Technology, Korea (the Republic of).

4:30 PM EP14.3.07
Wearable High Resolution Quantum Dot LEDS Using Intaglio Transfer Printing Moon Kee Choi2, 1; 1Seoul National University, Korea (the Republic of); 2Center for Nanoparticle Research, Institute for Basic Science (IBS), Korea (the Republic of).

4:45 PM EP14.3.08
Fabrication of InGaN/GaN Uniform-Nanocolumn-Array LEDs by Nanoimprint-Patterning of Whole Area of 2-inch AlN/Si Substrates Katsumi Kishino1, 2; 1Sophia University, Japan; 2Sophia Nanotechnology Research Center, Japan.
 SESSION EP14.4: Poster Session: Materials for Next-Generation Displays
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

EP14.4.01
Fully Solution-Processed Electronic Devices by Ultrasonic Spray Pyrolysis
Miguel A. Dominguez; CIDS-BUAP, Mexico.

EP14.4.02
Demonstration Of Multi-Color-Patterned Electro-Mechanoluminescence Emitting Display Based on Elastomeric Zinc Sulphide Composite Soon-Moon Jeong; Daegu Gyeongbuk Institute of S&T, Korea (the Republic of).

EP14.4.03

EP14.4.04
New Reduction Technique and Impact of Halogen Ion Size of Chemical Reducing Agents on Electrical and Optical Characteristics of rGO Thin Films in Transparent Conductive Electrodes Afsoon Fallahi1, 2, 4; 1Harvard-MIT Division of Health Science and Technology, United States; 2Polymer Engineering, Department, Iran (the Islamic Republic of); 3Sharif University of Technology, Iran (the Islamic Republic of).

EP14.4.05
Invisible Metal Grid Transparent Electrode Embedded into Flexible Substrate and Its Application to Organic Solar Cell Jihoon Kim; Kongju National University, Korea (the Republic of).

EP14.4.06
Improved Properties of Oxide TFTs by Patterning and Electrohydrodynamic-Jet Printing Woon-Seop Choi; Hoseo University, Korea (the Republic of).

EP14.4.07
Alkyl Chain Length Dependence of the Field-Effect Mobility in Novel Anthracene Derivatives Taekyu Ahn; Korea National University of Transportation, Korea (the Republic of).

EP14.4.08
Hybrid Transparent Conducting Electrode Using Crystalline-ITO and Surface-Embedded Silver Nanowire Networks: A Robust Platform for Flexible Optoelectronics Hyewon Yoon; KAIST, Korea (the Republic of).

EP14.4.09
Electroplated Metal Grid/Surface Embedded Silver Nanowire Hybrid Transparent Electrode Film for Flexible Touch-Screen Panel Taejun An; Korea Advanced Institute of Science & Technology, Korea (the Republic of).

EP14.4.10
Flexible Thermal Touch Sensor Array Mikko Ruohonen; Aalto University, Finland.

EP14.4.11
Development of Single-Layer Capacitive Touch Screen Panel Using Hybrid Electrodes Chan Hwa Hong; 1, 2, 4ETRI, Korea (the Republic of), 3Korea university, Korea (the Republic of).

EP14.4.12
Intrinsic Tensile Properties of Chemical-treated PEDOT:PSS Thin Film Jeong-Hyeon Woo; UNIST, Korea (the Republic of).

EP14.4.13
Coaxial InGaN/GaN MQDs on n-GaN NWs for Blue Emission Ji-Hyeon Park; Chonbuk National University, Korea (the Republic of).

EP14.4.14
Morphology Development of InGaN QDs Having High Density by a Pulsed-Mode Growth Method Using MOCDV for LED Daeyoung Um; Chonbuk Nat University, Korea (the Republic of).

EP14.4.15
Efficient Emission by Stable Subdomain Formation in Graphene Quantum Dots Hyewon Yoon; KAIST, Korea (the Republic of).

EP14.4.16
Effects of Transparent MoO3/Au/MoO3 Anode and Its Surface Treatment on the Performance of OLEDs Sunghyun Kim; Kookmin University, Korea (the Republic of).

EP14.4.17
White Emitting Phosphor Based on Ce-Doped Strontium Aluminate and Enhanced with Li Ions David A. Chavez; Universidad Autónoma de Coahuila, Mexico.

EP14.4.18
Highly Flexible Metal grid/PEDOT:PSS Hybrid Electrodes for Fiber-Shape Organic Light-Emitting Diodes Keeum-jin Ko; Chonbuk National University, Korea (the Republic of).

SESSION EP14.5: Organic Light-Emitting Diodes
Session Chairs: Christophe Brault, Dave Devore and Jang-Joo Kim
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 226 C

8:30 AM EP14.5.01
Enhancement of Light Extraction in Organic Light Emitting Diodes with Nanoporous Polymer Film Min Chul Suh; Kyung Hee University, Korea (the Republic of).

9:00 AM EP14.5.02
Influence of Assistant Dopant with Thermally Activated Delayed Fluorescent Behavior for Highly Efficient OLEDs Jang-Joo Kim; Seoul National University, Korea (the Republic of).

9:15 AM EP14.5.03
Light-Emitting Electrochemical Cells with Enhanced Electrochemical Stability and Lowered Turn-On Voltage for Next Generation Displays Kenji I. Chee1, 2; 1Nanyang Technological University, Singapore; 2Nanyang Technological University, Singapore.

9:30 AM EP14.5.04
Exciplex as Emitters and Hosts for Fluorescent and TADF OLEDs with 100% Internal Quantum Efficiency Jun Joo Kim; Seoul National University, Korea (the Republic of).

10:00 AM BREAK

10:30 AM EP14.5.05
A Thin Film Encapsulation Fabricated via Initiated Chemical Vapor Deposition and Atomic Layer Deposition for Its Application to Organic Electronics Bong Jun Kim; Korea Advanced Institute of Science & Technology, Korea (the Republic of).

10:45 AM EP14.5.06
Investigation of Phosphorescent Blue and White Organic Light-Emitting Diodes with High Efficiency and Long Lifetime Lisong Xu; University of Rochester, United States.

11:00 AM EP14.5.07
Degradation of Hole Transport Materials via Exciton Driven Cyclization David D. Devore; The Dow Chemical Company, United States.

11:30 AM EP14.5.08
Synthesis of Squaraine Based π-Conjugated Polymers via Metal-Free Polymerization: Versatile Materials for White and Red/Near Infra-Red OLEDs Guillaume Garbay; 1, 2, 3; 1LCPO, France; 2CNRS, France; 3Université de Bordeaux, France.
SESSION EP14.6: Materials for Electronics, User Interfaces and Other Components I
Session Chairs: Thomas Jackson and Peter Trefonas
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 226 C

1:30 PM EP14.6.01
Modifying the Electrostatics of Conductive Oxides for High-Mobility Thin Film Transistors Andre R. Zeumault; University of California-Berkeley, United States.

1:45 PM EP14.6.02
XRR and XPS Analysis of a-IGZO TFT Channel Layer and Associated Interface Dielectrics Tarun Mudgal; Rochester Institute of Technology, United States.

2:00 PM *EP14.6.03
PEALD ZnO TFTs for Future Generation Displays Thomas N. Jackson; Pennsylvania State University, United States.

2:30 PM EP14.6.04
Precision Maskless Patterning of Indium-Free Metal Oxide TFTs by Selective Spray Pyrolysis William J. Scheideler; University of California-Berkeley, United States.

2:45 PM EP14.6.05
Comparing Density of States Models for Transient Photoconductivity in Amorphous IGZO Thin Films Jiajun Luo; Northwestern University, United States.

3:00 PM BREAK

3:30 PM *EP14.6.06
Transparent Conductive Materials Development at The Dow Chemical Company Christophe M. Brault; Dow Corporate, France.

4:00 PM EP14.6.07
E-Beam Writing and Erasing of Color on a Solid Ionic Conductor Kyle Jacobs; University of Illinois at Urbana Champaign, United States.

4:15 PM EP14.6.08
Effects of Application of Alkali-Added TiO2 on Silver Nanowires-Networked Films Suwho Kim; SungKyunKwan University, Korea (the Republic of).

4:30 PM EP14.6.09
Novel Ultra-Thin Silver Electrodes Using an Amine-Containing Nonconjugated Polyelectrolytes for Organic Electronics Soyeong Jeong; Gwangju Institute of Science and Technology, Korea (the Republic of).

4:45 PM EP14.6.10
Flexible Optoelectronic Devices Based on Transparent Electrodes Bin Hu; Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, China.

SESSION EP14.7: Materials for Electronics, User Interfaces and Other Components II
Session Chairs: Ralf Anselmann and Peter Trefonas
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 226 C

8:30 AM *EP14.7.01
Schottky Contacts on Nanocrystalline ZnO Thin-Films by Atomic Layer Deposition Mei Shen; University of Alberta, Canada.

8:45 AM EP14.7.02
Direct Writing of Low Resistive Co Thin Films by Atmospheric Laser Chemical Vapor Deposition (LCVD) for TFT Circuit Repair Jiwon Lee; Kookmin University, Korea (the Republic of).
Symposium Support
Advanced Diamond Technologies, Inc. (ADT)
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Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

1:30 PM *EP15.1.01
Recent Achievements On Diamond Vertical Schottky Diodes Jocelyn Achard, LSPM-CNRS, France.

2:00 PM *EP15.1.02
Heavily Phosphorus Doping of (111) Homoeptaxial Diamond on Misoriented Substrates Satoshi Koizumi, NIMS, Japan.

2:15 PM *EP15.1.03
Low Resistivity P+ Single-Crystal Diamond Prepared by Hot-Filament CVD Shinya Ohmagari, AIST, Japan, Japan.

2:30 PM *EP15.1.04
Incorporating Si into Cubic Boron Nitride Films via Plasma Enhanced CVD: Steps to n-Type Doping Joseph Shammas, Arizona State University, United States.

2:45 PM BREAK

3:15 PM *EP15.2.01
Diamond Schottky Diodes: Expected Performance and Realization David Eon, 1, 2; 1CNRS, France; 2University Grenoble Alpes

3:45 PM *EP15.2.02
Diamond Material Properties and Resulting Vertical Diode Characteristics Timothy A. Grotjohn, 1, 2; 1Michigan State University, United States; 2Fraunhofer Center for Coatings and Diamond Technologies, United States.

4:15 PM *EP15.2.03
Extremely Low On-Resistance Diamond Vertical Schottky Diode by Ion-Beam-Assisted Lift-Off Technique Sensei Tarelkin, 1, 2, 3; 1Technological Institute for Superhard and Novel Carbon Materials, Russian Federation; 2Moscow Institute of Physics and Technology, Russian Federation; 3National University of Science and Technology MISiS, Russian Federation.

4:30 PM *EP15.2.04
Spectral Sensitization of Boron-Doped Diamond Foam for Prospective Application in Solar Cells Ladislav Kavan, J. Heyrovsky Institute of Physical Chemistry, Czech Republic.

5:30 PM *EP15.2.05
Spectroscopic Ellipsometry as Relevant Method for Diamond Growth Dependence of Electronic Performance of Diamond Schottky Barrier Diodes on Fabrication Methods of Substrates Makoto Kasu, Saga University, Japan.

8:00 PM *EP15.4.01
Dependence of Electronic Performance of Diamond Schottky Barrier Diodes on Fabrication Methods of Substrates Satoshi Yamasaki, 1, 2, 3; 1AIST, Japan; 2Core Research for Evolutional Science and Technology (CREST), Japan Science and Technology (JST), Japan; 3Tsukuba University, Japan.

9:30 AM *EP15.4.02
Effect of Bias Enhanced Nucleation Parameters on Diamond Heteroepitaxy on Ir/SrTiO3/Si (001) Kee Han Lee, CEA LIST, France.

9:45 AM *EP15.4.03
10:30 AM *EP15.5.01
Diamond Unipolar Devices for Future Power Electronics Hitoshi Umezawa1, 2; 1AIST, Japan; 2Inst. Neel/CNRS, France.

11:00 AM EP15.5.02
Diamond Logic Inverter with Normally-Off Mode Metal-Insulator-Semiconductor Field Effect Transistors Yasuo Koide; NIMS, Japan.

11:15 AM EP15.5.03
Band Alignments in Diamond MOSFETs Christophe Pernot1, 2; 1'CNRS, Inst. Neel, France; 2Univ. Grenoble Alpes, France.

11:30 AM EP15.5.04
Fabrication of Diamond Field-Effect Transistors with Various NOx Hole-Doping Conditions and Al2O3 Gate Insulator Layers Makoto Kasu; Saga University, Japan.

11:45 AM EP15.5.05
Oxide Leakage Current in Oxygen-Terminated Diamond Metal Oxide Semiconductor Capacitors Julien Perrier1, 2; 1Institut Neel - CRNS Grenoble, France; 2Institut Universitaire de France, France.

8:30 AM *EP15.8.01
Diamond Power Electronics: From Device Simulation to Implementation in Power Converters Nicolas Rouger1, 2; 1CNRS, G2Elab, France; 2Univ. Grenoble Alpes, G2Elab, France.

9:00 AM EP15.8.02
Normally-Off C-H Diamond MOSFET with the Breakdown Voltage of Above 2000V Hiroshi Kawarada; Waseda University, Japan.

9:15 AM EP15.8.03
Capacitance Frequency Dispersion in Oxygen Terminated Diamond Metal Oxide Semiconductor Capacitors Thanh-Toan Pham; Institute Neel - CRNS Grenoble, France.

9:30 AM EP15.8.04
Reduction of Contact Resistance in Hydrogen-Terminated Diamond FETs by Surface Chemical Doping Yutaka Ohno; Nagoya University, Japan.

10:00 AM BREAK

1:30 PM *EP15.8.05
Large Emission Current Density Of Diamond p-i-n Diode Type NEA Electron Emitters Daisuke Takeuchi; AIST, Japan.

2:00 PM EP15.8.06
Simulation of Diamond PNP Bipolar Junction Transistors Raghuraj Hathwar; Arizona State University, United States.

2:15 PM EP15.8.07
Doped Diamond Homoeptaxy on (100) Substrates for High Power p-i-n Diodes Franz A. Koeck; Arizona State University, United States.

2:30 PM EP15.8.08
Electron-Hole Recombination Processes in Diamond Pin Diodes Daisuke Kuwabara1, 2, 3; 1Univ. of Tsukuba, Japan; 2AIST, Japan; 3CREST/JST, Japan.

2:45 PM EP15.8.09
Diamond Based Diodes for High Voltage and High Temperature Applications Maitreya Dutta; Arizona State University, United States.

3:00 PM BREAK

3:30 PM *EP15.7.01
Diamond/Metal Interface Analysis by STEM-EELS Daniel Araujo; UCA, Spain.

4:00 PM EP15.7.02
Diamond on HEMT: Maskless Patterning and Selective Diamond Growth on Passivation Dielectrics Ken Haenen1, 2; 1Hasselt University, Belgium; 2IMEC vzw, Belgium.
SYMPOSIUM MD1
Materials, Interfaces and Devices by Design
March 28 - April 1, 2016

Chairs
Carla Gomes, Cornell University
Geoffroy Hautier, Université Catholique de Louvain
John Perkins, National Renewable Energy Laboratory
Vladan Stevanovic, Colorado School of Mines

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances).

Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

TUTORIAL
Creating the Materials Innovation Infrastructure for Materials by Design
Monday Morning, March 28, 2016
8:30 AM – 5:00 PM
PCC North, 100 Level, Room 121 B

The Materials Genome Initiative (MGI), launched by President Obama in 2011, envisions the creation of a three-component materials innovation infrastructure where computational tools, experimental tools and digital data are brought together along with a cultural shift in materials research towards more collaborative and open research to accelerate advanced materials development and deployment. The MGI (aka Materials by Design) approach is a theory-driven approach where computational design of new materials and materials properties directly guides the experimental materials development.

The morning segments of the tutorial will focus on the methods and techniques of materials by design. The afternoon segments will explore the application of these methods to real materials development, with demonstrations via a series of example cases.

The integrated panel of instructors, experts at the forefront of Materials by Design, will cover all components of the materials innovation infrastructure and demonstrate, through example, how the envisioned collaborative MGI research environment can be realized. The perspectives of both senior researchers and younger scientists who are normalizing this new approach will be presented.

Part I: David Ginley
Overview: The Materials Genome Initiative—Opportunities and Challenges

Part II: Marco Buongiorno Nardelli
Theory for Computational Materials Design

12:00 PM – 1:30 PM BREAK

Part III: Andriy Zakutayev
High-Throughput Experiment for MGI Part IV: Michael Toney
In-situ and Synchrotron-based Measurements

Instructors
David Ginley, National Renewable Energy Laboratory
Michael Toney, Stanford University
Marco Buongiorno Nardelli, University of North Texas
Andriy Zakutayev, National Renewable Energy Laboratory

SESSION MD1: Materials by Design—Theory, Experiment and Data
Session Chairs: Carla Gomes and John Perkins
Tuesday Afternoon, March 29, 2016
PCC West, 100 Level, Room 101 A

1:30 PM * MD1.1.01
Causal Models in Big-Data Analytics for Novel Materials Discovery Luca Ghiringhelli: Fritz Haber Institute of the Max Planck Society, Germany.

2:00 PM * MD1.1.02
Data Driven Approaches to Combinatorial Materials Science Ichiro Takeuchi: University of Maryland, United States.

2:30 PM * MD1.1.03

3:00 PM BREAK

SESSION MD1.2: Machine Learning with Experimental Data and Synthesis Control
Session Chairs: Geoffroy Hautier and Vladan Stevanovic
Tuesday Afternoon, March 29, 2016
PCC West, 100 Level, Room 101 A

3:30 PM *MD1.2.01

4:00 PM MD1.2.02
Mixing Machine Learning with Experiment: Learning Assembly Mechanisms from Particle Tracking Data Andrew W. Long: University of Illinois at Urbana-Champaign, United States.

4:15 PM MD1.2.03

4:30 PM MD1.2.04
Seed Layer Mediated Crystallization of Amorphous TiAl Thin Films to Obtain Tailored Microstructures Jagannathan Rajagopalan: Arizona State University, United States.

4:45 PM MD1.2.05
Microsecond-Resolved in situ Insights by SAXS and WAXS into the Very Early Stages of CdS Quantum Dot Formation Andreas Magerl: University of Erlangen-Nürnberg, Germany.

SESSION MD1.3: Poster Session I: Materials, Interfaces and Devices I
Session Chairs: Carla Gomes and John Perkins
Tuesday Afternoon, March 29, 2016
Sheraton, Third Level, Phoenix Ballroom

MD1.3.01
A Self-Healing, Stretchable Dielectric for Thin-Film Field-Effect Transistors Yingli Rao: Stanford University, United States.

MD1.3.02
Three-Dimensional ZnO Porous Films for Self-Cleaning Ultraviolet Photodetectors Longyan Yuan: HUST, China.

MD1.3.03
Design of Sandwich-Structured ZnO/ZnS/Au Photoanode for Enhanced Efficiency of Photoelectrochemical Water Splitting Yiehong Liu: University of Science and Technology, China.

MD1.3.04
Learning the “Write Mechanism” For Digital Colloids Andrew W. Long: University of Illinois at Urbana-Champaign, United States.
MDI.3.05
Microwave Assisted Low Temperature Annealing of AgTi Alloy Melvy Ann B. Thekkady: Arizona State University, United States.

MDI.3.06
Nonequilibrium and Nonadiabatic Molecular Dynamics in Materials
Design Guohua Tao: Peking University, China.

MDI.3.07
Improving Scintillator Performance of Multicomponent Garnet by Band-Gap and Band-Edge Engineering Satvish K. Yadav: Los Alamos National Laboratory, United States.

MDI.3.08
Influence VSR on Deformation of Thin-Walled Component in 7075 Al Liao Kai: Central South University of Forestry and Technology, China.

MDI.3.09
Tuning the Mechanical Properties of Fused Carbon Nanotube Yarns by Controlling Their Structure before Fusion Sanwei Liu: Northeastern University, United States.

MDI.3.10
Tetrathiafulvalene-Based Polymers for the Modification of MoS2 Nanomaterials Ryan Selhorst: University of Massachusetts Amherst, United States.

MDI.3.11

MDI.3.12

MDI.3.13
Nanodiamond Growth and Adhesion on Temperature Varied Tungsten Borides Formed by Plasma Enhanced Chemical Vapor Deposition Jamin M. Johnston: UAB, United States.

MDI.3.14
Artificial Modulation of Schottky Barrier and Surface Charge Effect in the High Energy-Efficient ZnO Based Ultraviolet Photodetectors Hy Chen: Fudan University, China.

SESSION MD1.4: Foundational Theory for Materials by Design
Session Chair: Anatole von Lilienfeld
Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 101 A

8:30 AM * MDI.4.01
Computational Exploration of the Space of 2-Dimensional Materials Nicola Marzari: EPFL, Switzerland.

9:00 AM * MDI.4.02
Entropy Descriptors and Entropy Stabilized Oxides Stefano Curtarolo: Duke University, United States.

9:30 AM MDI.4.03
First Principles Investigation of Dislocations in BCC Lithium-Magnesium Alloys Ian Winter: University of California, Berkeley, United States.

9:45 AM MDI.4.04
Accelerated Calculations through the Use of Efficient k-Point Grids Tim Mueller: Johns Hopkins University, United States.

10:00 AM BREAK
MD1.8.01
Investigation of AlGaN/GaN HEMTs with Different Cap Layers in Dynamic On-Resistance Characteristics Yue-ming Hsin1, 2; 1National Central University, Taiwan; 2University of California, Los Angeles, United States.

MD1.8.02
Highly Porous Activated Carbon, Synthesis, Characterization and Their Application to Methane Storage Babak Ashourirad; Virginia Commonwealth University, United States.

MD1.8.03
Sol-Gel Synthesis and Characterization of Annealed Pyrolytic Graphite/ Sodium Borosilicate Glass Composites Katherine E. Copenhaver; Georgia Institute of Technology, United States.

MD1.8.04
Dual-Beam Pulsed Laser Deposition of Periodically-Assembled BiSb2-xTe3/GaTe, and BiSb2-xTe3/Carbon Nanocomposite Films Tsung-Han Chen; National Chiao Tung University, Taiwan.

MD1.8.05
Quantitative STEM-EDX of Surface Segregation and Miscibility in a (PbSn0.5Se)0.75TiSe2 Nanolaminate System Jeffrey J. Ditto; University of Oregon , United States.

MD1.8.06
The Effect of Adhesion Strength between Steel and Polymer on the Mechanical and Acoustic Properties of Their Composites Sunejin Han; Seoul National University, Korea (the Republic of).

MD1.8.07
Selective Tuning of Catalyst Support Properties for Catalyst Formation and Development Jennifer Carpena3, 1; 1Air Force Research Laboratory, United States; ‘NRC RAP, United States.

MD1.8.08
Design of Functional Chalcogenide Materials for Electronics, Photonics, and Data Storage Robert E. Simpson; SUTD, Singapore.

MD1.8.09
Spin Filtering in Double Quantum Dots Aharonov-Bohm Ring under General Rashba Spin Orbit Interaction Kenji Kondo; Research Institute for Electronic Science, Hokkaido University, Japan.

MD1.8.10
Study on the Composite Strengthening Performance of TiCN Coated Nitrogen Alloyed Hot Forging Die Steel Ying Chen; Huzhong University of Science and Technology, China.

MD1.8.11
Biodegradable Triboelectric Nanogenerator for Implantable Medical Devices Guang Zheng; Beijing Institute of NANOenergy and Nanosystem, Chinese Academy of Science, China.

MD1.8.12
Large Area Film Type Acoustic Metamaterials Utilized by Micro-Structured Resonators Moonkyu Kwak1, 2; 1Kyungpook National University, Korea (the Republic of); 2Korea (the Republic of).

MD1.8.13
Pt Nanostructures Loaded SnO2 Thin Film Based NH, Gas Sensor Md. Shahabuddin; Allama Iqbal College, Magad University, India.

MD1.8.14
Thermally-Induced Layer Compression in the Topochemically-Prepared FeLa2Ti3O10 and Reductive Intercalation Products Lea Gustin1, 2; 1University of New Orleans, United States; 2University of New Orleans, United States.

MD1.8.15
Effect of Increased Strain Rate on the Deformation Mechanism of AZ31 Magnesium Alloy under a Triaxial Stress State Chaitanya Kale; Arizona State University, United States.

MD1.8.16
Frozen Polarization in Ferroelectric Polymers for High Performance in Organic Transistors Ashar Abuzahida; Jawaharlal Nehru Center for Advanced Scientific Research, India.

MD1.8.17
Oxidation and Reduction Reactions in a Confined Space at the silica/Ru(0001) Interfaces Fengjiang Zhang; Brookhaven National Laboratory, United States.

MD1.8.18
Output Enhancement of Triboelectric Energy Harvester by Micro-Porous Triboelectric Layer Daewon Kim; Korea Advanced Institute of Science and Technology, Korea (the Republic of).

SESSION MD1.9: Methods and Applications of Computational Materials by Design

MD1.9.01
Computational Design of 2D Materials and van der Waals Heterostructures Kristian S. Thygesen; Technical University of Denmark, Denmark.

MD1.9.02
Effects of Magnetic Order on Transport Property Predictions for Materials Design Prashun Gorai2; 1Colorado School of Mines, United States; 2National Renewable Energy Laboratory, United States.

MD1.9.03
Scanning the Chemical Compound Space for Novel High- and Low-k Dielectrics Using High-Throughput Density Functional Perturbation Theory Calculations Ioannis Petousis; Stanford University, United States.

MD1.9.04
Accelerated Materials Design Based on Computational Approaches: From bulk to interfaces Yifei Mo; University of Maryland-College Park, United States.

MD1.9.05
Defects in Alpha and Gamma Crystalline Nylon6: A Computational Density Functional Tight Binding Study Serreii Manzhos; National University of Singapore, Singapore.

10:00 AM BREAK

SESSION MD1.10: Materials by Design for Reduced Dimensionality and Nanostructured Materials

MD1.10.01
Design of Optoelectronic Materials Based on ab initio Computations Stephan Lany; NREL, United States.

MD1.10.02
Molybdenum Disulfide Nanostructures with Controllable Phase Stabilities: Predicted by First Principle Calculations with Continuum Modelling Bin Oo Favang; McGill University, Canada.
11:15 AM MD1.10.03
Quasi-Two-Dimensional Electronic Structure in Ca₃N: An Angle-Resolved Photoemission Study
Ji Soon Oh¹,²; Institute for Basic Science, Korea (the Republic of); ²Seoul National University, Korea (the Republic of).

11:30 AM MD1.10.04
Creating Nanostructures from Atomically Precise Cobalt Selenide Building Blocks
Alexandra Velian; Columbia University, United States.

11:45 AM MD1.10.05
Microarchitecture Matters: 3D Printed Cellular Solid Outdoors Stochastic Foam in Long Term Performance
Amitesh Maiti; Lawrence Livermore National Lab, United States.

SESSION MD1.11: Experimental Materials Optimization for Materials by Design
Session Chair: Shyue Ping Ong
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 101 A

1:30 PM *MD1.11.01
Application of High-Throughput Experimental Methods to Materials Development for Energy Application
Alfred Ludwig; Ruhr Univ-Bochum, Germany.

2:00 PM MD1.11.02
Utilizing Pulsed Laser Deposition Lateral Inhomogeneity as a Tool in Combinatorial Material Science
David A. Keller; Bar-Ilan University, Israel.

2:15 PM MD1.11.03
Engineering the ScₓAl₁₋ₓN Thin Film Structures for Pyroelectric Sensing
Vladimir Vasilev; Air Force Research Laboratory, United States.

2:30 PM MD1.11.04
Phase Behavior of Self-Assembled Ternary Polymer Brushes
Chester Simcock; Sandia National Laboratory, United States.

2:45 PM BREAK

SESSION MD1.12: Materials Design Using Theory and Computation
Session Chair: Alfred Ludwig
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 101 A

3:15 PM *MD1.12.01
First Principles Design of Alkali Superionic Conductors
Shyue Ping Ong; University of California-San Diego, United States.

3:45 PM MD1.12.02
High-Throughput Density Functional Theory Screening of Perovskite Compounds for High Oxygen Surface-Exchange for Solid Oxide Fuel Cell Cathodes
Ryan Jacobs; University of Wisconsin-Madison, United States.

4:00 PM MD1.12.03
Design Principles and Non-Equilibrium Synthesis of Functional Heterostructural Alloys
Aaron Holder; National Renewable Energy Laboratory, United States.

4:15 PM MD1.12.04
Design Rules for High Dielectric Breakdown Strength Materials
Ghanshyam Pilania; Los Alamos National Laboratory, United States.

4:30 PM MD1.12.05
Co-Substitution as a Method to Direct Synthesis towards Otherwise Hypothetical Polymorphs of Inorganic Solids
Martijn Zwijnenburg; University College London, United Kingdom.

SESSION MD1.13: Poster Session III: Materials, Interfaces and Devices by Design III
Session Chairs: John Perkins and Vladan Stevanovic
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

MD1.13.01
Interface Engineering by Sorbitol for Inorganic-Organic Hybrid Perovskite Solar Cells
Cigem Kiribiyik; Selcuk University, Turkey.

MD1.13.02
A DFT Study of Effects of Nitrogen Vacancies on Electronic and Magnetic Properties of Cerium Doped Aluminum Nitride
Abdul Majid; University of Gujrat, Pakistan.

MD1.13.03
A Scale-Parity Framework for Potential Parameterization: The Environment Dependent Dynamic Charge Potential
Abduljabar Alsayoud; University of Arizona, United States.

MD1.13.04
Incorporation of Viscoelastic Materials with Barium Titanate Nanocubes for Dielectric Elastomer Actuators
Naman Salemi-zadeh Pariz; Central Michigan University, United States; ²Central Michigan University, United States.

MD1.13.05
Synthesis of Thermochromic W-VO₂ (M) Nanoparticles under Mild Calcination Condition for Smart Window Application
Hye Jung Kim¹,²; ¹Korea Institute of Ceramic Engineering & Technology, Korea (the Republic of); ²SungKyunKwan University, Korea (the Republic of).

MD1.13.06
Spontaneous Levitation of As-Forming Ice Droplets on Superhydrophobic Surfaces
Thomas Schutz; ETH-Zurich, Switzerland.

MD1.13.07
Synthesis of Size-Controllable Copper Nanoparticles with Strong Antioxidation for Flexible Printed Electronics
Yu Zhang; Chinese Academy of Sciences, China.

MD1.13.08
Slip vs Twin in Hexagonal Close Packed Crystals
Mehul A. Bhatia; Arizona State University, United States.

MD1.13.09
Thermal Interface Characterization Based on Heat Flux Mapping
Fatih Canbazoglu; UCSD, United States.

MD1.13.10
De Novo Design of Mechanically Active MOFs
Charles A. Manion; Oregon State University, United States.

MD1.13.11
Realization of Atomic Transitions with Colloidal Nanoparticles by Using Ultrafast Laser
Serim Ilday; Bilkent University, Turkey.

MD1.13.12
Synthesis and Characterization of New Metastable (Sn,Ti)₅N₃ Alloys
Andriy Zakutayev; National Renewable Energy Laboratory, United States.

MD1.13.13
Si Microcrack Evolution under Combined Environments: An Experimental and Computational Study
Wei-Jie Huang; University of Arizona, United States.

MD1.13.14
Mechanical Behavior of a Thermally Stable, Nanocrystalline Cu-Ta Alloy under Compressive Load at High Temperatures and High Strain Rates
Scott A. Turnage; Arizona State University, United States.

MD1.13.15
Nano-heteropitaxy of CdTe/Si(211) Doped with ZN by Closed Space Sublimation
Jose Valdez; The University of Texas at El Paso, United States.
MD1.13.16
Conductance Dependence on Solid-State Nanopore Structure Uppiliappan Renagasan
1; 2; 1University of Alberta, Canada; 2Ingenium Labs, Canada.

MD1.13.17
Role of Dispersion and Functionalization on Mechanical Properties in Carbon Nanotube-Polymer Composites Medisetti Sai Praveen Kumar; Utah State University, United States.

MD1.13.18
NEXAFS Spectroscopy to Predict Interface Dynamics in Strained Polymer Nanocomposites Following Excessive Nanoparticle Sonication Allen D. Winter; Bangor University, United Kingdom.

SESSION MD1.14: Materials Design for Applications
Session Chair: Tonio Buonassisi
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 101 A

8:30 AM *MD1.14.01
New Approaches to Thermoelectric Materials Discovery and Design Eric Toberer; Colorado School of Mines, United States.

9:00 AM MD1.14.02
Silicon Doped Gallium Oxide Wide Band Gap Semiconductors Lauren Garten; NREL, United States.

9:15 AM MD1.14.03
Processing Effects on Graphene by Experimental and Theoretical Near-Edge X-ray Absorption Fine Structure Spectroscopy Wudmir Y. Rojas; Bangor University, United Kingdom.

9:30 AM MD1.14.04
Heat Transport at Interfaces in the Metal-Organic–Framework MOF-5 Wenxi Huang; Oregon State University, United States.

9:45 AM MD1.14.05
Controlling of the Aggregation of Merocyanine and Thiazole Dyes for Photovoltaic Applications by Means of the Langmuir-Blodgett Technique: An In-Depth Study of Morphological Effects on Optical Properties Felix Herrmann-Westendorf 1; 2; 1Friedrich Schiller University Jena, Germany; 2Leibniz Institute of Photonic Technology, Germany.

10:00 AM BREAK

10:30 AM *MD1.14.06
Bulk Combinatorics and High Throughput Assessments for Accelerated Materials Development Matthew J. Kramer; Iowa State University, United States.

11:00 AM MD1.14.07
Thermodynamic Stabilization of MgAl2O4 Spinel Nanoparticles: Atomistic Calculations and Experimental Analysis Md Hasan; UC Davis, United States.

11:15 AM MD1.14.08
Design of Metastable Mn Chalcogenide Heterostructural Alloys Sebastian Sidd; National Renewable Energy Laboratory, United States.

11:30 AM MD1.14.09
Spontaneous Droplet Self-Launching on Superhydrophobic Surfaces Thomas Schützing; ETH-Zurich, Switzerland.

SESSION MD1.15/EE1.15: Joint Session: Perovskite Inspired PV Materials by Design
Session Chairs: Stephan Lany and John Perkins
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 224 A

1:30 PM *MD1.15.01/EE1.15.01
Computational Screening of Novel Bismuth Based Solar Absorbers David O. Scanlon; University College London, United Kingdom.
SYMPOSIUM MD2

Tuning Properties by Elastic Strain Engineering—From Modeling to Making and Measuring
March 29 - April 1, 2016

Chairs
Paul Evans, University of Wisconsin-Madison
Tobias Schulli, ESRF - The European Synchrotron
Bilge Yildiz, Massachusetts Institute of Technology
Ting Zhu, Georgia Institute of Technology

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION MD2.1: Elastic Strain-Driven Materials Design and Discovery
Session Chairs: Paul Evans, Tobias Schulli, Bilge Yildiz and Ting Zhu
Tuesday, April 1, 2016

1:30 PM *MD2.1.01
Tuning the Band Structure of Complex Oxides Utilizing Elastic Strain Engineering Darrell G. Schlom1,2; Cornell University, United States; 2Kavli Institute at Cornell for Nanoscale Science, United States.

2:00 PM *MD2.1.02
Predicting Epitaxial-Strain-Induced Structural, Magnetic and Electronic Phase Transitions in Perovskite Oxides from First Principles Karin M. Rabe; Rutgers University, United States.

2:30 PM *MD2.1.03
Selective Control of Oxygen Sublattice Stability by Strain in Epitaxial Complex Oxides Ho Nyung Lee; Oak Ridge National Laboratory, United States.

3:00 PM BREAK

SESSION MD2.2: Dynamically Strained Oxide Electronics
Session Chairs: Ho-Nyung Lee and Karin Rabe
Tuesday, April 1, 2016

3:30 PM *MD2.2.01
A Strain-Based Transduction Device for Fast Low Power Digital Switching at the Nanoscale: The Piezoelectronic Transistor Glenn J. Martyna; IBM Research, United States; 2University of Edinburgh, United Kingdom.

4:00 PM MD2.2.02
Strained Oxide Heterostructures for Modulating Memristance Sebastian Schweiger; ETH Zurich, Switzerland.

4:15 PM MD2.2.03
Theoretical Study of the Insulator-to-Metal Transition in LaMnO3 Jose P. Rivero; Louisiana State University, United States.

4:30 PM *MD2.2.04
Elastic Strain Engineering of Thermal and Charge Transport in Semiconductor Nanostructures: The Role of Heterogeneity Daniel S. Giusti1,2; 1University of Pennsylvania, United States; 2University of California, United States.

8:30 AM *MD2.3.01
Manipulating Domain Structures in Nanoscale Thin Films and Heterostructures via Strain Engineering Long-Qing Chen; The Pennsylvania State University, United States.

9:00 AM MD2.3.02
Novel Functionalities in Strain-Gradient Engineered Labile Ferroelastic Domain Walls Joshua Agar; University of California Berkeley, United States.

9:15 AM MD2.3.03
Ferroelectric 180° Domain Wall Motion Controlled by Reversible Elastic Strain Eric Guo1,2; 1Martin-Luther-University Halle-Wittenberg, Germany; 2IFW-Dresden, Germany.

9:30 AM MD2.3.04
Flexoelectric Coupling with Ferroelectric Twin Walls in Pb(Zr0.2Ti0.8)O3 Thin Film Ye Cao1,2; 1Oak Ridge National Laboratory, United States; 2Oak Ridge National Laboratory, United States.

9:45 AM BREAK

10:15 AM *MD2.3.05
Strain-Relief Engineering in Ferroelectric Oxides Beatriz Noheda; University of Groningen, Netherlands.

10:45 AM MD2.3.06
Interaction of Dislocation with Ferroelectric Domain Structure and Switching in Pb(Zr0.52Ti0.48)O3 Thin Film Ye Cao1,2; 1Oak Ridge National Laboratory, United States; 2Oak Ridge National Laboratory, United States.

11:00 AM MD2.3.07
First-Principles High-Throughput Screening of Epitaxially Stabilized Ferroelectric Films Thomas H. Angsten; University of California - Berkeley, United States.

11:15 AM MD2.3.08
Modulation of Metal-Insulator Transitions by Electric-Field-Controlled Strain in NdNiO3/SrTiO3/PMN-PT (001) Heterostructures Seung Yang Heo; Pohang University of Science and Technology (POSTECH), Korea (the Republic of).

SESSION MD2.4: Strain in Ion-Transporting Materials
Session Chair: Roland Kroeger
Wednesday, March 30, 2016

1:30 PM *MD2.4.01
Ionic Transport in Complex Oxides: Understanding the Interplay between Lattice Distortions, Electronic Structure, and Epitaxial Strain Nicole Benedek; Cornell University, United States.

2:00 PM MD2.4.02
Influence of Dislocations on Ionic Conductivity and Surface Reactivity in Reduced and Doped Ceria Lixin Sun; Massachusetts Institute of Technology, United States.

2:15 PM *MD2.4.03
Strain Effects on Oxygen Defect Chemistry and Diffusion in Perovskites Dane Morgan; University of Wisconsin-Madison, United States.

2:45 PM MD2.4.04
Colossal Enhancement of Oxygen Electrocatalysis in La3-δ Srδ CoO4 Thin Films by Epitaxial Strain Dongkyu Lee; Oak Ridge National Laboratory, United States.

3:00 PM BREAK
SESSION MD2.5: Poster Session: Tuning Properties by Elastic Strain Engineering—From Modeling to Making and Measuring

Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

MD2.5.01
Novel Method to Fabricated Ti-Al Intermetallic Compounds by the Infiltration of Al into Porous Titanium
Samun Kim1, 2; 1Yonsei University, Korea (the Republic of); 2Korea Institute of Science and Technology, Korea (the Republic of).

MD2.5.02
Controlling Chemical Vapor Transport Synthesis of Bismuth Telluride Nanosheets on Mica Substrates
Quentarius D. Moore; Jackson State University, United States.

MD2.5.03
Strain State of TbMnO3, Epitaxial Thin Films on (010) YAlO3, Substrate Altered by Growth Condition of Pulsed Laser Deposition
Kenta Shimamoto; Paul Scherrer Institut, Switzerland.

MD2.5.04
Modifying the Ferroelectric Phase Diagram of Orthorhombic REMnO3, by Epitaxial Strain
Kenta Shimamoto; Paul Scherrer Institut, Switzerland.

MD2.5.05
Stress Focusing and Transfer at the Graphene/Polymer Interface
Woongbin Yim; Ajou University, Korea (the Republic of).

SESSION MD2.6: Strain Control of Low-Dimensional Materials

Session Chairs: Jun Lou and Yujie Wei
Thursday Morning, March 31, 2016
8:30 AM *MD2.6.01
Elastic Strain Engineering of 1D and 2D Materials
In Li; MIT, United States.

9:00 AM MD2.6.02
Predictive Strain Engineering of Electron Bands and Phonon Bands in Transition Metal Dichalcogenides: Atomistic Simulation and Continuum Modeling
Bin Ouyang; McGill University, Canada.

9:15 AM MD2.6.03
Photo luminescence and Raman Modes of Transition Metal Dichalcogenides under Tensile and Compressive Strain
Sarah Bobek; University of California-Riverside, United States.

9:30 AM MD2.6.04
Highly Transparent Stretchable Ag Nanowire Circuits and Its Use for Transparent Direction-Recognizable Tactile Sensor
Insang You; POSTECH, Korea (the Republic of).

SESSION MD2.7: Nanomechanics and Thermal Transport in Strained Low-Dimensional Materials

Session Chairs: Ju Li and Evan Reed
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 101 B

1:30 PM *MD2.7.01
On the Griffith Criterion for Brittle Fracture in Graphene
Yujie Wei; Institute of Mechanics, Chinese Academy of Sciences, China.

2:00 PM MD2.7.02
Study of Flexoelectricity in Graphene Composite Structures
Mohamed Serry2; 1The American University in Cairo (AUC), Egypt; 2The American University in Cairo (AUC), Egypt.

2:15 PM *MD2.7.03
Nanomechanical Characterization and Strain Engineering of Two Dimensional Materials
Jun Lou; Rice University, United States.

2:45 PM MD2.7.04
Strain Effects on Thermal Transport at the Nanoscale
Aman Haque; Pennsylvania State University, United States.

3:00 PM BREAK

3:30 PM MD2.7.05
Thermal Conductivity in the Radial Direction of Deformed Polymer Fibers
Jun Liu; North Carolina State University, United States.

SESSION MD2.8: Strain-Tuning of Semiconductor Electronic Properties I

Session Chairs: Ju Li and Evan Reed
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 101 B

3:45 PM MD2.8.01
Mapping the Full Strain Tensor and Lattice Tilts in Ge Microstructures for Photonics Applications Using Laue Microdiffraction
Samuel Tardif; CEA-INAC, France.

4:00 PM MD2.8.02
In Situ Strain and Lattice Orientation Distribution in SiN/Ge CMOS Compatible Light Emitting Microstructures by Quick X-Ray NanoDiffraction Microscopy
Gilbert Chahine; European Synchrotron E.S.R.F., France.

4:15 PM MD2.8.03
Measuring strain at the Nanoscale with High Precision Using Nanobeam Precession Electron Diffraction
Jean-Luc Rouviere1, 2; 1University Grenoble Alpes, France; 2CEA, France.

4:30 PM MD2.8.04
Phase Segregation and Elastoplastic Strain in Semiconductor Nanowires
Mehrdad Arjmand; University of Wisconsin-Madison, United States.

9:45 AM BREAK

10:15 AM *MD2.6.05
Strain in Different Phases of Two Dimensional Transition Metal Dichalcogenide Nanosheets
Manish Chhowalla; Rutgers University, United States.

10:45 AM *MD2.6.06
The Role of Mechanical Constraints in Structural Phase Changes of Two-Dimensional Materials
Evans J. Reed; Stanford University, United States.

11:15 AM MD2.6.07
Strain Engineered Diffusive Atomic Switching in Chalcogenide Heterostructure Superlattices
Robert E. Simpson; SUTD, Singapore.

11:30 AM MD2.6.08
Strain Tuning of Phonon Dispersion Relations in Single-Walled Carbon Nanotubes
Tarek Ragab1, 2; 1State University of New York at Buffalo, United States; 2Alexandria University, Egypt.

SESSION MD2.8: Strain-Tuning of Semiconductor Electronic Properties II

Session Chairs: Jun Lou and Evan Reed
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 101 B

3:45 PM MD2.8.05
Strain Tuning of Phonon Dispersion Relations in Single-Walled Carbon Nanotubes
Tarek Ragab1, 2; 1State University of New York at Buffalo, United States; 2Alexandria University, Egypt.

4:00 PM MD2.8.06
In Situ Strain and Lattice Orientation Distribution in SiN/Ge CMOS Compatible Light Emitting Microstructures by Quick X-Ray NanoDiffraction Microscopy
Gilbert Chahine; European Synchrotron E.S.R.F., France.

4:15 PM MD2.8.07
Measuring strain at the Nanoscale with High Precision Using Nanobeam Precession Electron Diffraction
Jean-Luc Rouviere1, 2; 1University Grenoble Alpes, France; 2CEA, France.

4:30 PM MD2.8.08
Phase Segregation and Elastoplastic Strain in Semiconductor Nanowires
Mehrdad Arjmand; University of Wisconsin-Madison, United States.
SESSION MD2.9: Nanomechanical and Structural Phenomena in Strained Functional Materials
Session Chairs: Mark Eriksson and Hans Sigg
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 101 B

8:15 AM *MD2.9.01
Coherent X-Ray Diffraction Imaging of Strain in Nanoscale Structures
Paul H. Fuoss; Argonne National Lab, United States.

8:45 AM MD2.9.02
In Situ Nanomechanics Ting Zhu; Georgia Institute of Technology, United States.

9:00 AM MD2.9.03
The Nanodiffraction Beamline ID01/ESRF: Strain Microscopy by Diffraction Imaging Tobias Schulli; ESRF, France.

9:15 AM MD2.9.04
Structure of Nanoscale Strontium Titanate Sheets Fabricated by Focused Ion Beam Milling Jack A. Tilka; University of Wisconsin-Madison, United States.

9:30 AM MD2.9.05
Epitaxial Growth, Strain Accommodation and Defect Creation in Epitaxial Structures Nikolai N. Faleev; Arizona State University, United States.

9:45 AM BREAK

SESSION MD2.10: Strain-Tuning of Semiconductor Electronic Properties II
Session Chairs: Paul Fuoss and Ting Zhu
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 101 B

10:15 AM *MD2.10.01
High-Speed Control of Qubits in Elastically Strained Si Quantum Wells
Mark A. Eriksson; University of Wisconsin-Madison, United States.

10:45 AM *MD2.10.02
Group IV Alloys for Electronic-Photonic Integrated Circuitry on Silicon Detlev Gruetzmacher1, 2; 1Forschungszentrum Julich, Germany; 2Juelich Aachen Research Alliance (JARA), Germany.

11:15 AM *MD2.10.03
Top Down Method to Introduce Ultra High Elastic Strain in Si and Ge for CMOS Based Electronics and Photonic Thomas K. Zabel; Paul Scherrer Institut, Switzerland.

11:45 AM MD2.10.04
Two-Dimensional Electron Gases in Elastically Strain Engineered Epitaxial Si/SiGe Heterostructures Yize Li1, 2; 1University of Wisconsin-Madison, United States; 2California State University, United States.
SYMPOSIUM MD3

Functional Oxide Heterostructures by Design
March 28 - April 1, 2016

Chairs
Ariando Ariando, National University of Singapore
Gertjan Koster, University of Twente
Ho-Nyung Lee, Oak Ridge National Laboratory
Yayoi Takamura, University of California, Davis

Symposium Support
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* Invited Paper

TUTORIAL

discovery of functional oxides by computational and epitaxial design

Monday Afternoon, March 28, 2016
1:30 PM - 5:00 PM
PCC North, 100 Level, Room 125 A

The tutorial will provide foundational knowledge for researchers, ranging from students to professional scientists, in the field of the design of complex oxide thin films and heterostructures. Participant outcomes will include understanding routes to predict, synthesize, control, and explain the functional properties of complex oxide heterostructures with a focus on theoretical approaches and synthetic methods. The tutorial will be divided into three presentations covering theoretical and experimental approaches. In each segment, the instructor will highlight how experiment and theory can work together to design targeted materials structure-property relationships in oxide heterostructures.

1:30 PM - 2:30 PM
Part I: James Rondinelli
Part I focuses on computational design oxide heterostructures by first principles approaches. It will include theoretical approaches for predicting and understanding ground state structures and properties in thin films and heterostructures. The main topics to be discussed include (1) basic chemistry and electronic structure of complex oxides, (2) structured-based design approaches for new functionality in oxide heterostructures, including strain engineering and polycrystalline control, (3) density functional theory methods for calculation the ground state of complex oxides under various mechanical constraints, and (4) open questions and new opportunities at oxide interfaces, including proximity effects, phononic coupling and gradients in order parameters.

2:30 PM - 3:00 PM BREAK

3:00 PM - 4:00 PM
Part II: Hans Christen
Part II provides a general introduction to pulsed-laser epitaxy, its successes and limitations and its future. From the perspective of complex-oxide research, pulsed-laser deposition has been crucial in advancing the field, with many of the key discoveries being enabled by this approach (high-temperature superconducting films, room-temperature multiferroics, 2D conductivity at perovskite interfaces). While pulsed-laser deposition is conceptually simple, the technique has seen significant advances in recent years; modern pulsed-laser deposition has been crucial in advancing the field, with many modifications needed for the growth of oxides and the history of its use in oxide synthesis. The relative advantages and disadvantages of MBE compared to other oxide growth techniques will be discussed. The latter half will provide a forward-looking perspective on emerging opportunities based on oxide MBE, including in situ characterization techniques that can be integrated with MBE, the growth of complex oxides beyond ABO3 perovskites, growth of superlattice structures with more than two constituent materials, and post-growth approaches for expanding the array of epitaxial oxides that can be realized.

Instructors
Hans Christen, Oak Ridge National Laboratory
Steven May, Drexel University
James Rondinelli, Northwestern University

SESSION MD3.1: Functional Defects and Strain
Session Chair: Elke Arenholz
Tuesday Afternoon, March 29, 2016
PCC West, 100 Level, Room 101 C

1:30 PM *MD3.1.01
Elemental Defect Induced Phase Transitions in Epitaxial Oxide Thin Films
Woo Seok Choi, Sungkyunkwan University, Korea (the Republic of).

2:00 PM MD3.1.02
Revisiting the Strong Coupling of Strain and Oxygen Stoichiometry in Superconducting La1-xSrxCuo4 Films
Tricia Meyer, Oak Ridge National Laboratory, United States.

2:15 PM MD3.1.03
Interfacial Strain in Oxide Lateral Heterostructures and Vertical Nanocomposites
Aiping Chen, Los Alamos National Lab, United States.

2:30 PM BREAK

3:00 PM *MD3.1.04
Elucidating the Role of Oxygen Vacancies, Cation Intermixing and Nanostructuring in Oxide Interfaces Using Theory and Computations
Panchapakesan Ganesh, Oak Ridge National Laboratory, United States.

3:30 PM *MD3.1.05
Cognitive Devices Based on Ion Currents in Oxide Thin Films
Stuart S. Parkin1, 2; 1Max Planck Institute for Microstructure Physics, Germany; 2IBM Research - Almaden, United States.

SESSION MD3.2: Functionality on the Nanoscale
Session Chair: Woo Seok Choi
Tuesday Afternoon, March 29, 2016
PCC West, 100 Level, Room 101 C

4:00 PM - 5:00 PM
Part III: Steven May
Part III covers experimental design of oxide heterostructures by molecular beam epitaxy (MBE). Molecular beam epitaxy is one of the most powerful synthesis techniques for growing oxide heterostructures, due to the high degree of crystalline quality and monolayer precision it enables, and the wide variety of chemistries and crystal structures that can be realized. This segment will begin by describing the basic principles of molecular beam epitaxy, the modifications needed for the growth of oxides and the history of its use in oxide synthesis. The relative advantages and disadvantages of MBE compared to other oxide growth techniques will be discussed. The latter half will provide a forward-looking perspective on emerging opportunities based on oxide MBE, including in situ characterization techniques that can be integrated with MBE, the growth of complex oxides beyond ABO3 perovskites, growth of superlattice structures with more than two constituent materials, and post-growth approaches for expanding the array of epitaxial oxides that can be realized.

Instructors
Hans Christen, Oak Ridge National Laboratory
Steven May, Drexel University
James Rondinelli, Northwestern University

SESSION MD3.2.01
Massive Band Gap Variation in Layered Oxide Heterostructures by Atomic Scale Design
James M. Rondinelli, Northwestern University, United States.

4:30 PM MD3.2.02
Nanophases in Complex Oxides
Elke Arenholz1, 2; 1Lawrence Berkeley National Lab, United States; 2UC Berkeley, United States.
SESSION MD3.3: Poster Session I
Session Chairs: Ho-Nyung Lee and Yayoi Takamura
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

MD3.3.01
Enhanced Controllability of Two-Dimensional Electron Gas Carrier Density Formed in Monolayer LaTiO$_3$ on SrTiO$_3$ 
Hyunkeum Yoo$^{1,2}$; $^{1}$Lawrence Berkeley National Laboratory, United States; $^{2}$Institute for Basic Science, Korea (the Republic of).

MD3.3.02
Epitaxial Stabilization of Pure S-Phase BiFeO$_3$
Anke Sander; Unite Mixte de Physique CNRS/Thales, France.

MD3.3.03
Atomic Layer Deposition of Epitaxial $\text{K}_{x}\text{Na}_{1-x}\text{NbO}_3$
Henrik H. Soenstebj; University of Oslo, Norway.

MD3.3.04
Nanoscale Mechanical and Electronic Properties of Morphotropic Phase Boundaries in Highly Strained BiFeO$_3$
Yoon Hee; UNSW, Australia.

MD3.3.05
Characterizing the $\gamma$-Al$_2$O$_3$/SrTiO$_3$ Interface Sirong Lu; Arizona State University, United States.

MD3.3.06
Characterization of Ferroelectric BaTiO$_3$/SrTiO$_3$ Heterostructure Using Aberration-Corrected STEM HanWei Wu; Arizona State University, United States.

MD3.3.07
Morphotropic Phase Elasticity of Strained BiFeO$_3$
Pankai K. Sharma; The University of New South Wales, Australia.

MD3.3.08
The Nature of Co Doped Ferroelectric BaTiO$_3$
Patrick Ponath; University of Texas at Austin, United States.

MD3.3.09
Tunneling Spectroscopy in Electric Dipole Engineered Oxide Heterostructures Hisashi Inoue; Stanford University, United States.

MD3.3.10
Towards Two-Dimensional Oxides for Optoelectronic Applications Jonathan C. Rackham; Imperial College London, United Kingdom.

MD3.3.11
Quantitative Analysis of the Local Ferroelectric-Paraelectric Phase Transitions Induced by Laser Heating Anton V. Ievlev; Oak Ridge National Laboratory, United States.

MD3.3.12
Polarization Effects on the Interfacial Conductivity in the LaAlO$_3$/SrTiO$_3$ Heterostructure: First-Principles Study Maziar Behtash; UC San Diego, United States.

MD3.3.13
Backscattered Scanning Electron Microscopy Domain Imaging of Ferroelectric Films David A. Seryngueur; Sandia National Labs, United States.

MD3.3.14
Thermodynamic Equilibrium States of 2DEGs at Oxide Interfaces Felix Gunkel$^{1,2}$; $^{1}$RWTH Aachen University, Germany; $^{2}$FZ Jülich, Germany.

MD3.3.15
Two-Dimensional Electron Gas Driven by Strain-Induced Polarization in Nonpolar AHI$_3$/SrTiO$_3$ (001) (A=Ca, Sr, and Ba) Heterostructure: First-Principles Analysis Jiunli Cheng; University of California, San Diego, United States.

SESSION MD3.4: Interfaces in Oxide Heterostructures
Session Chairs: Steven May and Jayakanth Ravichandran
Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 101 C

MD3.4.01
Confining d Electrons in (001)-, (110)-, and (111)- Oriented Complex Oxide Heterostructures Zhicheng Zhong; Max Planck Solid State Research, Germany.

MD3.4.02
Optical Switching of Resistivity in Oxide Heterostructures Hosting 2D Electron Gases Fabio Miletto Granozio; CNR-SPIN UOS Napoli, Italy.

MD3.4.03
Beyond GaAs: Room-Temperature Intersubband Absorption in SrTiO$_3$/LaAlO$_3$ Multiple Quantum Wells John E. Ortmann; University of Texas at Austin, United States.

MD3.4.04
Creating Two-Dimensional Electron Gas in Nonpolar/Nonpolar Oxide Interface via Polarization Discontinuity: First-principles Analysis of CaZro3/SrTiO3 Heterostructure Kesong Yang; University of California-San Diego, United States.

MD3.4.05
Electronic and Magnetic Properties of Epitaxial Ca$_{x}$Sr$_{y}$Mn$_{1}$O$_{3}$ Films Steven May; Drexel University, United States.

MD3.4.06
Magnetic Interactions in Oxide Heterostructures and at Nonmagnetic Oxide Surfaces Michael Coey; Trinity College Dublin, Ireland.

MD3.4.07
Polar Boundary Conditions at the Anatase TiO$_2$/LaAlO$_3$ Interface Harold Y. Hwang$^{1,2}$; $^{1}$Stanford University, United States; $^{2}$SLAC, United States.

MD3.4.08
Strain-Induced Metal-Insulator Transitions in d$^1$ and d$^2$ Perovskite Transition Metal Oxides within DFT+DMFT Claude Ederer; ETH Zurich, Switzerland.

MD3.4.09
Electronic and Magnetic Properties of Epitaxial Ca$_{x}$Sr$_{y}$Mn$_{1}$O$_{3}$ Films Steven May; Drexel University, United States.

MD3.4.10
Ferroelectric Modulation of Two-dimensional Electron Gas Conductivity at Oxide Interfaces Wenxiong Zhou$^{1,2}$; $^{1}$National University of Singapore, Singapore; $^{2}$National University of Singapore, Singapore.

SESSION MD3.5: Oxide Electrocatalysts I
Session Chair: Bilge Yildiz
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 101 C

MD3.5.01
Rational Design Strategies for Oxide Oxygen Electro catalysts Wesley T. Hong; Massachusetts Institute of Technology, United States.

MD3.5.02
Pulsed Laser Epitaxy of VO$_2$(B) and TiO$_2$(B) Thin Films and Heterostructures Shinbuhm Lee; Oak Ridge National Laboratory, United States.
2:15 PM MD3.5.03
Stabilization of Catalytically-active Ultrathin Fe (II) Oxide Films on
Perovskites by Heteroepitaxy Matteo Monti; Stanford University, United
States.

2:30 PM *MD3.5.04
Electrocatlysis at Complex Oxide Interfaces Nenad M. Markovic; Argonne
National Laboratory, United States.

3:00 PM BREAK

SESSION MD3.6: Oxide Electrocatlysts II
Session Chair: Dillon Fong
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 101 C

3:30 PM *MD3.6.01
Improved Chemical and Electrochemical Stability on Perovskite Oxides
by Oxidizing Cations at the Surface Bilge Yildiz; Massachusetts Institute of
Technology, United States.

4:00 PM *MD3.6.02
Spontaneous Polarization and Anomalous Photovoltaic Effect Induced
in Oxide Heterointerfaces Masao Nakamura; RIKEN Center for Emergent
Matter Science, Japan.

4:30 PM MD3.6.03
Crystallographic Orientation Dependent Oxygen Electrocatlysis in
Epitaxial La$_{2-x}$Sr$_x$CuO$_{4+\delta}$ Thin Films Dongkyu Lee1,2; 1Oak Ridge National
Laboratory, United States; 2Massachusetts Institute of Technology, United
States.

4:45 PM MD3.6.04
Interfacial Control of Oxygen Vacancy Doping and Electrical Conduction
in Thin Film Oxide Heterostructures Jeffrey A. Eastman; Argonne National
Laboratory, United States.

MD3.7.01
Strain Control Manipulation of Charge Transfer Induced Metal Insulator
Transition via V-Valins in VO$_x$A-B Composite Films-Evidence for
Primary Role of Dimerization Amar Srivastava; National University of
Singapore, Singapore.

MD3.7.02
Thickness Dependence of Exchange Coupling in (111)-Oriented Perovskite
Oxide Superlattices Yue Jia; University of California, Davis, United States.

MD3.7.03
Epitaxial Synthesis of BaBiO$_3$ Heterostructures by Using Buffer Layers
Han Gyeol Lee1,2; 1Center for Correlated Electron Systems, Korea (the
Republic of); 2Seoul National University, Korea (the Republic of).

MD3.7.04
Influence of the Local Oxygen Vacancy Concentration on the
Piezoresponse of Strontium Titanate Thin Films Felix Gunkel1,2; 1RWTH
Aachen University, Germany; 2FZ Jülich, Germany.

MD3.7.05
Correlated Metals as Transparent Conductors Lei Zhang1,2; 1Pennsylvania
State University, United States; 2Pennsylvania State University, United States.

MD3.7.06
Probing Electronic Structure and Polarization in SrTiO$_3$:LaCrO$_3$
Superlattices Using X-Ray Absorption and X-Ray Photoemission
Spectroscopies Steven R. Spurgeon; Pacific Northwest Nat’l Lab, United
States.

MD3.7.07
Modulate Resistance State by Controlling the Reentrance of
Antiferromagnetic Insulator Phase in Manganite Films Feng Jin; University
of Science and Technology of China, China.

MD3.7.08
Enhanced Conductivity and Metal-Insulator Transitions of Ultrathin
CaRuO$_3$ Films in Superlattices Haoran Xu; University of Science and
Technology of China, China.

MD3.7.09
Controlled Growth and Designed Epitaxial Multiferroic Oxide
Heterostructures Yanxi Li; Virginia Tech, United States.

MD3.7.10
Integration of Multifunctional Epitaxial Oxide Heterostructures with III-V
Semiconductors Md Shafiquir Rahman; Texas State University, United States.

MD3.7.11
In-Situ X-Ray Studies of LaGaO$_3$ Epitaxial Thin Film Synthesis Matthew
Highland; Argonne National Laboratory, United States.

MD3.7.12
Big Data in Materials Science: Physics from Imaging, and Changing
Materials Paradigms Rama K. Vasudevan; Oak Ridge National Laboratory,
United States.

MD3.7.13
Origin of Magnetic Correlation between La$_2$Sr$_x$MnO$_4$ and La$_2$Sr$_x$CoO$_4$
Layers in Artificial Heterostructures J.P. Byers1,2; 1University of California-
Davis, United States; 2Pacific Northwest National Laboratory, United States.

MD3.7.14
Ferroelectric Control of Interfacial Magnetism Studied by Polarized
Neutron Reflectivity Andreas Herlotz; Oak Ridge National Laboratory, United
States.

MD3.7.15
Direct In Situ Observation of Local Oxygen Migration during Resistance
Switching in Tantalum Oxide Memristors Suharn Kumar1,2; 1Hewlett Packard
Labs, United States; 2Stanford University, United States.

MD3.7.16
Characterizing Atomic Scale Ordering and Antiphase Domains in Double
Perovskite Thin Films Using Scanning Transmission Electron Microscopy
and Simulation Bryan D. Esler; The Ohio State University, United States.

MD3.7.17
Electron-Doped Manganite Films as Channels in Ferroelectric Mott
Transistors Anke Sander; Unité Mixte de Physique CNRS/Thales, France.

SESSION MD3.8: Magnetism in 3D and 5D Heterostructures
Session Chair: Gertjan Koster
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 101 C

8:00 AM *MD3.8.01
Engineering Correlated Dirac Electrons in SrIrO$_3$/SrTiO$_3$ Superlattice+
Hidekori Takagi1,2; 1Max Planck Institute for Solid State Research, Germany;
2University of Tokyo, Japan; 3University of Stuttgart, Germany.

8:30 AM MD3.8.02
Metastable Honeycomb SrTiO$_3$/SrIrO$_3$ Heterostructures Trevor Anderson;
University of Wisconsin-Madison, United States.

8:45 AM MD3.8.03
Emerging Ferromagnetism in (SrMnO$_3$)$_x$(SrIrO$_3$)$_{1-x}$ Heterostructures John
Nichols; Oak Ridge National Laboratory, United States.

9:00 AM *MD3.8.04
Electric-Field Control Of Magnetic Order Just Above Room Temperature
Agnes Barthelemy; Unite Mixte de Physique CNRS/THALES, France.

9:30 AM MD3.8.05
Hybridization-Controlled Charge Transfer and Induced Magnetism at
Correlated Oxide Interfaces Mathieu Grisolia; CNRS/Thales, France.
SESSION MD3.9: Symmetry and Interfacial Engineering
Session Chair: Kesong Yang
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 101 C

10:15 AM MD3.9.01
Control of Interfacial Magnetism via Structurally Induced Symmetry Mismatch in Complex Oxide Superlattices Arturas Vailionis; Stanford University, United States.

10:30 AM MD3.9.02
Tuning Magnetic Anisotropy by Interfacially Engineering the Oxygen Coordination Environment in a Transition-Metal Oxide Danise Kan; ICR Kyoto University, Japan.

10:45 AM MD3.9.03
Structural and Electronic Reconstructions in TiO$_2$(B)/VO$_2$(B) Heterostructures Xiang Gao; Oak Ridge National Laboratory, United States.

11:00 AM MD3.9.04
Nanostructured Complex Oxides as a Route towards Thermal Behavior in Artificial Spin Ice Systems Rajesh V. Chopdekar; University of California, Davis, United States.

11:15 AM MD3.9.05
Tailoring Spin Textures in Complex Oxide Microstructures Michael S. Lee; University of California, Davis, United States.

11:30 AM *MD3.9.06
Long Range Symmetry Propagation Initiated at Heterostructure Interfaces Guus Rijnders; University of Twente, Netherlands.

SESSION MD3.10: Topological Phases in Complex Oxides
Session Chair: John Nichols
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 101 C

1:30 PM *MD3.10.01
Exotic Mott and Interacting Topological Phases by Lattice Engineering Jak Chakhalian; University of Arkansas, United States.

2:00 PM *MD3.10.02
Suppression of Three-Dimensional Charge Density Wave Via Thickness Control Taewon Noh*; 1; Center for Correlated Electron Systems, Institute for Basic Science, Korea (the Republic of); 2Seoul National University, Korea (the Republic of).

2:30 PM MD3.10.03
Metastable Pseudocubic BaBiO$_2$, Epitaxial Thin Films David T. Harris; University of Wisconsin-Madison, United States.

2:45 PM BREAK

SESSION MD3.11: Advanced Characterization of Functional Oxides
Session Chair: Arturas Vailionis
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 101 C

3:15 PM *MD3.11.01
Aberration-Corrected TEM Imaging and Spectroscopy as a Tool to Understand the Origin of Emergent Phenomena at Oxide Interfaces Nicolas Gauquelin; EMAT, University of Antwerp, Belgium.

3:45 PM MD3.11.02
Chiral Polar Vortex Arrays in Titanate Superlattices Padraic Shafer; Lawrence Berkeley National Lab, United States.

4:00 PM MD3.11.03
Advanced Metrology of Epitaxial Oxide Thin Films on a Laboratory X-Ray Diffraction System Michael F. Hawkridge; PANalytical, United States.

4:15 PM MD3.11.04
Multiscale Characterization of Chemical Ordering and Extended Defects in the Double Perovskite Oxide La$_2$MnNiO$_6$ Steven R. Spurgeon; Pacific Northwest National Laboratory, United States.

4:30 PM *MD3.11.05
Resonant Inelastic X-Ray Scattering on Oxide Heterostructures Thorsten Schmidt; Paul Scherrer Institut, Switzerland.

SESSION MD3.12: Epitaxial Design of Oxides
Session Chair: Beatriz Noheda
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 101 C

8:00 AM *MD3.12.01
Surface Structures and Epitaxial Growth of SrTiO$_3$(110) Michele Riva; Inst. of Applied Physics, TU Wien, Austria.

8:30 AM MD3.12.02
Synchrotron Studies on the Growth of Complex Oxides by Molecular Beam Epitaxy Dillon D. Fong; Argonne National Lab, United States.

8:45 AM MD3.12.03
Polar Vortex Arrays in Ferroelectric/Paraelectric Superlattices Christopher T. Nelson; University of California Berkeley, United States.

9:00 AM *MD3.12.04
Solution-Based Lego Block-Like Approach to Functional Oxide Heterostructures Using 2D Nanosheets Takayoshi Sasaki; National Institute for Materials Science, Japan.

9:30 AM MD3.12.05
High-Mobility BaSnO$_3$, Using Oxide Molecular Beam Epitaxy Santosh Raghavan; University of California-S Barbara, United States.

9:45 AM MD3.12.06
High-Temperature Superconductivity in La$_2$CuO$_4$ Induced by Space-Charge Effects Giuliano Gregori; Max Planck Institute for Solid State Research, Germany.

10:00 AM BREAK

SESSION MD3.13: Devices and Applications
Session Chair: Ulrike Diebold
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 101 C

10:30 AM *MD3.13.01
“Vertical” Heterostructures by Defect Self-Assembly Beatriz Noheda; University of Groningen, Netherlands.

11:00 AM MD3.13.02
Tailoring Self-Polarization of BaTiO$_3$, Thin Films by Interface Engineering and Flexoelectric Effect Kun Gao*; 1; National University of Singapore, Singapore; 2National University of Singapore, Singapore.

11:15 AM MD3.13.03
Barrier Engineering of Ferroelectric Tunneling Junctions Lingfei Wang*; 1; 2Seoul National University, Korea (the Republic of); 3Center for Correlated Electron Systems, Korea (the Republic of).

11:30 AM MD3.13.04
Negative Capacitance is a General Phenomenon in Ferroelectrics Asif Khan; UC Berkeley, United States.

11:45 AM MD3.13.05
Non-Fermi Liquid Behavior and Resistivity Saturation in Rare Earth Nickelate Thin Films Evgeny Mikheev; University of California, Santa Barbara, United States.
This tutorial will introduce the properties of phase-change materials relevant to applications in memory and neuromorphic devices. Part I will discuss the structure-property correlations, including the structural origin of the optical and electronic contrast between the crystalline and amorphous state. Part II will focus on theoretical and computational tools to investigate phase-change materials. In particular, it will review recent \textit{ab initio} simulations, which have greatly helped to rationalize the structure-property relationship in these materials. Part III will concentrate on experimental methods and discuss recent progress made to optimize the structural, electronic and kinetic properties of phase-change materials.

8:30 AM – 9:45 AM
Part I: Bart Jan Kooi
Part I is an overview of the intimate link between structures and properties of phase-change materials, with the main focus on (1) the differences between amorphous and crystalline phases generating optical and electrical contrast and (2) the extraordinary crystallization kinetics of phase-change materials. Properties will be reviewed mainly with respect to applications in phase-change random access memories, with attention to scaling, data retention and endurance. This segment will demonstrate that memory performance is not only strongly dependent on phase-change material composition, but that for the same phase-change material; it can clearly vary for differently processed memories. Prospective applications of phase-change materials beyond binary data storage will be discussed.

10:15 AM - 11:30 AM
Part II: Jean-Yves Raty
Part II focuses on \textit{ab initio} simulation techniques and describe how these methods can yield realistic models of phase-change materials. Various quantities that can be obtained from such simulations will be reviewed; these include bonding strength and structural, electronic, optical and dynamical quantities. There will be a discussion of how these quantities can shed light on technologically important features of phase-change materials, such as the optical and electronic contrast between the crystalline and amorphous phase, the stability and the ageing mechanisms of the glass, as well as its crystallization properties at high temperature.

11:30 AM – 1:30 PM BREAK

1:30 PM - 2:45 PM
Part III: Raffaella Calarco
The third section will review recently developed experimental methods for the realization and growth of crystalline phase change materials and for the optimization of their properties. In addition, it will focus on chalcogenide superlattices and describe a) their peculiar structural and electronic properties and b) various potential applications, ranging from interfacial phase-change memories to novel device concepts based on the topological insulator properties of these superlattices.

Instructors
Bart Jan Kooi, University of Groningen
Jean-Yves Raty, University of Liège
Raffaella Calarco, Paul-Drude-Institut für Festkörperelektronik
MD4.3.01
Electromigration Behaviors of Ge$_x$Sb$_y$Te$_z$ Chalcogenide Srtips under Pulse Bias Yen-Hsien Huang; National Chiao Tung University, Taiwan.

MD4.3.02
Synthesis of Single-Crystalline Chalcogenide Nanowire by Vapor-Liquid-Solid Process Chi-Wei Yeh; National Chiao Tung University, Taiwan.

MD4.3.03
Nucleation in Confined High Aspect Ratio Thin Films James P. Mastandrea; 1; Lawrence Berkeley National Laboratory, United States; 2University of California, Berkeley, United States.

MD4.3.04
Properties of Metal Contacts on Vanadium Dioxide Thin Films and Nanowires Bo Hsu; University of Illinois-Chicago, United States.

MD4.3.05
THz Spectroscopy Study and THz Applications of Interfacing Phase Change Memory Material Yuta Saito; 1; AIST, Japan; 2CREST-JST, Japan.

MD4.3.06
Phase Transitions in Complex Oxide Thin Films with Elemental Vacancies Sang A Lee; 1; Sungkyunkwan University, Korea (the Republic of); 2Sungkyunkwan University, Korea (the Republic of).

MD4.3.07
Comparison of Vanadium Oxide Thin Films Prepared Using Femtosecond and Nanosecond Pulsed Laser Deposition Ying Deng; 1; Missouri State University, United States; 2US Photonics Inc, United States.

MD4.3.08
Optical, Electronic, and Thermal Stability of Bulk ST12 Ge Haidong Zhang; Geophysical Laboratory, Carnegie Institution of Washington, United States.

MD4.3.09
A Zero Density Change Phase Change Memory Material: GeTe-O Structural Characteristics upon Crystallisation Xin Zhou; Singapore University of Technology and Design, Singapore.

SESSION MD4.4: Crystallization Kinetics
Session Chair: Riccardo Mazzarello
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

8:15 AM *MD4.4.01
The Kinetic Fragility of Phase-Change Chalcogenide Liquids A. Lindsay Greer; 1; University of Cambridge, United Kingdom; 2Tohoku University, Japan.

8:45 AM MD4.4.02
A Fragile-to-Strong Liquid Transition in Ge$_x$Te$_{1-x}$ and Phenomenological Analogy between Phase-Change Materials and Water Shuai Wei; 1; 2Arizona State University, United States; 2University of Arizona, United States.

9:00 AM MD4.4.03
Control of the Crystallization Mechanism of Phase Change Materials Pierre Nuc; CEA-LETI Minatec Campus, France.

9:15 AM *MD4.4.04
Glass Formation and Crystallization Dynamics of Phase-Change Materials Probed by Time Resolved X-Ray Scattering and Optical Reflectance Peter Zalden; 1; SLAC National Accelerator Laboratory, United States; 2CUI Center for Ultrafast Imaging, Germany.

9:45 AM BREAK

SESSION MD4.5: Resistance Drift, Switching and Failure
Session Chair: Huai-Yu Cheng
Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 102 C

10:15 AM *MD4.5.01
I-V Drift in Phase-Change Memory Devices Abu Sebastian; IBM Research - Zurich, Switzerland.

10:45 AM MD4.5.02
A Systematic Study on Electrical Switching Characteristics of InSbTe Phase Change Material for Multi-Bit Data Storage Anbarasu Manivannan; 1; 2Indian Institute of Technology Indore, India; 2Indian Institute of Technology Indore, India.

11:00 AM MD4.5.03
In situ TEM Study of Electrical Wind Force-Driven Amorphization in Phase-Change Materials Sung-Wook Nam; 1; 2Institute for Basic Science (IBS), Korea (the Republic of); 2University of Pennsylvania, United States.

11:15 AM *MD4.5.04
Migration of Elements in Phase Change Memory (PCM) Luca Ceppi; Politecnico di Milano, Piazza L. Da Vinci, Italy.

SESSION MD4.6: Devices
Session Chair: Anbarasu Manivannan
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 102 C

1:30 PM *MD4.6.01
Materials Engineering for Phase Change Memory Huai-Yu Cheng; 1; 2IBM/ Macronix PCRAM Joint Project, United States; 3Macronix International Co Ltd, United States.

2:00 PM MD4.6.02
Imaging of Phase Change Materials below a Capping Layer Using Correlative Infrared Near-Field Microscopy and Electron Microscopy Martin Lewin; RWTH Aachen University, Germany.

2:15 PM *MD4.6.03
Phase-Change Memory-Based Crossbar Arrays for Non-Von Neumann Computing Prithish Narayanan and Geoffrey W. Burg; IBM Research - Almaden, United States.

2:45 PM BREAK

SESSION MD4.7: Novel Materials
Session Chair: Bart Kooi
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 102 C

3:15 PM MD4.7.01
MOCVD Self-Assembly of Ultra-Thin In-Sb-Te Nanowires for Scaled Phase Change Memories Massimo Longo; IMM-CNR, Italy.

3:30 PM MD4.7.02
Au-Catalyzed Ordered Synthesis and Characterization of In-Ge-Te Nanowires by MOCVD Raimondo Cecchini; Laboratorio MDM, IMM-CNR, Unità di Agrate Brianza, Italy.

3:45 PM MD4.7.03
Performance Improvement on In$_3$Sb$_2$Te$_2$ Phase-Change Material by Bi Doping with Vacancy and Distortion Minho Choi; Hanyang University, Korea (the Republic of).

4:00 PM MD4.7.04
Role of Photostriction in Tailoring the Photoinduced Phase-Change in Amorphous Selenium Nano-Structures Sivakumar Gayathri; Indian Institute of Science, India.
SESSION MD4.8: Superlattice Materials
Session Chairs: Paul Fons and Yuta Saito
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 102 C

8:30 AM *MD4.8.01
Sub-Picosecond and Sub-Nanometer Resolution Measurements of Atomic Motion during Electronic Excitation in Epitaxial Ge$_2$Sb$_2$Te$_5$ ☐ Paul Fons$^4$, ☐ Bart J. Koop, University of Groningen, Netherlands.

9:00 AM MD4.8.02
Atomic Stacking and Van-der-Waals Bonding in GeSbTe Superlattices ☐ Bart J. Koop, University of Groningen, Netherlands.

9:15 AM MD4.8.03
Molecular Beam Epitaxy and Characterization of GeSbTe/Sb$_2$Te$_3$ Superlattices ☐ Stefano Cecchi, Paul-Drude-Institut für Festkörperelektronik, Germany.

9:30 AM MD4.8.04
The Raman Spectrum and Analysis of Phonon Modes in GeSbTe Based Alloys and Superlattices ☐ Eugenio Zallo, Paul-Drude-Institut für Festkörperelektronik, Germany.

SESSION MD4.9: Photonics
Session Chair: Robert Simpson
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 102 C

1:30 PM *MD4.9.01
Switchable Infrared Nanophotonic Elements Enabled by Phase-Change Materials ☐ Thomas Taubner, RWTH Aachen University, Germany.

2:00 PM MD4.9.02
Achievement of an Ultrafast Beam Steering through Gradient Au-Gc2Sb2Te5 -Au Plasmonic Resonators ☐ Fun Cao, Dalian University of Technology, China.

10:15 AM MD4.8.05
The Role of Intrinsic Vacancies in Chalcogenide Phase-Change Materials ☐ Zhimei Sun, Beihang University, China.

10:45 AM MD4.8.06
Growth of High-Quality Chalcogenide Superlattice Film and Feasibility Study for Novel Electronic Device ☐ Yuta Saito$^{1,2}$, ☐ AIST, Japan; ☐ CREST, JST, Japan.

11:00 AM MD4.8.07
Atomic Stacking and Van-der-Waals Bonding in GeSbTe Superlattices ☐ Bart J. Koop, University of Groningen, Netherlands.

11:15 AM MD4.8.08
Molecular Beam Epitaxy and Characterization of GeSbTe/Sb$_2$Te$_3$ Superlattices ☐ Stefano Cecchi, Paul-Drude-Institut für Festkörperelektronik, Germany.

11:30 AM MD4.8.09
The Raman Spectrum and Analysis of Phonon Modes in GeSbTe Based Alloys and Superlattices ☐ Eugenio Zallo, Paul-Drude-Institut für Festkörperelektronik, Germany.

SESSION MD4.10: Emerging Applications
Session Chair: Thomas Taubner
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 102 C

3:15 PM *MD4.10.01
Novel Displays, Smart Windows and Other Optoelectronics Using Phase Change Materials ☐ Harish Bhaskaran$^{1,2}$, ☐ University of Oxford, United Kingdom; ☐ Bodle Technologies Limited, United Kingdom.

3:45 PM MD4.10.02
Low Resistivity Phase Change Materials for High Performance RF Switches ☐ Matt King$^{1,2}$, ☐ Northrop Grumman Electronic Systems, United States; ☐ North Carolina State University, United States.

4:00 PM MD4.10.03
Impact of Pre-Metallization Surface Preparation and Metallurgical Reactions on Ohmic Contacts to Germanium Telluride ☐ Haila M. Aldosari$^{1,2}$, ☐ Pennsylvania State University, United States; ☐ Materials Research Institute, United States.

4:15 PM MD4.10.04
Thermal Tuning of Colors Generated by Ultrathin Phase-Change Films on Metal Mirrors ☐ Gokhan Bakan$^{1,2}$, ☐ Bilkent University, Turkey; ☐ Antalya International University, Turkey.

4:30 PM MD4.10.05
Magnetic Phase Change Materials: A Screened Exchange Hybrid Functional Study ☐ Huanglong Li, Tsinghua University, China.

SESSION MD4.11: Field-Induced Effects
Session Chair: Matthias Wuttig
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 102 C

8:30 AM *MD4.11.01
Field Induced Transformation in Solid State Memory and Beyond ☐ Victor Karpov, University of Toledo, United States.

9:00 AM MD4.11.02
Occupation of Defect States in Amorphous Phase Change Materials - Relevance for the Inter-Trap Distance in Conduction Models ☐ Matthias E. Kaes, RWTH Aachen University, Germany.

9:15 AM *MD4.11.03
Low Bias Resistance of Crystalline and Amorphous Phase Change Materials: Application to GeTe ☐ M.P. Anantram, University of Washington, United States.

9:30 AM MD4.11.04
Thermal Tuning of Colors Generated by Ultrathin Phase-Change Films on Metal Mirrors ☐ Gokhan Bakan$^{1,2}$, ☐ Bilkent University, Turkey; ☐ Antalya International University, Turkey.

4:30 PM MD4.10.05
Magnetic Phase Change Materials: A Screened Exchange Hybrid Functional Study ☐ Huanglong Li, Tsinghua University, China.
Invited Paper

Organic and Transparent Photovoltaics

Energy Level Control in Organic Salts for Efficient, Deep Near-Infrared Photovoltaics

Hossein Hashemi; University of Michigan, United States.


Kentucky, United States.

Performance of Organic Solar Cells

Jean-Luc Bredas; KAUST, Saudi Arabia.

Impact of Polymer/Fullerene Intermolecular Interactions on the Efficiency of Organic Solar Cells

Chad Risko; University of Massachusetts Amherst, United States.

Modification of Scaffold Layer Surfaces for Preventing from Hysteresis in Perovskite Solar Cell

Mahmut Kus; Selcuk University, Turkey.

Electronic Tuning of 4,10-dibromoanthanthrone for n-Type Materials

Robert R. Johnson; North Carolina State University, United States.

Modification of Scaffold Layer Surfaces for Preventing from Hysteresis in Perovskite Solar Cell

Alexander Tsegaye; KAUST, Saudi Arabia.

Visualization of Distributed Charge Density in Polycrystalline Pentacene Thin Films by Gate-Modulation Imaging

Satoshi Matsuoka1, 2; 1University of Tsukuba, Japan; 2AIST, Japan.

SESSION MD5.2: Poster Session I
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

Lacunary Polyoxometalates as Effective Electron Conducting Layers for Improving Efficiency in Organic Optoelectronics

Yasemin Tosal; Selcuk University, Advanced Technology Research and Application Center, Turkey.


Martin Presselt1, 2; 1Friedrich Schiller University Jena, Germany; 2Leibniz Institute of Photonic Technology, Germany.

Self-Assembling Amphiphilic Dyes and Tuning of Photonic Properties via Morphology Control

Lacunary Polyoxometalates as Effective Electron Conducting Layers for Improving Efficiency in Organic Optoelectronics

Yasemin Tosal; Selcuk University, Advanced Technology Research and Application Center, Turkey.


Martin Presselt1, 2; 1Friedrich Schiller University Jena, Germany; 2Leibniz Institute of Photonic Technology, Germany.

Low Dimensional Polypyrrole Structures and Their Carbonized Analogues as Sensitive Materials for Chemical Gas Sensors

Dusan Kopecky; University of South Bohemia, Czech Republic.

Fabrication of Chiral Organic Semiconductor Nanowires and Their Use in Circularly Polarized Light Detection

Xiaobo Shang; Pohang University of Science and Technology, Korea (the Republic of).

Control of Pi-Conjugation in Diketopyrrolopyrrole-Based Copolymer Thin Films for High-Performance Organic Transistor

Mi Jang; Inha University, Korea (the Republic of).

Band-Like Transport in Disordered Organic Molecular Semiconductors

Subhasis Ghosh; Jawaharlal Nehru University, New Delhi, India.

Selecting Donor Pairs for Parallel-Like Bulkheterojunction Organic Solar Cells

Mary A. Kelly; University of North Carolina-Chapel Hill, United States.

Characterization of n-Type Nitrogen-Doped Single-Walled Carbon Nanotubes Synthesized by Defluorination-Assisted Nanotube-Substitution Reaction

Koji Yokoyama; Tohoku University, Japan.

Electronic Tuning of 4,10-dibromoanthanthrone for n-Type Materials

Robert R. Johnson; North Carolina State University, United States.

Modification of Scaffold Layer Surfaces for Preventing from Hysteresis in Perovskite Solar Cell

Mahmut Kus; Selcuk University, Turkey.

Visualization of Distributed Charge Density in Polycrystalline Pentacene Thin Films by Gate-Modulation Imaging

Satoshi Matsuoka1, 2; 1University of Tsukuba, Japan; 2AIST, Japan.
Three-Dimensionally Stacked Microscale Organic Nonvolatile Memory by Orthogonal Photolithography. Deokyoung Yoo; Seoul National University, Korea (the Republic of).


Tuning Doping Type and Concentration in the Active Layer of Organic Photovoltaic Devices Using Contacts. Jim Wang; University of Texas-Dallas, United States.

What Could be the Highest Hopping Mobility in Organic Thin Film Transistor. Varsha Rani; Jawaharlal Nehru University, India.

Characterization of Dye: PCBM Bulk Heterojunction Solar Cells. Anshu Sharma; 1University of Rajasthan, India; 2University of Rajasthan, India.

Effect of Thermal Annealing on Donant Site Choice in Conjugated Polymers. Jun Li; University of California-Davis, United States.

Introducing Solubility Control for Improved Organic P-Type Dopants. Jun Li; University of California, Davis, United States.

Extended Small Molecules for High-Efficiency BHJ Solar Cells. Philipp Wucher; KAUST, Saudi Arabia.

The Influence of Bulk Doping on Trap States, Charge Transport and Recombination in Organic Bulk Heterojunction Solar Cells. Zhengrong Shang; Stanford University, United States.

The Role of Structural Order in p-Type Doping of P3HT. Lars Mueller; 1TU Braunschweig, Germany; 2Heidelberg University, Germany; 3InnovationLab GmbH, Germany.

Excellent Gate Bias Stress Stability of Fluorinated Dielectric-Based Organic Field-Effect Transistors. Minjung Lee; Inha University, Korea (the Republic of).

High Field-Effect Mobility and Bias Stress Stability of a Fused Dithienobenzothiadiazole-tetrathiophene Based Semiconducting Copolymer. Mingyuan Pei; Inha University, Korea (the Republic of).

A Flexible and Transparent Sensor Array Based on Robust Organic Field-Effect Transistors. Cheol Hee Park; Pohang University of Science and Technology, Korea (the Republic of).

Advanced Computational Techniques to Model Absorption Spectra Including Vibrational Progression. Julia Preiss; Friedrich-Schiller-University Jena, Germany.


Gate-Modulation Imaging of Organic Thin-Film Transistor Arrays. Jun'ya Tsutsui; AIST, Japan.

Synthesis and Characterization of Donor-Acceptor Type Copolymers Based on Thiénylenevinylene for Organic Electronics. Yeong-A Kim; Gwangju Institute of Science and Technology (GIST), Korea (the Republic of).

Highly Efficient Blue Fluorescent Organic Light Emitting Diode Based on Intramolecular Charge-Transfer Emitter Using Azasilin Core. Jin Won Sun; Seoul National University, Korea (the Republic of).

Structure Formation in Organic Photovoltaic Blends. Xiaoyuan Sheng; 1University of Cambridge, United Kingdom; 2Adolphe Merkle Institute, Switzerland.


Effects of Moleculer Weight and Annealing Conditions on P3HT Interlayers for Enhancing the Performance of P3HT:PCBM Solar Cells. Sona Avetian; The University of Arizona, United States.

Comparison of Photo-Degradation in P3HT and Deuterium Substituted P3HT-Based Polymer Cells. Satvik Shah; Iowa State University, United States.

Polymer: Fullerene Bulk Heterojunction Solar Cells: Vertical Stratification and Device Performance. Tao Wang; Wuhan University of Technology, China.

Mulitlayer Substituted Polystyrene Dielectrics Used to Decrease Bias Stress and Control Turn-On Voltages in Organic Field Effect Transistors. Olivia Alley; Johns Hopkins University, United States.

Organic Micro-Electro-Mechanical (MEM) Relay Technology for Ultralow-Power Flexible Low-Cost Large-Area Electronics. Yanbiao Pan; Rutgers, The State University of New Jersey, United States.

Effects of Donor/Acceptor Interfacial Energectics on Carrier Behavior in Organic Photovoltaics Investigated by Impedance Spectroscopy. Toshinori Mavuni; 1The University of Tokyo, Japan; 2RIKEN, Japan.

Solution Processable Carbon Nanoelectrodes for Single-Molecule Investigations. Jingyuan Zhu; 1Queen Mary, University of London, United Kingdom; 2University of London, United Kingdom.

π-Extended Narrow-Bandgap Oligomers for Solution-Processed Organic Solar Cells. Hideaki Komiyama; 1Kyushu University, Japan; 2Kyushu University, Japan.

Thickness Resolved In Situ Studies of Organic Heterojunction Effect in Pentacene/C60 Heterostructured Organic Thin Film Transistors. Jongboum Kim; Soongsil University, Korea (the Republic of).

Aggregate Formation on Spectroscopic Properties of the Interface-Active Amphiphilic Fullerene Derivative PEG-C60: From Solutions to Thin Films. Sanaak K. Das; 1Institute of Physical Chemistry (IPHT) Jena, Germany; 2Leibniz Institute of Photonic Technology (IPHT) Jena, Germany; 3University of Jena, Germany.

Enhanced Thermoelectric Properties of poly(3,4-ethylenedioxiythiophene): poly(styrene sulfonate) by Binary Secondary Dopants. Chao Yi; University of Akron, United States.
MD5.2.47
Effect of Energy Gap and Purity in Energetic Cascade Layer at D/A Interface on Organic Photovoltaic Performance Kvohei Nakano; RIKEN, Japan.

MD5.2.48
Thermal Resistances of Thin Films of Small-Molecule Organic Semiconductors Yulong Yao; University of Kentucky, United States.

MD5.2.49
Electron Injection and Transport in Phosphorescent Organic Light-Emitting Diode: The Role of Dope Molecule Jun-Hoow Lee; Graduate Institute of Photonics and Optoelectronics and Department of Electrical Engineering, National Taiwan University, Taiwan R. O. C., Taiwan.

SESSION MD5.3: Morphology and Thin-Film Interfaces I
Session Chairs: Aram Amassian, Stefan Mannsfeld, Lee Richter and Garry Rumbles
Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 102 AB

8:00 AM MD5.3.01
Solution-Printed High Performance Organic Field Effect Transistors by Controlled Crystallization Muhammad R. Niazi; Cornell University, United States.

8:15 AM MD5.3.02
Molecular Basis for Alignment in Solution Coated Conjugated Polymer Thin Films Ying Diao; University of Illinois at Urbana-Champaign, United States.

8:30 AM *MD5.3.03
What Happens at a Moving Drying Line: A Hartman-Perdok View of Coating Detlef M. Smilgies; Cornell University, United States.

9:00 AM *MD5.3.04
High Performance Morphologies in Solution-Sheared Films of Organic Semiconductors and Conductors Stefan C. Mannsfeld; Center of Advancing Electronics Dresden, Germany.

9:30 AM BREAK

10:00 AM *MD5.3.05
In Situ Studies of Opv Film Formation: Accelerating the Transition from Lab to Synchrotron to Fab Lee Richter; NIST, United States.

10:30 AM MD5.3.06
Optimizing OPV Morphology: Is a Reappraisal of the Mixed Domains Yet Again Needed Harald Ade; NC State University, United States.

10:45 AM MD5.3.07
Structure-Property Relationships in Bulk Hetero Junction Solar Cells: Efficiency Enhancement by Exploring New Electron Transport Interlayers Dirk J. Vanderzande1, 2; 1University of Hasselt, Belgium; 2IMEC, Belgium.

11:00 AM MD5.3.08
Influence of Donor Crystallinity on the Charge Transfer State Energy and the Open Circuit Voltage in Organic Solar Cells Guy Olivier Njengang Ndiea; King Abdullah University of S&T, Saudi Arabia.

11:15 AM MD5.3.09
Characterizing and Controlling Compositional Gradients in OPV Devices with up to 10.7 % Average Efficiency Joshua H. Carpenter; North Carolina State University, United States.

11:30 AM *MD5.3.10
The Principles of Manipulating the Phase Transformations and Solid-State Order of Organic Semiconductors for Manipulation of Their Photophysical Properties Natalie Stingelin; Imperial College London, United Kingdom.

SESSION MD5.4: Morphology and Thin-Film Interfaces II
Session Chairs: Barry Rand and Chad Risko
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 102 AB

1:30 PM *MD5.4.01
Fullerene Mixtures for FETs and Polymer Solar Cells Christian Muller; Chalmers University of Technology, Sweden.

2:00 PM MD5.4.02
Extraction of Intrinsic Charge Carrier Mobility in Organic Semiconductors by the Gated Van Der Pauw Method Cedric Rolin; IMEC, Belgium.

2:15 PM MD5.4.03
Vertical Charge Transport in a High Mobility Polymer Organic Semiconductor with Application in High Speed Rectification Stuart G. Higgins; University of Cambridge, United Kingdom.

2:30 PM MD5.4.04
Edge-Nucleation Driven Hetero-Quasicrystal Growth of Organic-Multilayer Films Pei Chien; Michigan State University, United States.

2:45 PM MD5.4.05
Energetic Trapping States of Mixed-Isomer Organic Semiconductors within Organic Field-Effect Transistors Peter Diemer; Wake Forest University, United States.

3:00 PM BREAK

3:15 PM MD5.5.01
Antioxidants Increase the Photooxidation Stability of Organic Photovoltaic Polymers and Blends Michael Salvador; Friedrich-Alexander University Erlangen Nuremberg, Germany.

3:30 PM *MD5.5.02
Controlled Nucleation and Growth of Single Crystal Organic Semiconductor Films on Arbitrary Substrates Paul Heremans1, 2; 1IMEC, Belgium; 2University of Leuven, Belgium.

4:00 PM MD5.5.03
Understanding Electron-Induced Instability of p-Type Field-Effect Transistors fabricated from Low Band-Gap Donor-Acceptor Polymers Hung Pham; University of California-Santa Barbara, United States.

4:15 PM MD5.5.04
Charge Transfer States in Dilute-Donor/Acceptor Blend Organic Heterojunctions Xiao Liu; University of Michigan, United States.

4:30 PM *MD5.5.05
Defect Studies of Light Soaked Organic Bulk Heterojunctions Robert Street; Palo Alto Research Ctr, United States.

SESSION MD5.6: Poster Session II
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

MD5.6.01

MD5.6.02
Oxygen-Permeation-Controlled Metal Electrodes for Stable Organic Solar Cells Hansol Lee; POSTECH, Korea (the Republic of).
MD5.6.03
Charge Formation and Recombination in a Low Disorder, Low Energy Loss Polymer Fullerene Blend S. Matthew Menke; University of Cambridge, United Kingdom.

MD5.6.04
Development of Solution-Processable Electron-Accepting Indigos for High Performance Fullerene-Free Organic Photodiodes Xin Li; Centre for Organic Photonics & Electronics, Australia.

MD5.6.05
Novel Ferroelectric Buffering Mechanism with Polymer Ultra-Thin Layer to Boost the Transport of Fe-OFET Devices Yi Shi1, 2, Nanjing University, China; 1Nanjing University, China.

MD5.6.06
The Role of Solvent Evaporation Dynamics in Meniscus-Guided Coating Techniques for High-Performance, Single-Crystalline Organic Thin-Film Transistors Robby Janneck1, 2; 1IMEC, Belgium; 2‘KU Leuven, Belgium.

MD5.6.07
New Vacuum-Deposited D-A-A Small Molecule Donors for Organic Photovoltaics with High Open Circuit Voltage Xiaozhou Che; University of Michigan, United States.

MD5.6.08
A Mechanistic Study of the Photodegradation of poly(3-hexylthiophene-2,5-diyl) and poly(3,5-didodecyl-cyclopenta[2,1-b;3,4-b']dithiophene-4-one) Logan P. Sanow; South Dakota State University, United States.

MD5.6.09
Chemical-Vapor-Deposited Polythiophene Thin Films and Organic Thin Film Transistor Applications Sungwhan Lee; Baylor University, United States.

MD5.6.10
Effect of Chiral Ethylhexyl Side Chains on the Chiroptical Properties of PCPDTBT and PCDTPY Stephanie Frank; University of California-S Barbara, United States.

MD5.6.11
Quantitative Evaluation of Inhomogeneous Device Operation in Thin Film Solar Cells by Luminescence Imaging Harald Hoppe; Friedrich-Schiller-University Jena, Germany.

MD5.6.12
Growth of Dark Spots by Pinholes in Metal Electrodes of Organic Photovoltaic Cells Daniel Fluh; 1, 2, Freidrich Schiller University, Germany; 1Freidrich Schiller University, Germany.

MD5.6.13
Revealing the Full Charge Transfer State Absorption Spectrum from Optical Polarization Anisotropy of Oriented CT States in Bilayer Organic Solar Cells Xin Yan; The Pennsylvania State University, United States.

MD5.6.14
Effects of Hole-Transport Layer Homogeneity in Organic Solar Cells – A Multi-Length Scale Study Huei-Tung Chien; Institute of Solid State Physics, Graz University of Technology, Austria.

MD5.6.15
Effect of Annealing Temperature on Out-of-Plane Mobility and Structure of MEH-PPV Film Daisuke Kajiya; Hiroshima University, Japan.

MD5.6.16
All-atom Molecular Dynamics Studies of the Link between Processing, Structure and Charge Transport in Polymer: Fullerene Based Solar Cells Sai Vineth Bobbili; Cornell University, United States.

MD5.6.17
The Role of Counter-Ions in the Processing of poly(3,4-ethylenedioxythiophene) (PEDOT) Liangqi Ouyang; Linkoping University, Sweden.

MD5.6.18
The Effect of Molecular Dipole Moment on the Electrical Properties of Molecular Rectifiers Zach Lampert; Wake Forest University, United States.

MD5.6.19
Determination of Surface Defect States in Organic Diode Structure Performing Capacitance-Voltage Measurements Sunil Kumar; 1Indian Institute of Technology Kanpur, India; 2‘Indian Institute of Technology Kanpur, India, India.

MD5.6.20
Core-Shell Structured Organic Nanofibers for Flexible Photovoltaic Applications Min Kim; Pohang University of Science and Technology, Korea (the Republic of).

MD5.6.21
Stretchable and Transparent Semiconducting Layer for Flexible Organic Transistors Eunjoo Song; POSTECH, Korea (the Republic of).

MD5.6.22
Environmentally Processible New Organic Semiconducting Materials Yun-Hi Kim; Gyeongsang National University, Korea (the Republic of).

MD5.6.23
The Interface Morphology Study in the Polymer/Fullerene Based Devices Yufeng Hu; Beijing Jiaotong University, China.

MD5.6.24
Electron Microanalysis of Polypyrrole Structures Synthesized under Different Condition Jaksa Korenca; University of Chemistry and Technology, Prague, Czech Republic.

MD5.6.25
Rethinking Coal: Thin Films of Solution Processed Natural Carbon Nanoparticles for Electronic Devices Nicola Ferralis; MIT, United States.

MD5.6.26
Investigating Thermally Dependent Morphological Changes in Films Used in Organic Light-Emitting Diodes Using Neutron Reflectometry Jake A. McEwan; The University of Queensland, Australia.

MD5.6.27
Synthesis of Polybenzoquinolines as Graphene Nanoribbon Precursors David J. Dibble; University of California, Irvine, United States.

MD5.6.28
Electrospinning of Highly Rigid Conjugated Polymer Nanofibers Ziqi Liang; Fudan University, China.

MD5.6.29
Novel Palladium-Based Excimer for Efficient and Stable Single-Doped White OLEDs Liang Huang; Arizona State University, United States.

MD5.6.30
A Novel Synthesis Strategy for Dissolving Alternating Conjugated Copolymers in Nonchlorinated Solvents Using an Asymmetric Monomer Eun Seo Ahn; Gyeongsang National University, Korea (the Republic of).

MD5.6.31
Optimization of Solution Process Conditions of the Al2O3 Gate Insulators for Organic Thin-Film Transistor Park Fang-Kyu; Sungkyunkwan University, Korea (the Republic of).

MD5.6.32
Reproducible Performance of Crystallization Controlled Tips-Pentacene Based TFT with Hybrid Insulator Dong-Hoon Lee; Sungkyunkwan University, Korea (the Republic of).

MD5.6.33
Host Matrix Dependence of Thermally-Activated Delayed Fluorescence Emitter Photophysics Benjamin L. Cotts; University of California-Berkeley, United States.

MD5.6.34
Doped PEDOT Nanoreceptor for Subnanomolar Fe(III) Detection Rajen K. Dutta; University of California, Irvine, United States.

MD5.6.35
Correlating Aggregation of Semiconducting Polymers in Solution with Resulting Solid State Morphology Kathryn A. O’Hara; University of California Santa Barbara, United States.
SESSION MD5.7: Device Physics/Charge Transport II
Session Chairs: Mamatimin Abbas, Howard Katz, Vitaly Podzorov and Barry Rand
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 102 AB

8:00 AM *MD5.7.01
Liquid Crystalline Molecular Donors in High Performance OPV Devices
David J. Jones; University of Melbourne, Australia.

8:30 AM MD5.7.02
Carrier-Selective Contact Limit on the Recombination Dynamics of Organic Photovoltaics Using Ferroelectric Blend Interlayer
Kilwon Cho; Pohang University of Science and Technology, Korea (the Republic of).

8:45 AM *MD5.7.03
Consequences of Extreme Levels of Order on Organic Solar Cell Function
Barry P. Rand; Princeton University, United States.

9:15 AM *MD5.7.04
Novel Hall Effect Measurement Technique with a Drastically Improved Sensitivity for OFETs
Vitaly Podzorov; Rutgers University, United States.

9:45 AM BREAK

10:15 AM *MD5.7.05
Third Generation Organic Blend Semiconductors for High Mobility Thin-Film Transistor Applications
Thomas D. Anthopoulos; Imperial College London, United Kingdom.

10:45 AM MD5.7.06
Towards Highly Stable Polymer Electronics
Mark Nikolka; University of Cambridge, United Kingdom.

11:00 AM *MD5.7.07
Charge Transport in Conjugated Polymers: Effect of Microstructure from the Nanoscale to the Mesoscale
Albeto Salleo; Stanford University, United States.

11:30 AM *MD5.7.08
Organic Field Effect Transistors for Charge Transport Study in Organic Photovoltaics
Mamatimin Abbas; CNRS, Université de Bordeaux, Lab. IMS, UMR 5218, France.

SESSION MD5.8: Design and Synthesis of Organic Semiconductors
Session Chairs: Alejandro L. Briseno, Iain McCulloch, Dmitrii Perepichka and Oezlem Usluer
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 102 AB

1:30 PM *MD5.8.01
Tuning Conjugated Polymer Properties by Post-Polymerization Modification
Martin Heeney; Imperial College London, United Kingdom.

2:00 PM *MD5.8.02
Electron-Deficient Thiocymenes for Electronic Materials
Kazuo Takimiya; RIKEN Center for Emergent Matter Science (CEMS), Japan.

2:30 PM MD5.8.03
New Insights into Alkyl Substitution Patterns for Photoactive Polymers
Christian Nielsen; Imperial College, United Kingdom.

2:45 PM MD5.8.04
How Fluorine Substituents Impact Polymer and BHJ Solar Cell Efficiencies
Pierre Beaunieux; KAUST, Saudi Arabia.

3:00 PM BREAK

3:30 PM MD5.8.05
Synthesis and Self-Assembly Properties of Alternated Multi-Block Copolymers for Third Generation Organic Photovoltaic
Andrea Gasperini; EPFL SB ISIC LIMNO, Switzerland.
SESSION MD5.9: Thin-Film Devices and Materials I
Session Chairs: Mamatimin Abbas, Michael Chabinyc, Mahmut Kus and Vitaly Podzorov
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 102 AB

8:00 AM MD5.9.01
Synthesis of Photo-Active Inks: Towards Eco-Friendly Fully Printed Organic Solar Cells Laurie Parrenin1,2, 1LCPO, France; 2CNRS, France; 1University of Bordeaux, France.

8:15 AM MD5.9.02
UV Light Activation of the n-Doping of a Low Electron Affinity Organic Semiconductor with Air-Stable Organometallics Xin Lin; Princeton University, United States.

8:30 AM *MD5.9.03
Organic-Inorganic Hybrid Interfaces for New Generation Organic and Perovskite Solar Cells Mahmut Kus; Selcuk University, Turkey.

9:00 AM *MD5.9.04
Doping Semiconducting Polymers for Thermoelectrics Michael L. Chabinyc; University of California-S Barbara, United States.

9:30 AM BREAK

10:00 AM *MD5.9.05
Donor-Acceptor Charge Transfer Complexes: From Fundamentals to Applications Oana D. Jurchescu; Wake Forest University, United States.

10:30 AM *MD5.9.06
Interfacial Control of Charge Carrier Density and Transport in Organic Electronics and Thermoelectrics Howard E. Katz; Johns Hopkins University, United States.

11:00 AM *MD5.9.07
Microwave Absorption of Free Carriers in Doped Conjugated Polymer Films Gary Rumbles1; 1National Renewable Energy Laboratory, United States; 2University of Colorado, United States.

11:30 AM MD5.9.08
Probing the Molecular Structure of Doped Sites within Crystals by Pyroelectricity and Dispersion Corrected DFT Modeling Elena Meirzadeh; Weizmann Institute of Science, Israel.

11:45 AM MD5.9.09
Process-Structure-Property Relationships in Fast-Coated, Nanostructured Polymer Semiconductors for Large-Area Electronics Mario Cairoli; Istituto Italiano di Tecnologia, Italy.

SESSION MD5.10: Thin-Film Devices and Materials II
Session Chairs: Mahmut Kus, Christian Muller and Jianhui Wu
Friday Afternoon, April 1, 2016
PCC West, 100 Level, Room 102 AB

1:30 PM MD5.10.01
Synthesis and Characterization of New PEDOT:Polyanion Systems Anna Hofmann; University Bordeaux, France.

1:45 PM MD5.10.02
Using Alternating Electric Fields to Tune the Molecular Structure and Electrical Properties of Solution-Based Large-Area Organic Semiconductor Thin Films Francisco Molina-Lopez; Stanford University, United States.

2:00 PM MD5.10.03
Tuning the Electronic and Structural Properties of Terpolymers for Transistors and Photovoltaic Cells Kirsty Leong; Sandia National Labs, United States.

2:15 PM MD5.10.04
Fluxional Pi-Electronics: Attenuated Aromaticities and Spins in Organic Electronic Materials John D. Tozwar; Johns Hopkins University, United States.

2:30 PM MD5.10.05
Mechanical Properties of Organic Semiconductors for Mechanically Stable and Intrinsically Stretchable Devices Darren J. Lipomi; University of California-San Diego, United States.

2:45 PM MD5.10.06
Ultra-Flexible Organic Amplifier System using Pseudo-CMOS Circuits for a Wireless Biosignal Detection Takafumi Uemura1,2; 1ISIR, Osaka University, Japan; 2Graduate School of Engineering, Osaka University, Japan.

3:00 PM BREAK

3:15 PM MD5.10.07
Photoactive C,N,P Carbon Phosphonitride Semiconductor Brian L. Chalvey; U.S. Naval Research Laboratory, United States.

3:30 PM MD5.10.08
The Dependence of the Lifetime of Organic Photovoltaic Cells on Morphology and Molecular Stability Quinn C. Burlingame; University of Michigan, United States.

3:45 PM MD5.10.09
Ultra-Thin Parlylene Gate Insulator for Low-Voltage-Operating Organic Transistor Circuits Masaya Kondo1,2; 1The Institute of Scientific and Industrial Research, Osaka University, Japan; 2Osaka University, Japan.

4:00 PM MD5.10.10
Direct Observation of Bound Multielectron States in Organic Semiconductor Films and Their >100% Charge Transfer Efficiency Chaw Keong Yong; University of Cambridge, United Kingdom.

4:15 PM MD5.10.11
Time-and-Temperature-Independent Local Carrier Mobility and Effects of Regioregularity in Polymer-Fullerene Organic Semiconductors Meng-ju Slee; Stanford University, United States.

4:30 PM MD5.10.12
Assessing Stability of High Performance Organic Solar Cells Ronprong Cheacharoen; Stanford University, United States.

4:45 PM MD5.10.13
Novel Functional Conjugated Polymers Derived from a Common Set of Enediyne Building Blocks Yang Qin; University of New Mexico, United States.
SESSION MD6.2: Materials for e-Textile
Session Chairs: Beatrice Fraboni and Esma Ismailova
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 105 A

1:30 PM *MD6.2.01
Recent Progress of Printable Elastic Conductors for E-Textile Takao Someya; University of Tokyo, Japan.

2:00 PM MD6.2.02
Silver Nanowire Coatings for Electrically Conductive Textile Irene Goldthorpe; University of Waterloo, Canada.

2:15 PM MD6.2.03
Ink-Jet Printed Silver Nanowires as Stretchable Conductor Le Cai; Michigan State University, United States.

2:30 PM BREAK

3:00 PM *MD6.2.04
Dynamic Strain Sensing Behavior of Fabric Sensors Coated with Carbon Elastomeric Composites Xiaoming Tao; The Hong Kong Polytechnic University, Hong Kong.

3:30 PM MD6.2.05
Physical and Optical Performance of Electroluminescent Fibers in Knitted Textiles Alyssa Bellingham; Drexel University, United States.

3:45 PM MD6.2.06
Hybridizing Millimeter Long Carbon Nanotubes with Electrospun Fabrics for High Performance Electrically Conductive Textiles Ozkan Yildiz; North Carolina State University, United States.

4:00 PM MD6.2.07
Wearable All-Solid Photovoltaic Textile Jun Chen; Georgia Institute of Technology, United States.

4:15 PM MD6.2.08
Boosting the Speed of Printed and Direct-Written Polymer and Hybrid Transistors for High Performance Wearable Electronics Mario Caironi; Istituto Italiano di Tecnologia, Italy.

SESSION MD6.3: Poster Session: e-Textile Devices
Session Chairs: Esma Ismailova and Seiichi Takamatsu
Wednesday Afternoon, March 30, 2016
Sheraton, Third Level, Phoenix Ballroom

1:30 PM *MD6.3.01
A Wearable Electro-Chemical Sensor for the Detection of Redox-Active Biomolecules Beatrice Fraboni; University of Bologna, Italy.

1:45 PM MD6.3.02
Electroadhesive Fibers for Biocompatible and Conformal Electronics Thien-An N. Nguyen; The University of Texas at Austin, United States.

2:00 PM MD6.3.03
Biaxially Stretchable Transparent Conductors Based on Designed Nanowire Networks Sang-Soo Lee; Korea Institute of Science and Technology, Korea (the Republic of).

2:15 PM MD6.3.04
Wearable Textile Biosensors for Cardiac Disease Detection Vikramshankar Kamakoti; University of Texas-Dallas, United States.

2:30 PM MD6.3.05
Ni-Ti-Cu Wire Bending Actuation Analysis at Low Frequencies for Smart Fabric Applications Jamie L. Kennedy; Drexel University, United States.

2:45 PM MD6.3.06
Integrated Flexible Thermal and Humidity Sensors for Real Time Wound Healing Monitoring C.C.K.W. Chan; Faculte de Medecine-Aix Marseille Universite (Neurosciences), France; 

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper
SESSION MD6.4: Processing Technology for e-Textile
Session Chairs: Beatrice Fraboni and Seiichi Takamatsu
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 105 A

9:00 AM *MD6.4.01
E-Textile Manufacturing Approach at the Intersection of Design and Engineering Genevieve Dion1, 2, 7; 1Drexel University, United States; 2Drexel University, United States; 7Drexel University, United States.

9:30 AM MD6.4.02
Fully Printed Electrodes on Textiles for Healthcare Monitoring Eloise Bihar1, 2; 1Ecole des Mines de Saint Etienne, France; 2Microvitae, France.

9:45 AM MD6.4.03
Solution-Phase Deposition of Metallic Copper on Cellulose Fibers and Their Processing into Conductive Paper or Mats Rupali Deshmukh; ETH Zurich, Switzerland.

10:00 AM BREAK

10:30 AM *MD6.4.04
Power Storage on Electrical Fibers for Wearables Jayan Thomas; University of Central Florida, United States.

11:00 AM MD6.4.05
An Electroactive Fabric With Programmable Shape, Flexibility and Surface Area Mark Ransley; University College London, United Kingdom.

11:15 AM MD6.4.06
3D Composite Fibers of Reduced Graphene Oxide and Layered Molybdenum Disulfide Nanosheets as Electrode Material for Flexible Cable Capacitors Anup K. Roy; University of Sydney, Australia.

11:30 AM MD6.4.07
Dielectric/Semiconductor Coaxial Electronic Fiber for Weavable, Fibriform Organic Field-Effect Transistors Jung Ah Lim; Korea Institute of Science and Technology (KIST), Korea (the Republic of).

11:45 AM MD6.4.08
1-Dimensional Fiber-Embedded Metal-Oxide Field-Effect Transistors Using Low-Temperature Photoactivation for Electronic Textiles Jae Sang Heo; Chung-Ang University, Korea (the Republic of).

SESSION MD6.5: e-Textile Application
Session Chairs: Esma Ismailova and Davide Vigano
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 105 A

1:30 PM *MD6.5.01
A Textile Platform for Body Monitoring Annalisa Bonfiglio; University of Cagliari, Italy.

2:00 PM MD6.5.02
An Electrotextiles-Based Sensorized Glove for Wearable Robotics and Rehabilitation Massimo Totaro; Istituto Italiano di Tecnologia, Italy.

2:15 PM MD6.5.03
Wearable Textile Organic Electrochemical Biosensors Monitoring Human Psycho-Physical Condition Nicola Coppede; Italian National Research Council, Italy.

2:30 PM BREAK

3:00 PM *MD6.5.04
New Electrochromic Flexible Textile Display Vladan Koncar; University of Lille Nord de France, France.

3:30 PM MD6.5.05
Human and Environment Influences on Thermoelectric Energy Harvesting toward Self-Powered Textile-Integrated Wearable Devices Amanda Myers; North Carolina State University, Raleigh, United States.
SYMPOSIUM MD7
Advances in Lanthanide Materials for Imaging, Sensing, Optoelectronics and Recovery/Recycling
March 30 - March 31, 2016

Chairs
Paola Deplano, University of Cagliari
Hongshan He, Eastern Illinois University
Nobuhiko Iki, Tohoku University
Xingqiang Lv, Northwest University

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

SESSION MD7.1: Synthesis, Sensing and Imaging I
Session Chair: Hongshan He
Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 106 A

8:30 AM *MD7.1.01
Nanosopic Lanthanide-Containing Clusters: Exploratory Synthesis and Materials Properties
Zhiping Zheng; University of Arizona, United States.

9:00 AM MD7.1.02
Hyperspectral Imaging of Single Upconversion Nanocrystals within Individual Cavities of a Gold Micro-Cavity Array
Paul S. May; University of South Dakota, United States.

9:15 AM MD7.1.03
Toward Highly Luminous Lanthanide-Organic Polymers for LED Applications
Jennifer Weimmerskirch-Aubatin; CIMAP, NIMPH CNRS/CEA/ENSICAEN/UCBN, France.

9:30 AM MD7.1.04
Resolving the Ambiguity in the Relation between Stokes Shift and Huang-Rhys Parameter
Mathis de Jong; Utrecht University, Netherlands.

9:45 AM BREAK

10:15 AM *MD7.1.05
Multi-Functional Lanthanide Systems for Biological Applications: Imaging and Inhibition of Tumor
Rick W.K. Wong; Hong Kong Baptist University, China.

10:45 AM MD7.1.06
Cathodoluminescence-Activated Imaging by Resonance Energy Transfer (CLAIRE): Using Ultra-Thin Films of Cerium-Doped Yttrium Aluminum Perovskite for Nanoscale Imaging
Connor G. Bischak; University of California, Berkeley, United States.

11:00 AM MD7.1.07
Exfoliation of Lanthanum Hexaboride Using Solution-Based Methods
Roshini Ramachandran; University of Georgia, United States.

11:15 AM *MD7.1.08
On the Optical and Magnetic Properties of Ln3+ Based Nanoparticles
Frank Van Veghel; University of Victoria, Canada.

SESSION MD7.2: Synthesis, Sensing and Imaging II
Session Chairs: Hongshan He and Zhiping Zheng
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 106 A

1:30 PM *MD7.2.01
Counterintuitive Design of Lanthanide-Doped Upconverting Nanocrystals for Single Particle Imaging
Bruce F. Cohen; Lawrence Berkeley National Lab, United States.

2:00 PM MD7.2.02
Potential for Lanthanide-Based Tetrakis Smart Sensor Materials
William A. Hollerman; University of Louisiana-Lafayette, United States.

2:15 PM MD7.2.03
Fabrication of Pixelated Gd2O2S:Tb Scintillator on Flexible Substrate for X-Ray Imaging Detectors
Son Sinul; Kookmin University, Korea (the Republic of).

2:30 PM MD7.2.04
Carbon Monoxide Gas Sensing Performance of Monodisperse CeO2 Microspheres
Edgar R. Lopez-Mena; Tecnologico de Monterrey, Mexico.

2:45 PM BREAK

3:15 PM *MD7.2.05
Thermochromism, the Alexandrite Effect and Other Fascinating Properties of 4f/3d Materials
Thomas Albrecht-Schmitt; Florida State University, United States.

3:45 PM MD7.2.06
Rare-Earth Oxysulfate Hollow Nanospheres for Upconversion
Hongmei Luo; New Mexico State University, United States.

4:00 PM MD7.2.07
Analytical Study of the Thermal Activation of Tb3+ Doped Amorphous SiC:H Thin Films
Jorge A. Guerra; Pontificia Universidad Catolica del Peru, Peru; University of Erlangen-Nürnberg, Germany.

4:15 PM *MD7.2.08
Luminescent Nanothermometry: Nanothermometers and Nanoheaters Get Closer
Luis D. Carlos; Universidade de Aveiro, Portugal.

4:45 PM MD7.2.09
Explaining the Nanoscale Effect in the Upconversion Dynamics of β-NaYF3:Yb3+,Er3+ Core and Core/Shell Nanomaterials
Mary Berry; University of South Dakota, United States.

SESSION MD7.3: Poster Session: Synthesis, Sensing and Imaging
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

MD7.3.01
Lanthanide Selective Adsorption by Nd-Imprinted Polymer with Chelidonic Acid Monoamide Groups
Tomohito Ide; Corporate Research & Development Center, Toshiba Corporation, Japan.

MD7.3.02
Recyclable Photoluminescence Switcher Property of Eu(III) Doped CeO2 Nanorods Regulated by L+:+Ascorbic Acid and Hydrogen Peroxides
Wei Gao; City University of Hong Kong, Hong Kong; Xi'an Jiaotong University, China.

MD7.3.03
Ab Initio Study of the Lattice Dynamical, Electronic and Optical Properties of Double Perovskite La2HoErO6 Compound
Gokhan Surucu; Ab Initio Study of the Lattice Dynamical, Electronic and Optical Properties of Double Perovskite La2HoErO6 Compound
Gokhan Surucu; 1Ahi Evran University, Turkey; 2Gazi University, Turkey.

MD7.3.04
Infrared-to-Visible Light Upconversion in Er:Yb:SrFBr
Federico Rahuffetti; Wayne State University, United States.
MD7.3.05
Non-Linear Density Dependent Upconversion Luminescence Enhancement of β-NaYF₄: Yb³⁺: Er³⁺ Nanoparticles on Random Ag Nanowire Aggregates
Amy Hor; South Dakota School of Mines and Technology, United States.

MD7.3.06
White Light Emission through Partial Energy Transfer from Organic Molecules to Lanthanide Complexes in Gel Prashant Kumar; Indian Institute of Technology Madras, India.

SESSION MD7.4: Synthesis, Sensing and Imaging III
Session Chairs: P. Stanley May and Frank Van Veggel
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 106 A

8:30 AM *MD7.4.01
Lanthanide Luminescent Helicates for Detecting Biomarkers Jean-Claude G. Bunzli; EPFL, Switzerland.

9:00 AM MD7.4.02
Lanthanides-TTF Complexes: Single Molecule Magnet Behaviour and Luminescence Lahcene O. Ouahab; CNRS-University of Rennes1, France.

9:15 AM MD7.4.03
Thermochemistry of Rare Earth Perovskites Dawei Feng; University of California-Davis, United States.

9:30 AM MD7.4.04
Ternary Rare Earth Gd La₂O₃:Eu³⁺ Pigments for Phosphor-Based Thermometric Systems Salek Guillaume; ICMCB, France.

9:45 AM BREAK

10:15 AM *MD7.4.05
Magnetoluminescent Nanoparticles – Combining the Dual Power of Time-Resolved Luminescence and MRI Contrast Agents of Lanthanide Complexes Valerio C. Pierre; University of Minnesota, United States.

10:45 AM MD7.4.06
Electrochemical Recycling of Erbium Using Ionic Liquids Leo J. Small; Sandia National Laboratories, United States.

SESSION MD7.5: Synthesis, Sensing and Imaging IV
Session Chair: Xingqiang Lv
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 106 A

11:00 AM MD7.5.01
Lanthanide Time Resolved Luminescence: From Basics to Business David Tatum¹, ²; ¹University of California, United States; ²Lumiphore, Inc., United States.

11:15 AM *MD7.5.02
Design Rules for Multiple d-f Emission Bands in Lanthanides Mathijs de Jong; Utrecht University, Netherlands.

11:45 AM MD7.5.03
Functionalized BODIPY Dyes for Near-Infrared Emission of Lanthanide Ions Hongshan He; Eastern Illinois University, United States.

12:00 PM MD7.5.04
Kinetics and Mechanisms of Synthesis and Shell-Growth for Upconversion Nanomaterials Paul S. May; University of South Dakota, United States.
**SYMPOSIUM MD8**

Multiscale Behavior of Materials in Extreme Environments
March 29 - April 1, 2016

**Chairs**
David Andersson, Los Alamos National Laboratory
Gianguido Baldinozzi, Paris-Saclay University
Chaitanya S. Deo, Georgia Institute of Technology
Michael R. Tonks, Pennsylvania State University

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

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**SESSION MD8.1: Modeling Radiation Effects at Multiple Scales**
Session Chairs: Chaitanya S. Deo, Meimei Li and William Weber
Tuesday Afternoon, March 29, 2016
PCC West, 100 Level, Room 106 BC

1:30 PM *MD8.1.01
Coupling Lattice Kinetic Monte Carlo and Phase Field for Solute Precipitation in RPV Steels
Yongfeng Zhang; Idaho National Lab, United States.

2:00 PM MD8.1.02
Multiscale Material Model Development and Simulations for Accident Tolerant Fuels
Jiamou Yi; Idaho National Lab, United States.

2:15 PM *MD8.1.03
Phase-Field Modeling of Irradiation Induced Microstructures
David Simeone; CentraleSupelec, France.

2:45 PM MD8.1.04
Multiscale Approach to Predict the Ageing and Strengthening of Cu-Alloyed α-Iron Under Service Conditions
Siegfried Schmauder; Institute for Materials Testing, Materials Science and Strength of Materials (IMWF), University of Stuttgart, Germany.

3:00 PM BREAK

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**SESSION MD8.2: Metallic Systems I**
Session Chairs: Chaitanya S. Deo and Yongfeng Zhang
Tuesday Afternoon, March 29, 2016
PCC West, 100 Level, Room 106 BC

3:30 PM *MD8.2.01
Materials in Harsh Environments: Insights from Atomic Scale Simulations
Susan B. Sinnott; Pennsylvania State University, United States.

4:00 PM MD8.2.02
Simulation of the Nano-Indentation Response of Metallic Nano-Foams
Diana Farakas; Virginia Tech, United States.

4:15 PM MD8.2.03
Spall Response of Single and Nanocrystalline Tantalum at Extreme Strain-Rates
Eric N. Hahn; University of California San Diego, United States; Los Alamos National Laboratory, United States.

4:30 PM *MD8.2.04
Understanding Radiation Damage and Deformation Dynamics in Neutron-Irradiated Steels with High-Energy X-Rays
Meimei Li; Argonne National Lab, United States.

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Session Chairs: Gianguido Baldinozzi, Thibault Charpentier, Blas Pedro Ubureaga and Gary Was
Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 106 BC

8:30 AM *MD8.3.01/EE12.2.01/EE13.2.01
Ion Irradiation for Studying Multiscale Radiation Effects in Structural Materials and Fuels
Gary S. Was; University of Michigan, United States.

9:00 AM MD8.3.02/EE12.2.02/EE13.2.02
Radiation Induced Fission Gas Diffusion in UO₂
Michael W. Cooper; Los Alamos National Laboratory, United States.

9:15 AM MD8.3.03/EE12.2.03/EE13.2.03
Small Angle X-Ray Scattering Study of Helium Bubbles in Plutonium
Anthony W. Van Baaren; Lawrence Livermore National Lab, United States.

9:30 AM *MD8.3.04/EE12.2.04/EE13.2.04
He Bubble Structure Evolution and Effect on the Mechanical Properties of Metals Studied Using Novel Microscopy Techniques
Peter Hosemann; University of California-Berkeley, United States.

10:00 AM BREAK

10:30 AM *MD8.3.05/EE12.2.05/EE13.2.05
Radiation Damages in Nuclear Waste Glasses: An NMR Point of View
Thibault Charpentier; CEA, IRAMIS, NIMBE - UMR CEA-CNRS 3685, France.

11:00 AM MD8.3.06/EE12.2.06/EE13.2.06
Effects of Radiation Fields on Actinide-Containing Materials
Steven D. Conradson; Soleil, France.

11:15 AM MD8.3.07/EE12.2.07/EE13.2.07
How Well Can Electronic Structure Calculations Describe Uranium Dioxide Properties?
Marjorie Bertolus; CEA, DEN, France.

11:30 AM MD8.3.08/EE12.2.08/EE13.2.08
Development of a Multiscale Thermal Conductivity Model for Fission Gas in UO₂
Michael R. Tonks; Pennsylvania State University, United States.

11:45 AM MD8.3.09/EE12.2.09/EE13.2.09
Fission Gas Diffusion in UO₂ Nuclear Fuel by Extended Vacancy Cluster
David Andersson; Los Alamos National Laboratory, United States.

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**SESSION MD8.4: Materials in Extreme Environments**
Session Chairs: Donald Brown, Chaitanya S. Deo and Laurence Luneville
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 106 BC

1:30 PM *MD8.4.01
The ANSTO/SINAP Joint Research Centre for Thorium Molten Salt Reactors, a Practical Example of the Multiscale Behavior of Materials in Extreme Environments
Gordon J. Thorogood; ANSTO, Australia.

2:00 PM MD8.4.02
Effects of Electronic Energy Loss on Evolution of Radiation Damage in Ceramics
William J. Weber; University of Tennessee, United States; Oak Ridge National Laboratory, United States.

2:15 PM MD8.4.03
In-Service Enhancement of Nuclear Nanoceramics
Francisco Garcia Ferre; Istituto Italiano di Tecnologia, Italy.

2:30 PM *MD8.4.04
Uncleared Nuclear Materials Development
Karl R. Whittle; University of Liverpool, United Kingdom.

3:00 PM BREAK
3:30 PM *MD8.5.01
Polyonization in Nuclear Materials Thierry Wiss; European Commission - Joint Research Centre, Germany.

MD8.5.02
Evolution of Grain Morphology of Ceramic Nuclear Fuels under Simulated Operating Conditions Donald W. Brown; Los Alamos National Laboratory, United States.

4:00 PM *MD8.5.03
Influence of Chemical Disorder on Energy Dissipation and Defect Evolution in Advanced Alloys Yanwen Zhang; Oak Ridge National Laboratory, United States.

SESSION MD8.6: Poster Session
Session Chairs: David Andersson, Gianguido Baldinozzi, Chaitanya S. Deo and Michael R. Tonks
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

MD8.6.01
Determining the Effect of Temperature on the Threshold Energy of Displacement under Irradiation Amelia Tee Qiao Ying; Georgia Institute of Technology, United States.

MD8.6.02
Examination of Defect Behavior in BCC Metals Richard T. Hoffman; Georgia Institute of Technology, United States.

MD8.6.03
First Principles Study of the Structure and Elastic Properties of Thorium Metal and Thorium-Uranium Alloys Jacob Startt; Georgia Institute of Technology, United States.

MD8.6.04
Microstructural Evolution in Hot and Cold Rolled Ti-Nb Alloys Jacob Startt; Georgia Institute of Technology, United States.

MD8.6.05
Can Meta-Stable States in \textit{ab initio} Calculations of Uranium Compounds be Avoided Luis Casillas; University of Tennessee, United States.

MD8.6.06
Swift Heavy Ion Irradiation Induced Modifications in Defect Fluorite Gd,Ce,0, Containing Bixbyite Micro-Domain Maulik K. Patel; University of Tennessee Knoxville, United States.

MD8.6.07
Shear Melting and High Temperature Embrittlement: Theory and Application to Machining Titanium Graeme J. Ackland; University of Edinburgh, United Kingdom.

MD8.6.08
Temperature and Electron Energy Dependent Evolution of Dislocation Loops in Yttria Stabilized Zirconia AKM S. Bhuian1, 2; Kyushu University, Japan; 2Bangladesh Atomic Energy Commission, Bangladesh.

MD8.6.09
Grain Subdivision Fission Gas Swelling Model for UO, Thomas Winter; Georgia Institute of Technology, United States.

MD8.6.10
Fretting Wear at Elevated Temperatures for APMT Reactor Fuel Cladding Thomas Winter; Georgia Institute of Technology, United States.

MD8.6.11
Chemical Stability of Nanotwinned Cu Nanowires Chun-Lung Huang; National Tsing Hua University, Taiwan.

MD8.6.12
Evaluation and Control of Mechanical Degradation of SUS310S Substrate in Superconducting Wire Processing Seung gyu Kim; Seoul National University, Korea (the Republic of).

MD8.6.13
Xe Irradiation Induced Strain in Single Crystal YSZ Caitlin A. Taylor; University of Tennessee-Knoxville, United States.

MD8.6.14
Aqueous Degradation of Polyamide Membrane Materials in Halogenated Environments Logan Kearney; School of Materials Engineering - Purdue University, United States.

MD8.6.15
Interpretation of Molten zncl2 Raman Spectra Using Ab Initio Methods Abduljabar Alsavoud; University of Arizona, United States.

MD8.6.16
A New Molecular Dynamics Method for Ionic Transport, and Its Application to Study Atomic Scale Processes of TlBr Crystals under Electric Fields Xiao-wang Zhou; Sandia National Labs, United States.

SESSION MD8.7: Measuring Multiscale Effects
Session Chairs: Kurt Sickafus and Michael R. Tonks
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 106 BC

8:15 AM *MD8.7.01
Raman Scattering Methods for Extreme Conditions Patrick Simon; CEMHTI CNRS, France.

8:45 AM MD8.7.02
Simulation and Measurement of Thermal Conductivity in UO2 and MOX Michael W. Cooper; Los Alamos National Laboratory, United States.

9:00 AM MD8.7.03
Glancing-Incidence X-Ray Techniques for Film Analysis Gianguido Baldinozzi1, 2; Centralesupelec, CNRS, France; 2CEA, France.

9:15 AM MD8.7.04
Thermal Effects in 3 Phase Composites Containing MgAl2O4 + YSZ + AI2O3; An In Situ High Temperature XRD Study Maulik K. Patel; University of Tennessee, United States.

9:30 AM BREAK

SESSION MD8.8: Metallic Systems II
Session Chairs: Gianguido Baldinozzi and Par Olsson
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 106 BC

10:00 AM MD8.8.01
The Discrete-Continuum Connection in Dislocation Dynamics: Coarse Graining of Cross Slip and the Impact on Dislocation Patterning in fcc Crystals Shengxu Xia; University of Tennessee-Knoxville, United States.

10:15 AM MD8.8.02

10:30 AM MD8.8.03
Oxidation Resistant Tungsten Carbide Cermets Samuel A. Humphry-Baker; Imperial College London, United Kingdom.

10:45 AM MD8.8.04
Understanding the Role of Hydrogen on the Slip Transmission Behavior in \textit{\alpha}-Fe: Implications on Intergranular Failure Kiran Solanki; Arizona State University, United States.
11:00 AM MD8.8.05
Multiscale Modeling of Intergranular Fracture Due to Diffusion-Assisted Hydrogen Embrittlement Benjamín Gholami Bazehhour; Arizona State University, United States.

11:15 AM MD8.8.06
Accurate Description of Phase Transition in Sn in Terapascal Pressure Range with Quantum Monte Carlo Roman Nazarov; Lawrence Livermore National Lab, United States.

11:30 AM MD8.8.07
Discrete Dislocation Plasticity Modelling of High-Temperature Alloys Incorporating Diffusion along Particle/Matrix Interfaces Siamak SoleymaniShishvan; University of Cambridge, United Kingdom.

11:45 AM MD8.8.08
Signatures of Shock-Induced Phase Transitions in Local Structure Measurements Akhil Tayal; Soleil, France.

SESSION MD8.9: Metallic Systems III
Session Chairs: David Andersson, Vassilis Pontikis and Mitra Taheri
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 106 BC

1:30 PM *MD8.9.01
First Principles Based Study of Displacement Damage in bcc Metals Par Olsson; KTH Royal Institute of Technology, Sweden.

2:00 PM MD8.9.02
Mechanical Property Evolution of Ion-irradiated Candidate Structural Alloys for Gen-IV Nuclear Reactors Utilizing Small-scale Mechanical Testing Anya Prasitthipayong; University of California, Berkeley, United States.

2:15 PM MD8.9.03
Role of Local Crystallographic Texture on Splitting in Low Carbon Steel Abhijit Ghosh; Indian Institute of Technology Kharagpur, India.

2:30 PM MD8.9.04
Corrosion of Single-Phase Magnesium Aluminum Alloys Ashlee Wingersky; Arizona State University, United States.

2:45 PM MD8.9.05
High Temperature Oxidation Behavior of APM and APMT under Dry Air/Steam Condition KkochNim Oh; Georgia Institute of Technology, United States.

3:00 PM BREAK

SESSION MD8.10: Modeling Nanocrystals and Interfaces
Session Chairs: Kkoch Nim Oh, Michael R. Tonks and Ting Zhu
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 106 BC

3:30 PM *MD8.10.01
Probing the “Immunity” of Grain Boundaries under in situ Irradiation in Nanocrystalline Metals Mitra L. Taheri; Drexel University, United States.

4:00 PM MD8.10.02
Atomistic Study of Hetero-Phase, Semi-Coherent Interfaces between Immiscible Metals: The Cases of AgCu and CuW Vassilis Pontikis; /CEA, France; /CEA, France.

4:15 PM MD8.10.03
Lattice Dynamics of Core-Shell Bimetallic Nanocrystals during Ultrafast Laser Excitation Kiran Sasikumar; Argonne National Laboratory, United States.

4:30 PM MD8.10.04
Dynamic Mechanical Behavior Stability of a Nanocrystalline Cu-Ta Alloy Scott A. Turnage; Arizona State University, United States.

4:45 PM MD8.10.05
Microstructural Evolution of a Nanocrystalline Copper-Tantalum Alloy Kiran Solanki; Arizona State University, United States.

8:15 AM *MD8.11.01
Microstructural Modeling and Characterization of Nuclear Materials at Extreme Burn-Up Melissa C. Teague; Sandia National Laboratories, United States.

8:45 AM MD8.11.02
Phase Field Modeling of Grain Growth in UO2 Karim Ahmed; Idaho National Laboratory, United States.

9:00 AM MD8.11.03
Atomistic Understanding of Ordering in U-Zr Alloys Alex P. Moore; Georgia Institute of Technology, United States.

9:15 AM *MD8.11.04
Electronic Structure Calculations in Support of Separate Effect Experiments for the Study of Irradiation Effects in Nuclear Ceramics Marjorie Bertolus; CEA, DEN, France.

9:45 AM BREAK

SESSION MD8.12: Complex Behaviors in Ceramics
Session Chairs: Gianguido Baldinozzi, Marjorie Bertolus and Alexander Moore
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 106 B

10:15 AM MD8.12.01
Ordered Atomic Arrangements and Electron Charge Density in La2UO4; Luis Casillas; University of Tennessee, United States.

10:30 AM MD8.12.02
Thin Film Samples: A New Methodology to Investigate the Fission Gas Release Mechanisms in Nuclear Fuel Guillaume Brindelle; CEA, DEN, DEC, Cadarache, France.

10:45 AM MD8.12.03
Examination of Complex Fission Products and Selective Materials Transport in TRISO Coated Particles Terry G. Holesinger; Los Alamos National Laboratory, United States.

11:00 AM MD8.12.04
Molecular Dynamic Simulations of the Coupled Effects of Electronic and Nuclear Energy Loss in Ion Irradiation Eva Zarkadoula; Oak Ridge National Laboratory, United States.

11:15 AM MD8.12.05
Atypical Phase Change in Gd2O3 Epitaxial Layers under Ion Irradiation Aurelien Debelly; University Paris-Sud, CNRS, Universite Paris-Saclay, France.

11:30 AM MD8.12.06
Investigations of the Mechanical and Hydrothermal Stabilities of SBA-15 and Al-SBA-15 Mesoporous Materials Dayton G. Kizzire; Missouri State University, United States.

11:45 AM MD8.12.07
Understanding the Gas Sensing Ability of (Zn,Co)Ga2O4 Thin Films via Optical, Thermal Transport and DC Conductivity Measurements Musa M. Can; Istanbul University, Turkey.
SESSION MD8.13: Strain and Radiation Effects in Insulators  
Session Chairs: Luis Casillas and Melissa Teague  
Friday Afternoon, April 1, 2016  
PCC West, 100 Level, Room 106 B

1:30 PM *MD8.13.01  
Mesoscale Modeling of Laser-Induced Crystallization of Amorphous Ge  
Jaime Marian; University of California- Los Angeles, United States.

2:00 PM MD8.13.02  
Radiation Defect Dynamics in SiC  
Leonardus Bimo Bayu Aji; Lawrence Livermore National Lab, United States.

2:15 PM MD8.13.03  
Pulsed Ion Beam Study of Radiation Defect Dynamics in Gallium Arsenide  
Aiden A. Martin; Lawrence Livermore National Laboratory, United States.

2:30 PM MD8.13.04  
Formation of Dynamic Topographic Patterns during Electron Beam Induced Etching of Diamond  
Aiden A. Martin1, 2; 1Lawrence Livermore National Laboratory, United States; 2University of Technology, Sydney, Australia.

2:45 PM MD8.13.05  
Structure-Modified Stress Behaviour by Ion Irradiation in Carbon Nanostructures for Field Emission Applications  
Himani Sharma1, 4; 1Doon University, India; 4Thin Film Laboratory, Indian Institute of Technology Delhi, India, India.

3:00 PM BREAK

SESSION MD8.14: Materials Performing in Harsh Environments  
Session Chairs: Jaime Marian and Michael R. Tonks  
Friday Afternoon, April 1, 2016  
PCC West, 100 Level, Room 106 B

3:30 PM MD8.14.01  
Failure Mechanisms of Fiber Optic Temperature Sensors in High Temperature and Vibration Environments  
Loucas Tsakalakos; GE Global Research, United States.

3:45 PM MD8.14.02  
Nanosecond Homogeneous Nucleation and Crystal Growth in Shock-Compressed SiO2  
Yuan Shen; Stanford University, United States.

4:00 PM MD8.14.03  
An Ultra-Robust High-Performance Triboelectric Nanogenerator Based on Charge Replenishment  
Jun Chen; Georgia Institute of Technology, United States.

4:15 PM MD8.14.04  
ZrB2 and h-BN Composite Thin Films for Use in Harsh Environments Above 1000°C  
David M. Stewart; University of Maine, United States.
SYMPOSIUM MD9

Magnetic Materials—From Fundamentals to Applications
March 28 - April 1, 2016

Chairs
Haifeng Ding, Nanjing University
Miguel Angel Garcia, Institute for Ceramic and Glass, CSIC
Carlos Rinaldi, University of Florida
Elena A. Rozhkova, Argonne National Laboratory

Symposium Support
The Center for Nanoscale Materials – Argonne National Laboratory

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* Invited Paper

SESSION MD9.1: Magnetic Materials—From Fundamentals to Applications I

Monday Afternoon, March 28, 2016
PCC North, 100 Level, Room 121 C

1:30 PM *MD9.1.01
The Intricacies of the Transduction Mechanism in Giant Magneto resistive Biosensors with Magnetic Nanoparticle Labels Shan X. Wang; Stanford University, United States.

2:00 PM *MD9.1.02
Development of Nanomagnetic Particles for Simultaneous Imaging and Therapy Yuning Shao; University of Alabama, United States.

2:30 PM BREAK

3:00 PM MD9.1.03
In Vivo Tissue Targeted Magnetic Particle Imaging (MPI) Hamed Arami1, 2; 1University of Washington, United States; 2Stanford University, United States.

3:15 PM MD9.1.04
Magneto resistance, Electrically Detected Magnetic Resonance, and Spin Transport in a Variety of Amorphous Semiconductor and Insulator Thin Films Michael Match; Pennsylvania State University, United States.

3:30 PM MD9.1.05
First-Principles Study of Magnetic Anisotropy in Cu-doped Nd-Fe-B Magnets Yasutomi Tatetsu; ESICMM, The University of Tokyo, Japan.

SESSION MD9.2: Magnetic Materials—From Fundamentals to Applications II

Tuesday Afternoon, March 29, 2016
PCC West, 100 Level, Room 105 B

1:30 PM *MD9.2.01
Spin(caloritronics with Magnetic Insulators Gerrit E. Bauer, 1, 2; 1Tohoku University, Japan; 2Delft University of Technology, Netherlands.

2:00 PM MD9.2.02
Coalescence Driven Magnetic Order of an Uncompensated Dilute Antiferromagnetic Oxide Verena Ney; Johannes Kepler University, Austria.

2:15 PM MD9.2.03
Interplay of Anisotropy, Strain and Microstructure in α″-Fe16N2 Bulk Magnet Md A. Mehedi; University of Minnesota, United States.

2:30 PM MD9.2.04
Antiferromagnetism in RuO2, Paul C. Snijders1, 2; 1Oak Ridge National Laboratory, United States; 2University of Tennessee, United States.

2:45 PM BREAK

3:15 PM *MD9.2.05
Graphene as a Spin Tunnel Barrier in MTJs and Silicon Berend T. Jonker; Naval Research Laboratory, United States.

3:45 PM MD9.2.06
P'T Symmetry-Breaking in Non-Equilibrium Magnetic Systems Alexey Galda; Argonne National Laboratory, United States.

4:00 PM *MD9.2.07
Exchange-Dominated Pure Spin Current Transport in A1q, Molecules Di Wu; Nanjing University, China.

4:30 PM MD9.2.08
Spin-Orbit Torque Induced Reversible Coercivity Change in Co/Pd Multilayer Thin Films Sandeep Kumar; University of California-Riverside, United States.

4:45 PM MD9.2.09
Thermal Dependence of Helicity Independent All-Optical Switching Richard B. Wilson; University of California Berkeley, United States.

SESSION MD9.3: Poster Session: Magnetic Materials—From Fundamentals to Applications

Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

MD9.3.01
Effect of Heat Treatment and Average Crystallite Size on MnBi Magnetic Behavior Alfredo Carranco; Universidad Autonoma de Ciudad Juarez, Mexico.

MD9.3.02
Inducing Coercivity in Coherently Strained [Fe-Co/Au-Cu]n Multilayers Georgios Giannopoulos; NCSR Demokritos Greece, Greece.

MD9.3.03
Increase of Magnetic Sensitivity of Magnetically Controlled Mem Switches Sergey M. Karabanov; Ryazan State Radio Engineering University, Russian Federation.

MD9.3.04
Structural, Magnetic Properties and Mossbauer Analysis of Dy2Fe17-x-y Nb, Nix (x= 0, 0.25,0.50 and y=0, 1, 2, 3) Prepared by Arc-Melting Hitoshi Adlukai; University of Memphis, United States.

MD9.3.05
Effect of Boron Addition on Magnetic Domain Structure of Rapidly Quenched Zr, Co, Ni, FeN, and Half-Metallic Ferromagnet: Systematic Analysis and Intuitive Explanation Satoshi Kokado; Shizuoka University, Japan.

MD9.3.06
A Flexible Magnetically Responsive Film for Remote Manipulation of Droplets Hsingil Ke; UNIST, Korea (the Republic of).

MD9.3.07
Anisotropic Magnetoresistance Effects in Fe, Co, Ni, FeN, and Half-Metallic Ferromagnet: Systematic Analysis and Intuitive Explanation Satoshi Kokado; Shizuoka University, Japan.

MD9.3.08
Characterization of (Ferromagnetic)/(Normal Metal or Insulator) Multilayer Thin Films Sandeep Kumar; University of California-Riverside, United States.

MD9.3.09
Au@CoFe2O4 Yolk-Shell Nanoparticles: An Efficient MRI Contrast Agent, Magneto-Hyperthermal and Drug-Delivery Armada for Cancer Theranostics Ravichandran Manisekaran; Centro de Investigación y de Estudios Avanzados del Instituto, Mexico.
MD9.3.10 Surfactant Assisted Synthesis of Single Phase BiFeO$_3$; Structural, Magnetic and Mossbauer Study Dipesh Neupane; University of Memphis, United States.

MD9.3.11 Geometrical Confinement and Spin Vortex Resonance Valentine Novosad; Argonne Nat’l Lab, United States.

MD9.3.12 Room-Temperature Ferromagnetism in Co-Implanted MoS$_2$ Single Crystals Li-Ting Tseng; University of New South Wales, Australia.


MD9.3.14 Electrospun Magnetic Iron/Polyaniline Nanofibers for Application in Magnetic Hyperthermia Therapy Shu-Chian Yang; Chung Yuan Christian University, Taiwan.


SESSION MD9.4: Magnetic Materials—From Fundamentals to Applications III
Session Chairs: Yuping Bao and Shouheng Sun

Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 105 B

8:30 AM *MD9.4.01 Synthesis and Assembly of Barium-doped Iron Oxide Nanoparticles and Nanomagnets Shouheng Sun; Brown University, United States.

9:00 AM MD9.4.02 Synthesis and Study of Magnetic Properties of Hard-Soft SrFe$_{12-x}$Al$_x$O$_{19}$/Ni$_x$Zn$_{1-x}$Fe$_2$O$_4$ Ferrite Nanocomposites Dipesh Neupane; University of Memphis, United States.

9:15 AM MD9.4.03 Atomic Scale Structure and Properties of Highly Stable Antiphase Boundary Defects in Fe$_3$O$_4$ Keith McKenna; University of York, United Kingdom.

9:30 AM MD9.4.04 Strain Effect in Epitaxial FePt Films on Different Single Crystal Substrates Sung Hun Wey; HGST, a Western Digital Company, United States.

9:45 AM MD9.4.05 Exchange-Coupled Ferromagnetism in Co$_{0.5}$Pt$_{0.5}$ Nanochessboards: Role of Lengthscales and Morphology Jerrold A. Floro; University of Virginia, United States.

10:00 AM BREAK

10:30 AM MD9.4.06 Fine-Tuning the Magnetic Properties of Cobalt Ferrite Thin Films by Controlling the Nanoscale Architecture Shauna Robbenmolt; UCLA, United States.

10:45 AM MD9.4.07 Magnetic Tunnel Junctions from Alkanethiol Self Assembled Monolayers Sophie Delprat$^1$, $^2$; $^1$Unité Mixte de physique CNRS-Université de Montpellier, France; $^2$Université Pierre et Marie Curie, France.

November 11, 2016
PCC West, 100 Level, Room 105 B

11:00 AM MD9.4.08 Longitudinal Domain Wall Formation in Elongated Nanoparticle Assemblies Mirium Varon; Technical University of Denmark, Denmark.

11:15 AM MD9.4.09 Structural and Magnetic Properties of YIG/ZnO Multilayers Grown by PLD Ramachandra Rao M. S.; IIT Madras, India.

11:30 AM MD9.4.10 Morphology Control and Associated Magnetic Properties of Metal/Carbon Hybrid Electrospun Nanofibers for Flexible EMI-Shielding Layer Jiwoo Yu; Seoul National University, Korea (the Republic of).

SESSION MD9.5: Magnetic Materials—From Fundamentals to Applications IV
Session Chair: Tetsuya Nakamura

Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 105 B

1:30 PM *MD9.5.01 Novel Magnetic Materials in the Spotlight of Polarized X-Rays Peter Fischer$^1$, $^2$; $^1$Lawrence Berkeley National Lab, United States; $^2$University of California, United States.

2:00 PM MD9.5.02 Nanoscale Magnetization Dynamics Studied by a Combination of Scanning Transmission X-Ray Microscopy and X-Ray Detected Ferromagnetic Resonance Andreas Ney; Johannes Kepler Univ-Unin, Austria.

2:15 PM MD9.5.03 “Superdiamagnetism” in Materials with Coexisting Ferromagnetic and Antiferromagnetic Interactions Mona Jani; Instituto de Física “Gleb Wataghin”, Universidade Estadual de Campinas (UNICAMP), Brazil.

2:30 PM MD9.5.04 Fe-Cr: Magnetic Properties and Crystal Structure under High Pressure Itzhak Halevy; NRCN, Israel.

2:45 PM BREAK

3:15 PM *MD9.5.05 Synchrotron Radiation Analysis of Nd-Fe-B Sintered Magnet Tetsuya Nakamura$^1$, $^2$; $^1$JASRI / SPring-8, Japan; $^2$ESICMM/ NIMS, Japan.

3:45 PM MD9.5.06 Domain Wall Manipulation in Cylindrical Nanowires Jurii Ivanov; KAUST, Saudi Arabia.

4:00 PM MD9.5.07 Structural and Magnetic Properties of Well-Orderd Inverted Core-Shell $\alpha$-Cr$_x$/Co$_{1-x}$Cr$_2$O$_{3}$(M=Co, Ni, Mn, Fe) Nanoparticles Mohammad Delover Hossain; Missouri State University, United States.

4:15 PM MD9.5.08 Improving Hard Magnetic and Magnetocaloric Properties of Nanocrystalline R-Fe-M (R=Sm,Pr M=Ga,Si) Nanoparticles Mohammad Fischer$^1$, $^2$; $^1$University of Gothenburg, Sweden; $^2$NanOsc AB, Sweden.

SESSION MD9.6: Magnetic Materials—From Fundamentals to Applications V
Session Chairs: Johan Akerman and Chia-ling Chien

Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 105 B

8:15 AM *MD9.6.01 Dynamic Magnetic Solitons in Spin Torque and Spin Hall Nano-Oscillators Johan Akerman; University of Gothenburg, Sweden.

8:45 AM MD9.6.02 Manipulating Room Temperature Magnetic Skyrmions Axel Hoffmann; Argonne National Laboratory, United States.

9:15 AM MD9.6.03 Spin Wave Beam Mediated Driven Synchronization of Nano-Contact Spin Torque Oscillators Randy Dumas$^1$, $^2$; $^1$University of Gothenburg, Sweden; $^2$NanOsc AB, Sweden.

SESSION MD9.7: Magnetic Materials—From Fundamentals to Applications VI
Session Chairs: Nora Dempsey and Carlos Rinaldi
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 105 B

1:30 PM *MD9.7.01
Biomedical Applications of Magnetic Nanoparticles: Delivering Genes and Remote Control of Cells
Jon Dobson; University of Florida, United States.

2:00 PM *MD9.7.02
Development of Micron-Scaled Magnetic Flux Sources for Biological and Medical Applications
Nora Dempsey; Institut NEEL - CNRS, France.

2:30 PM MD9.7.03
Magnetically Actuated Release of Pharmacological Compounds from Magnetic Nanoparticles for Neuronal Stimulation
Michael G. Christiansen; MIT, United States.

2:45 PM BREAK

3:15 PM *MD9.7.04
Lipid Base Magnetic Nanohybrids for Dual Therapy for Cancer
Dhirendra Bahadur; Indian Institute of Technology-Bombay, India.

3:45 PM MD9.7.05
Core-Shell Paramagnetic Gadolinium–Doped Melanin@Silica Nanoparticles for Multimodal Image–Guided Cancer Therapy
Sooneong Cho; Northwestern University, United States.

4:00 PM MD9.7.06
Multifunctional Magnetic Nanomaterials for Biomedical Applications
Manashi Nath; Missouri S&T, United States.

4:15 PM MD9.7.07
Quasi 1D Nanoarray of Superparamagnetic Iron Oxide Nanoparticles on Graphene Oxide Nanoribbons as a Promising MRI T2 Contrast Agent
Bibek Thapa; University of Puerto Rico, United States.

SESSION MD9.8: Magnetic Materials—From Fundamentals to Applications VII
Session Chairs: Laura Lewis and Frederick Pinkerton
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 105 B

8:45 AM *MD9.8.01
Progress towards Developing New Permanent Magnets
Laura H. Lewis; Northeastern University, United States.

9:15 AM MD9.8.02
Microstructure-Magnetic Property Correlations in Rare-Earth Free Permanent Magnet Alloy MnBiFe Synthesized Employing Melt Spinning
Nidhi Singh; CSIR-National Physical Laboratory, India.
SYMPOSIUM MD10
Micro-Assembly Technologies
March 30 - March 31, 2016

Chairs
Takafumi Fukushima, Tohoku University
Seok Kim, University of Illinois at Urbana-Champaign
Gregory Whiting, Palo Alto Research Center
Quan Zhou, Aalto University

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances).
Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

SESSION MD10.1: Micro-Assembly, Transfer Printing, Interconnections and Devices I
Session Chairs: Seok Kim and Gregory Whiting
Wednesday Morning, March 30, 2016
PCC West, 100 Level, Room 105 C

* Invited Paper

8:30 AM *MD10.1.01
Elastomeric Transfer Printing vs. Mobile Microrobotic Assembly
Metin Sitti; Max Planck Institute for Intelligent Systems, Germany.

9:00 AM *MD10.1.02
Dexterous and Non-Contact Micromanipulation: Two Ways for Micro-Nano-Assembly
Michael Gauthier; FEMTO-ST Institute, France.

9:30 AM MD10.1.03
Lego-Like Microassembly of Micro Scale Heterogeneous Materials
Hohyun Keum; University of Illinois Urbana-Champaign, United States.

9:45 AM MD10.1.04
Heterogeneous Integration of Semiconductor Devices by Micro-Transfer-Printing – Recent Advances
Kanchan Ghosal; X-celeprint Inc., United States.

10:00 AM BREAK

10:30 AM *MD10.1.05
Assembly on a MEMS Scale Using Magnetic Field
Isao Shimoveamap; University of Tokyo, Japan.

11:00 AM MD10.1.06
Fan-Out Packaging of Microdevices Assembled Using Micro-Transfer-Printing
Matthew Lueck; RTI International, United States.

11:15 AM MD10.1.07
Gallium-Gold Liquid-Solid Biphasic Thin Film Interconnects for Robust Stretchable Circuits
Arthur E. Hirsch; EPFL, Switzerland.

11:30 AM MD10.1.08
High-Resolution Printing of Copper Interconnects on Flexible Substrates
Manish K. Trivedi; University College London, United Kingdom.

11:45 AM MD10.1.09
Pressure-Activated Electrical Interconnections Formed During Elastomer Stamp Micro-Transfer-Printing
Kanchan Ghosal; X-celeprint Inc., United States.

SESSION MD10.2: Micro-Assembly, Transfer Printing, Interconnections and Devices II
Session Chairs: Seok Kim and Gregory Whiting
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 105 C

1:30 PM *MD10.2.01
Active Composite Membranes
Placid M. Ferreira; University of Illinois at Urbana-Champaign, United States.

2:00 PM *MD10.2.02
High Performance Flexible Silicon Photovoltaics Enabled with Micro-Transfer Printing
Jongseung Yoon; University of Southern California, United States.

2:30 PM MD10.2.03
Microassembly on Conductive Elastomers and Its Application to a Tip-Tilt-Piston Micromirror
Ziming Yang; University of Illinois at Urbana-Champaign, United States.

2:45 PM MD10.2.04
Single Build Processed 3D Printed Device with Low-Melting Metal Composites
Woo Soo Kim; Simon Fraser University, Canada.

3:00 PM BREAK

3:30 PM *MD10.2.05
Electrophotography and Micro Assembly - Printing as a Massive Parallel, Digital Manufacturing Process
J. P. Lu; PARC, a Xerox Company, United States.

4:00 PM MD10.2.06
Process Capability and Elastomer Stamp Lifetime in Micro Transfer Printing
Kanchan Ghosal; X-celeprint Inc., United States.

4:15 PM MD10.2.07
High Resolution Electrohydrodynamic Printing of Silver and Glass Reactive Inks
Christopher S. Lefky; Arizona State University, United States.

4:30 PM MD10.2.08
Friction-Controlled Positioning of Silicon Nanowires for Large-Scale Device Fabrication
Steffen Strehle; Ulm University, Germany.

4:45 PM MD10.2.09
Multiscale Crumpled Structured Topographies Created by Extreme Compression of Graphene Surface Films
Po-Yen Chen1, 2; 1Brown University, United States; 2MIT, United States.

SESSION MD10.3: Poster Session: Micro-Assembly Technologies
Session Chair: Seok Kim
Wednesday Afternoon, March 30, 2016
Sheraton, Third Level, Phoenix Ballroom

8:00 PM MD10.3.01
Polymer/Clay Nanocomposite Self–Assembly Approach for Gas Barrier Film Applications
Maedeh Dabbaghianamiri; Texas State University, United States.

8:15 PM MD10.3.02
Fast Self-Assembly of Pristine Large-Area Graphene Film on Liquid-Air Interface
Tae-Yeon Yoo; KAIST, Korea (the Republic of).

8:30 PM MD10.3.03
Cold-Drawing of Multimaterial Fibers and Films to Produce Micro- and Nanoparticles
Joshua Kaufmann; University of Central Florida, United States.

8:45 PM MD10.3.04
Amphiphilic 4-Hydroxy-1,3-thiazoles – Building Blocks for Hierarchically Structured Active Layers in Organic Solar Cells and OLEDs
Martin Kaufmann1, 2; 1Institute for Organic Chemistry and Makromolecular Chemistry, Germany; 2Institute of Physical Chemistry, Germany.
MD10.3.05
Soft Micropatterning of 2D Materials Using a Flexible Polymer Stamp
Deepak Ganta; Texas A&M International University, United States.

MD10.3.06
Instant Wet-spinning of Graphene Microfibers by Interfacial Assembly
with Branched Cationic Polymers Kyueui Lee; Korea Advance Institute of
Science and Technology (KAIST), Korea (the Republic of).

MD10.3.07
Roll-to-Roll Printing of Chemically Reduced Graphene Oxide Using
Shear-Induced Transfer Woo Soo Kim; Simon Fraser University, Canada.

SESSION MD10.4: Fluidic, Self-Assembly, Novel Materials
and Applications I
Session Chairs: Takafumi Fukushima and Quan Zhou
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 105 C

8:30 AM *MD10.4.01
Fluidic Microassembly with Surface Tension Effects Pierre Lambert;
Université libre de Bruxelles, Belgium.

9:00 AM *MD10.4.02
Capillary Self-Assembly for 3D Heterogeneous System Integration and
Packaging Yuka Ito; Sumitomo Bakelite Co., LTD., Japan.

9:30 AM MD10.4.03
Blown Bubble Assembly of Nanomaterials and Graphene-Hybridized
Structures for Advanced Electronic Nanodevices Shiting Wu; Peking
University, China.

9:45 AM MD10.4.04
Surface Mediated Synthesis of Reconfigurable Shape-Shifting Nanoscale
to Microscale Fullerene Self-Assemblies for Energy Applications Selene
Sandoval; University of Arizona, United States.

10:00 AM BREAK

10:30 AM *MD10.4.05
Self-Assembly across Scales Karl F. Boehringer; University of Washington,
United States.

11:00 AM MD10.4.06
Surface-Tension Driven Self-Transport and Self-Alignment of Microchips
on Patterned Superhydrophobic Surfaces Quan Zhou; Aalto University, Finland.

11:15 AM MD10.4.07
Non-Contact Location System for Precision Placement Of Nanostructures
in EHD Printing Galen Arnold; Arizona State University, United States.

11:30 AM MD10.4.08
Highly Ordered Honeycomb Patterns Fabricated via an Improved Phase
Separation Method Van Tien Bui; Chungnam National University, Korea (the
Republic of).

SESSION MD10.5: Fluidic, Self-Assembly, Novel Materials
and Applications II
Session Chairs: Takafumi Fukushima and Quan Zhou
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 105 C

1:30 PM *MD10.5.01
The Market Trend of Device Miniaturization and the Microelectronics
Packaging Development Hideki Kinosawa; YAMAHA MOTOR CO., LTD.,
Japan.

2:00 PM MD10.5.02
Acoustophoretic Printing Daniele Foresti; Harvard, United States.
SYMPOSIUM NT1

Functional Nanostructures and Metamaterials for Solar Energy and Novel Optical Phenomena
March 29 - April 1, 2016

Chairs
Renaud Bachelot, University of Technology of Troyes, Charles Delaunay Institute, CNRS
Alexander Govorov, Ohio University
Din Ping Tsai, Academia Sinica
Gary Wiederrecht, Argonne National Laboratory

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances).
Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION NT1.1: Plasmonics
Session Chairs: Alexander Govorov and Howard Jackson
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 129 A

1:30 PM *NT1.1.01
Sustainable Plasmonics and Plasmonics for Sustainability Naomi J. Halas; Rice University, United States.

2:00 PM *NT1.1.02
DNA-Based Plasmonic Metamaterial George C. Schatz; Northwestern University, United States.

2:30 PM *NT1.1.03
Designer Nanocavities for Room-Temperature Plasmon Lasing Teri W. Odom; Northwestern University, United States.

3:00 PM BREAK

3:30 PM *NT1.1.04
Quantum Plasmonics and Hot-Electron Induced Processes Peter Nordlander; Rice University, United States.

4:00 PM *NT1.1.05
Aluminum Nanostructures for Plasmonics Jerome Plain; University de Technologie de Troyes, France.

4:30 PM NT1.1.06
In-Situ Temperature Sensing of Plasmonic Nanostructures by Anti-Stokes Raman Scattering Xu Xie; University of Illinois-Urbana-Champaign, United States.

4:45 PM NT1.1.07
Design and Fabrication of a Plasmonic Switching Device Petra Ivaskovic1, 2; 1Centre de Recherche Paul Pascal, France; 2Institut des Sciences Moléculaires, France.

SESSION NT1.2: Poster Session I: Nanomaterials for Optics I
Tuesday Afternoon, March 29, 2016
Sheraton, Third Level, Phoenix Ballroom

NT1.2.01
First-Principles Investigation of Physical Properties of SeN Nanotubes Saad H. Binomran; King Saud University, Saudi Arabia.

NT1.2.02
Evaluation of Stress-Grown Carbon Nanotubes for Optically-Active Hybrid Mixtures Michael S. Lowry; NSWC Dahlgren Division, United States.

NT1.2.03
Au-Ag Core-Shell Nanoparticle Array by Block Copolymer Lithography for Synergistic Broadband Plasmonic Properties Seung Keun Cho; KAIST, Korea (the Republic of).

NT1.2.04
Lithography-Free Oxide Isolation of GaAs Nanowires Using the VLS Growth Method David J. Dvorak; Simon Fraser University, Canada.

NT1.2.05
Static and Transient Response of Strongly Coupled Molecular Vibration-Cavity Polariton States Blake S. Simpkins; Naval Research Laboratory, United States.

NT1.2.06
A Contactless Method to Measure the Doping Concentration of n-type GaAs Nanowires Shermin Arab; University of Southern California, United States.

NT1.2.07
Graphene-Assisted Thermal Stability of Percolative Silver Nanowire Networks Hyeyoung Ahn; National Chiao Tung University, Taiwan.

NT1.2.08
Engineering Transition Metal Dichalcogenides as Efficient Light Absorbers and Catalysts for Solar Energy Conversion Wei-Ren Wang; Rice University, United States.

NT1.2.09
Metamirror for Enhancing Light Extraction and Absorption Majid Esfandyarpour; Stanford University, United States.

NT1.2.10
Low-Temperature Synthesis of Wide Bandgap Semiconductor Nanostructures Muhammad Sajjad1, 2; 1University of Puerto Rico, United States; 2Institute of Functional Nanomaterials, United States.

NT1.2.11
Facile and Scalable Synthesis of TiN Nanoparticles by Using a Non-Thermal Plasma Process Alejandro J. Alvarez Barragan; University of California Riverside, United States.

NT1.2.12
Synthesis of Bi2S3 Nanocrystals by Microwave Irradiation with Different Reaction Temperature, Pressure and Solution pH Evelyn B. Diaz-Cruz; UNAM, Mexico.

NT1.2.13
Preparation of Magnéli Phase Films with Controlled Phase, Grain Size and Morphology Fiham Baktaš; Sorbonne Universités, France.

NT1.2.14
A Robust One-Pot Synthesis of Hierarchically Structured Bi2S3/BiWO4 Photocatalyst for Highly Efficient Reduction of Cr (VI) Ion Ali Rahif; Sungkyunkwan University, Korea (the Republic of).

NT1.2.15
Particle-on-Film Gap Plasmons on Antireflective ZnO Nanocone Arrays as Ultrasensitive SERS Sensors Yonghee Lee; Ulsan National Institute of Science and Technology, Korea (the Republic of).

NT1.2.16
Flexible and Transparent Photodetector Arrays with Highly Enhanced Optical Properties by Using Embedded AgNW Electrodes Doo-Seung Um; Ulsan National Institute of Science and Technology (UNIST), Korea (the Republic of).

NT1.2.17
Hierarchically Nanostructured F:SnO2 Transparent Conductive Oxide Dario Neri1, 2; 1Istituto Italiano di Tecnologia, Italy; 2Politecnico di Milano, Italy.

NT1.2.18
Platinum-Decorated Cadmium Chalcogenide Hybrid Nanocrystals with Different Shapes for Photocatalytic Hydrogen Generation Younghun Suna1, 2; 1Seoul National University, Korea (the Republic of); 2Seoul National University, Korea (the Republic of).
SESSION NT1.3: Hybrid Nanomaterials for Energy and Optics
Session Chairs: Renaud Bachelot and Chennupati Jagadish
PCC North, 100 Level, Room 129 A

8:30 AM *NT1.3.01
On Blue-Emitting Nanoplatelets and Carbon Dots Jochen Feldmann1, 2; 1University of Munich (LMU), Germany; 2Nanosystems Initiative Munich (NIM), Germany.

9:00 AM *NT1.3.02
Glutathione Capped Gold Clusters for Light Energy Conversion Prashant Kamat; University of Notre Dame, United States.

9:30 AM *NT1.3.03
Multifunctional Materials for Electronics and Photonics Federico Rosei; INRS, Canada.

10:00 AM BREAK

10:30 AM *NT1.3.04
Hot Electron Photodetectors Based on Bulk and 2D Semiconductors Jason G. Valentine; Vanderbilt University, United States.

11:00 AM *NT1.3.05
Excitonic Properties of Inorganic-Organic Hybrid Perovskites and Nanophotonic Devices Olhu Xia; Nanyang Technological University, Singapore.

11:30 AM NT1.3.06

11:45 AM NT1.3.07
Directly Metering Light Absorption and Heat Transfer in Single Nanowires Using Metal-Insulator Transition in VO2, Chun Cheng; SUSTC, China.

SESSION NT1.4: Semiconductor Nanomaterials for Energy and Optics—Nanowires, Quantum Dots, Plasmonic Emitters
Session Chair: Hilmi Demir
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 129 A

1:30 PM *NT1.4.01
Resonant Cavities for III-V Semiconductor Nanowire Device Applications Chunpuati Jagadish; Australian National University, Australia.

2:00 PM NT1.4.02
Scalable Epitaxy-Free Synthesis of Broadband, Super-Absorbing III-V Nanowire Arrays Wen-Hui Cheng; California Institute of Technology, United States.

2:15 PM *NT1.4.03
Probing the Carrier Dynamics of Mid-Infrared Semiconductor Nanowires Howard E. Jackson; University of Cincinnati, United States.

2:45 PM NT1.4.04
Two-Color Single Hybrid Plasmonic Nano-Emitters Renaud Bachelot; University of Technology of Troyes, France.

3:00 PM BREAK

SESSION NT1.5: Semiconductor Nanomaterials for Energy and Optics—Excitons and Plasmons
Session Chair: Jason Valentine
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 129 A

3:30 PM *NT1.5.01
Engineered Quantum Dots for Luminescent Solar Concentrators Victor I. Klimov; Los Alamos National Laboratory, United States.

4:00 PM *NT1.5.02
All-Colloidal Lasers of Solution-Processed Quantum Dots and Wells Hilmi V. Demir1, 2; 1Bilkent University, Turkey; 2NTU, Singapore.

4:30 PM NT1.5.03
Plasmon-Enhanced Fluorescence from Trions and Biexcitons in Colloidal Quantum Dots Marcus Jones; UNC Charlotte, United States.

4:45 PM NT1.5.04
Plasmon-Exciton Interactions Probed Using Spatial Co-Entrapment of Nanoparticles by Topological Singularities Paul J. Ackerman1, 2; 1University of Colorado, United States; 2University of Colorado, United States.

SESSION NT1.6: Poster Session II: Nanomaterials for Optics II
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

NT1.6.01

NT1.6.02
High Density Quantum Dots by Direct Laser Fabrication Haeyeon Yang; South Dakota School of Mines and Technology, United States.

NT1.6.03
Quantum Wires by Direct Laser Fabrication Haeyeon Yang; South Dakota School of Mines and Technology, United States.

NT1.6.04
Efficient Photo-Reduction of Bi-Carbonate to Formate Catalyzed by TiO2 Nanocatalysts in the Presence of Ag Nanoparticles—A Different Mechanism Sanchari Chowdhury; New Mexico Tech, United States.

NT1.6.05
Strong Plexcitonic Coupling between Metallic Nanoparticles and Fluorophores for Bio-Sensing Applications Andrea L. Rodarte; University of California, San Diego, United States.

NT1.6.06
Characterization of InN-InxGa1-xAsN Quantum Well Laser with In6Al13N Layers for 1300 nm Band Kamruzzaman Khan; University of Toledo, United States.
Stable and Highly Loaded CdSe/Cd0.5Zn0.5S Crosslinked Quantum Dot Films with High Gain in the Quasi-Continuous Wave Region Chuan Hao Lin; Georgia Institute of Technology, United States.

Dynamic Radiative Thermal Management with Switchable Vanadium Dioxide Based Fabry-Perot Thermal Emitters Sydney J. Taylor; Arizona State University, United States.

Near-Field Thermal Radiation between Dual Uniaxial Electromagnetic Metamaterials Hai-Ying Chang; Arizona State University, United States.

Fe Contacts to GaAs Nanowires Mingze Yang; Simon Fraser University, Canada.

Enhancement of Sensitivity of the Solution-Phase Localized Surface Plasmon by a Nanostructured Substrate Ali Darbandi; Simon Fraser University, Canada.

Oxidative Photocatalysis at TiO2 Aerogels Driven by Surface Plasmon Resonance of Non-Precious Metal Nanoparticles Paul A. DeSario; Naval Research Laboratory, United States.

Probing Radiative Heat Transfer in the Extreme Near-Field Baif Song; University of Michigan, Ann Arbor, United States.

Decoding Superstructural Structure by “Supercrystallography” Ruiqiong Li; Cornell University, United States.

Effect of Nanostructure Embedding on the Light Matter Interactions at Metal/Polymer Interface Rinsing Yu; Rutgers Univ., United States.

A Kinetic Investigation of Charge Transfer Characteristics of Hyperbolic Metamaterials Olivia M. Penrose; Norfolk State University, United States.

Photothermal Response of Gold Nanorods Prepared in the Presence of Salicylic Acid Derivatives Iris Gong; Simon Fraser University, Canada.

Highly Uniform Self-Assembled Metasurfaces for Enhanced Emission Matthew Roznio; University of California-San Diego, United States.

Solar Steam Generation by Concentrating Heat Fatih Cambazoglu; UCSD, United States.

High-Density 2D Homo- and Hetero- Plasmonic Dimers with Universal sub-10-nm Gaps Mingzhao Zhang; ‘University of Pennsylvania, United States; ’Stanford University, United States.

Azopolymer-Based Nanofabrication Method for Fluorescence-Enhancing Plasmonic Nanostructures Ville Pala; Aalto University, Finland.

pH Imaging of Multiphase Systems in Microfluidic Channels Using an Embedded Silico-Shell Nanoparticle with Plasmonic Enhancement Jesse Greener; Laval University, Canada.

Strong Chiroptical Response of Biomolecule-Coupled Plasmonic Nanostructure: Ultrasonic Detection of Chiral Molecules Hye-Yong Ahn; Seoul National University, Korea (the Republic of).

Brookite TiO2 Nanorods as Ideal Building Blocks for Photoelectrochemical Water Oxidation: Bulk versus Surface Plasmonic Decoration Alberto Naldoni; CNR-Istituto di Scienze e Tecnologie Molecolari, Italy.

Revealing Self-Induced InAlN Core-Shell Nanorod Formation Mechanism and Their Unique Optical Properties Justinas Palisaitis; Linkoping University, Sweden.

Nickel Electrodeposition on Anodized Aluminum Oxide Films as Selective Absorbing Coating Made by AC Voltage with Variable Frequency Samuel Santiago; ‘University Tecnologica de Huatzinco, Mexico; 'UNAM, Mexico.

Aligned Epitaxial Titanium Nitride (TiN) and Titanium Oxynitride (TiNO) Nanowires for Solar Energy and Optical Applications Chandra Shekar Reddy; North Carolina A&T State University, United States.


Electrocatalysis in Photovoltaics: Research on Counter Electrode in Dye-Sensitized Solar Cells Yantao Shi; State Key laboratory of Fine Chemicals, School of Chemistry, Dalian University of Technology, China.

The Efficiency of Hybrid Photochemical Solar Cells Akira Babu; Niigata University, Japan.

Enhanced Absorption and Charge Photogeneration in Polymer: Fullerene Thin-Films with MoS2-Metasurface Heterostructures for Photovoltaics Christopher Petoukhoff; ‘Rutgers University, United States; ’Okinawa Institute of Science and Technology, Japan.


Downscaling Diameter of Self-Organized TiO2 Nanotube towards Higher Efficiency of Hybrid Photochemical Solar Cells Milos Krbal; University of Pardubice, Czech Republic.

Plasmon-Induced Resonance Energy Transfer and Hot Electron Injection for Solar Energy Conversion Nianqiang Wu; West Virginia University, United States.

Ultrafast Dynamics of Electron-Hole Pairs in Two-Dimensional InSe Layers Jannika Lauth; Delft University of Technology, Netherlands.
SESSION NT1.8/EE3.8: Joint Session: Recent Developments in Optoelectronics and Photovoltaics
Session Chair: Gary Wiederrecht
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 129 A

1:30 PM *NT1.8.01/EE3.8.01
Optoelectronics: Is There Anything It Cannot Do; Can Opto-Electronics Provide the Motive Power for Future Vehicles
Eli Yablonovitch; University of California, Berkeley, United States.

2:00 PM *NT1.8.02/EE3.8.02
Controlling both Solar and Thermal Spectra for Solar Cell Applications
Shanhu; Fudan University, China.

2:30 PM NT1.8.03/EE3.8.03
Highly Conductive Ag Nanowire Meta-Electrodes Improve Silicon Heterojunction Solar Cells
Mark W. Knight; FOM Institute AMOLF, Netherlands.

2:45 PM NT1.8.04/EE3.8.04
Largely Tunable Plasmonic Metasurfaces for Efficient Bending of Light and Light Management in Thin-Film Solar Cells
Hadi Eghlidi; ETH Zurich, Switzerland.

3:00 PM BREAK

SESSION NT1.9: Hybrid Nanomaterials for Energy and Optics
Session Chair: Nianqiang Wu
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 129 A

3:30 PM *NT1.9.01
Functional Nanostructures and Their Applications in Catalysis, Sensing and Color Conversion
Alexander Eyehmueller; TU Dresden, Germany.

4:00 PM *NT1.9.02
The Role of Hot Electrons, Hot Spots and Interfacial Electronic Transitions in Photocatalysis on Metal Nanoparticles
Phillip Christopher; University of California, Riverside, United States.

4:30 PM *NT1.9.03
Efficiently Wave-Front Manipulations by Gradient Metasurfaces
Shulin Sun; Fudan University, China.

SESSION NT1.10: Poster Session III: Photovoltaics
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 129 A

9:00 AM *NT1.10.01
Bottom-Up Approaches for Precisely Nanostructuring Hybrid Organic/Inorganic Multi-Component Composites for Organic Photovoltaics
Yang Qin; University of New Mexico, United States.

9:15 AM NT1.10.02
Fullerene-Modified Zinc Oxide Thin Films Grown by Electrochemical Deposition for Hybrid Solar Cell Applications
Jennifer T. Damasco Ty; Nara Institute of Science and Technology, Japan.

9:30 AM NT1.10.03
Optically Enhanced Semi-Transparent Organic Solar Cells through Hybrid Metal/Nanoparticle/Dielectric Nanostructure
Xingang Ren; University of Hong Kong, China.

9:45 AM NT1.10.04
Aligned Silver Nanowire Transparent Electrodes for High Performance Solar Cells and Light Emitting Diodes
Saewon Kang; UNIST, Korea (the Republic of).

10:00 AM BREAK

SESSION NT1.11: Metamaterials and Nanostructures for Various Applications
Session Chairs: Jerome Plain and Joel Yuen-Zhou
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 105 C

8:30 AM *NT1.11.01
Metalfilms and Metasurfaces for Solar Energy Harvesting
Mark L. Brongersma; Stanford University, United States.

9:00 AM *NT1.11.02
Motion Detectors Based on Graphene-Integrated Plasmonic Metasurfaces
Gennady Shvets; The University of Texas at Austin, United States.

9:30 AM NT1.11.03
Growth of Multisegment ZnxCd1-xSySe1-y Nanosheets for Photonic Applications in Full Visible Spectrum
Sunay Turkdogan1, 2; 1Arizona State University, United States; 2University of Yafova, Turkey.

9:45 AM NT1.11.04
Turning Windows into Daytime Power Supplies: Luminescent Solar Concentrators Enabled by CuInSxSe1-x Quantum Dots
Hunter McDaniel1, 2; 1UBIQD, LLC, United States; 2Los Alamos National Laboratory, United States.

10:00 AM BREAK

10:30 AM *NT1.11.05
Metamaterial Infrared Absorber and Its Application for Attoholec
Detection of Organic Molecules
Takuo Tanaka1, 2; 1RIKEN, Japan; 2Tokyo Institute of Technology, Japan.
11:00 AM  **NT1.11.06**
Liquid-Phase Tunable Metasurfaces and Light Manipulation  **Ai Qun Liu**
Nanyang Technological University, Singapore.

11:30 AM  **NT1.11.07**
Circularly Polarized Light Detection with Hot Electrons in Chiral Plasmonic Metamaterials  **Wei Li**
Vanderbilt University, United States.

11:45 AM  **NT1.11.08**
Metamaterial Sensor Based on Vertical Split-Ring Resonator  **Wei-Yi Tsai**
National Taiwan University, Taiwan.

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**SESSION NT1.12: Novel Nanomaterials for Optics**
**Session Chair: Ai Qun Liu**
Friday Afternoon, April 1, 2016
PCC West, 100 Level, Room 105 C

1:30 PM  **NT1.12.01**
Chiroptical Polymer Film Exhibiting Tunable Chirality and Circularly Polarized Luminescence  **Hirotaka Ihara**
Kumamoto University, Japan;
Phoenics, Japan.

1:45 PM  **NT1.12.02**
Plasmonic Copper Chalcogenide Nanostructures: Controllable Synthesis, Properties and Applications  **Feifan Wang**
Peking University, China.

2:00 PM  **NT1.12.03**
Plexcitons: Energy Transfer, Dirac Cones and Topological Modes  **Joel Yuen-Zhou**
University of California San Diego, United States.

2:15 PM  **NT1.12.04**
Electron Energy-Loss Spectroscopy Calculation in Finite-Difference Time-Domain Package: EELS-FDTD  **Nicolas Large**
Northwestern University, United States;
International Institute for Nanotechnology, United States.

2:30 PM  **NT1.12.05**
Responsive Gold Nanorod (AuNR) Nanocomposites: Colorimetric and Polarization Sensing via In Situ Reshaping of Nanorods with Light  **Kyoungweon Park**
Air Force Research Laboratory, United States;
UES, United States.

2:45 PM  **NT1.12.06**
Hybrid Thermodynamics for Hydrogen in Palladium Nanocubes and Nanoparticles for Active Plasmonics  **Nikolai Strohfeldt**
4th Physics Institute, University of Stuttgart, Germany.
SYMPOSIUM NT2

Oxide and Chalcogenide-Based Thin Films and Nanostructures for Electronics and Energy Applications
March 29 - April 1, 2016

Chairs
Ningzhong Bao, Nanjing Tech University
Sergio D’Addato, Università di Modena e Reggio Emilia
Arunava Gupta, University of Alabama
Dhananjay Kumar, North Carolina Agricultural and Technical State University

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION NT2.1: Photocatalysis and Water Splitting
Session Chairs: Sergio D’Addato and Arunava Gupta
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 132 AB

1:30 PM NT2.1.01
Nano-Topographical, Electrical and Mechanical Studies of the Terrace and Edge Sites on WSe2. Zhuangqun Huang1, 1; 1California Institute of Technology, United States; 2Bruker Nano Surfaces, United States.

1:45 PM *NT2.1.02
Metal Oxide Nanosheets for Light-Induced Water Splitting. Kazuhiko Maeda; Tokyo Institute of Technology, Japan.

2:15 PM NT2.1.03
Ni0.85Se as a Non-Noble Bifunctional Electrocatalyst for Full Water Splitting. Xiaolin Wu; Zhejiang University, China.

2:30 PM NT2.1.04
Hierarchically Nanostructured Core-Shell MoO3-MoS2 Nanofibers and Their Application toward Hydrogen Evolution. Yosep Han; University of California-Riverside, United States.

2:45 PM NT2.1.05
Tailoring of Sputtered Nano-Crystalline ZnO films by γ-Irradiation. Amanullah Fatehmulla; King Saud University, Saudi Arabia.

3:00 PM BREAK

3:30 PM NT2.1.06
Cyclic Azasilanes: A Versatile Class of Precursors for ALD SiO2 and Molecular Layer Deposition. Nick C. Strandweitz; Lehigh University, United States.

3:45 PM *NT2.1.07
Bifunctional Cobalt Sulfide for Flexible Supercapacitor and Hydrogen Evolution Reaction. Ram K. Gupta; Pittsburg State University, United States.

4:15 PM NT2.1.09
Highly Active Hydrogen Evolution Electrocatalyst Based on Novel Cobalt-Nickel Sulfide Composite Electrode. Davide Ansovini1, 1; 1Institute of Materials Research and Engineering, A*STAR, Singapore; 2University of Southampton, United Kingdom.

4:30 PM NT2.1.10
Transition Metal Chalcogenide Based Electrocatalysts for Water Oxidation/Reduction. Manashi Nath; Missouri S&T, United States.

4:45 PM NT2.1.11
Plasmonic Enhanced Optical Disk Reactor for Wastewater Treatment. Ku Chen; National Taiwan University, Taiwan.

SESSION NT2.2: Poster Session I: Oxide Films
Session Chair: Dhananjay Kumar
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

NT2.2.01
Magnetic Multifunctional Nanostructures as High-Efficiency Catalysts for Oxygen Evolution Reaction. Sammu Handi Umanag Iroshini De Silva; Missouri University of Science & Technology, United States.

NT2.2.02
Formation of Insulating Oxide Films with Hydrolysis Reaction of Alkoxide Precursors in Supercritical Fluid CO2. Chemistry, Morphology, Characterization and Film Thickness. Joanna Wang; Wright-Patterson Air Force Base, United States.

NT2.2.03
Dielectric Functions and Vibrational Properties of VO3 Thin Films Grown on Various Sapphire Substrates Using Sputtering Deposition. Daeho Jung; Kyung Hee University, Korea (the Republic of).

NT2.2.04
Electronic Structure Engineering of Catalytic Activity in Epitaxial SrRuO3 Thin Films. Seokjae Oh; Sungkyunkwan University, Korea (the Republic of).

NT2.2.05
A Detailed Investigation on the Electrical Characterizations of the ZrO2 MOS Capacitors. Senol Kayal; 1; 1Abant Izzet Baysal University, Turkey; 2Abant Izzet Baysal University, Turkey.

NT2.2.06
Optimization of the Metal Electrode/ZnO Structure Using Thermal Annealing: Microstructure Evolution during Dewetting of Thin Cr/Au/Cr Films. Ihab Sinno; Victoria University of Wellington, New Zealand.

NT2.2.07
Electrochemically Controlled p-Type Cuprous Oxide Films with Antimony Incorporation and Their Photovoltaic Performances. Seung Ki Baek; Sungkyunkwan University, Korea (the Republic of).

NT2.2.08
Microstructural Tuning and Its Influence on the Piezoelectric Properties of Sodium Bismuth Titanate Thin Films, A Lead Free Piezoelectric Grown by Pulsed Laser Deposition. Kumaraswamy Miriyala; Indian Institute of Technology Hyderabad, India.

NT2.2.09
Thickness Dependent Multiferroic Properties of Nanoscale Single-Phase PZTFT. Danilo G. Barrionuevo Diestra1, 1; 1University of Puerto Rico-Rio Piedras Campus, United States; 2Institute of Functional Nanomaterials, United States.

NT2.2.10
The p-Type Conductivity of BaNaSnO3 Thin Film System. Hyoung Kwon1, 1; 1Institute of Applied Physics, Korea (the Republic of); 2Seoul National University, Korea (the Republic of).

NT2.2.11
Enhanced Magnetization and Electrical Insulation in La and Gd Co-Doped BiFeO3. Mehmet S. Bozgeyik1, 1; 1University of Puerto Rico, United States; 2Kahramanmaraş Sutcu Imam University, Turkey.

NT2.2.12
Fabrication of Heterostructure Consisting of Cubic-LSMO on Hexagonal-ZnO for Electro-Magnetic Devices. Tae Hyuk Soon; Gifu University, Japan.

NT2.2.13
Composition and Consequences of Interfacial Regions in Stacked Lanthanum Zirconium Oxide (LZO) Dielectric Films from Aqueous Solutions. Keenan N. Woods; University of Oregon, United States.
NT2.2.14 Chemical and Morphological Heterogeneity in Zinc Oxide Thin Films under Humidity Treatment Hua Jiang1,2; 1Stony Brook University, United States; 2Brookhaven National Lab, United States.

NT2.2.15 Stability of Silica Nanosprings Coated with Defect-Rich ZnO Quantum Dots under Microwave Irradiation Jean J. Guarnet; University of Lorraine, France.

NT2.2.16 Study of Nickel Oxide Thin Film and Nanoparticles for Hole Transport in All-Inorganic Colloidal Quantum Dot Light Emitting Devices Ramesh Vasan; University of Arkansas, United States.

NT2.2.17 Observation of Nanometer-Sized Crystalline Pits in β-Ga2O3 Single Crystals Makoto Kasu; Saga University, Japan.

NT2.2.18 Interfacial Study of Solution Processed CH3NH3PbI3 Films on ZnO Nanostructures for Photovoltaic Applications Katerina Nikolaidou; University of California-Merced, United States.

NT2.2.19 Fabrication of Coral-Like CuO Micro/Nanostructures as Counter Electrodes for Dye-Sensitized Solar Cells Chih-Hung Tsai; National Dong Hwa University, Taiwan.

NT2.2.20 Oxide Based (ZnO, CoGaO, and ZnGaO) Materials for Low Temperature Fuel Cells as a Potential Electrolyte Shalima Shawuti1,2; 1Istanbul University, Turkey; 2Istanbul University, Turkey.

NT2.2.21 The Role of Microstructure and Stoichiometry on Leakage Currents in Pulsed DC Magnetron Sputtered Hafnium Oxide Thin Films Amber Reed; Air Force Research Laboratory, United States.

NT2.2.22 2-nm ZnO Nano-Island Growth Using Thermal Atomic Layer Deposition Nazek El-Atab; Masdar Institute of Science and Technology, United Arab Emirates.

NT2.2.23 Role of Defects in Enhancing the Electrochemical Properties of Transition Metal Oxides Qi Wang; Rensselaer Polytechnic Institute, United States.

NT2.2.24 Effect of Plasma Treatment on the Morphology and Crystallinity of Zinc Oxide Films Chia-An Li; National University of Tainan, Taiwan.

NT2.2.25 Thin Film Epitaxy and Transition Characteristics of TiO2/TiN Buffered VOx on Si(100) Substrates Adele Moutit; North Carolina State University, United States.

NT2.2.26 Real Time Investigation of Silver Oxidation during Oxygen Plasma Exposure in Ag/Al2O3 Structure Using In Situ Spectroscopic Ellipsometry Kaveh Ahadi; University of Alberta, Canada.

NT2.2.27 Elucidation of Aluminum Oxide Thin Film Evolution from Solution Deposition with Solid-State NMR Matthew Kast; University of Oregon, United States.

NT2.2.28 A Comparative Characterization Study of Molybdenum Trioxide Thin Films Grown Using Femtosecond and Nanosecond Pulsed Laser Deposition Krishna Harsha Puppala; Missouri State University, United States.

NT2.2.29 A Detailed Study of the Densification of La2Zr2O7 Thin Films Deposited from Aqueous Nitrate Solutions Paul Plasmejer; University of Oregon, United States.

NT2.2.30 Nano Stability of Yttria Stabilized Zirconia: A Thermo-Kinetic Analysis Nazia Nafsin; University of California Davis, United States.

SESSION NT2.3: Piezoelectrics
Session Chair: Arunava Gupta
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 132 AB

8:00 AM NT2.3.01 Phase Transition and Domain Evolution of PLZST Antiferroelectric Single Crystal with MPB Composition Jinghan Gao; Department of Chemistry, Tsinghua University, China.

8:15 AM NT2.3.02 High Aspect Ratio KNbO3 Nanofibers – Synthesis, Characterization and Applications Rajasekaran Ganeshkumar; Singapore University of Technology and Design, Singapore.

8:30 AM *NT2.3.03 Challenges to Measuring Piezoelectricity in Thin Films Using Scanning Probe Microscopy Arthur P. Baddorf; Oak Ridge National Laboratory, United States.

9:00 AM NT2.3.04 Solution-Processing of Complementary Resistive Switching Arrays Based on ZrO2 and Printed Contacts Seungjun Chung; University of California Berkeley, United States.

9:15 AM NT2.3.05 Measurement Methodology and Properties of Interdigitated Transducers with Lead Zirconate Titinate Thin Films Robin Nigon; EPFL, Switzerland.

9:30 AM *NT2.3.06 Science and Technology of Interface-Engineered BiFeO3/SrTiO3/ BiFeO3 Nanolaminates with High Piezoelectricity and Low Leakage for Multifunctional and Biomedical MEMS/NEMS Devices Geunhee Lee; University of Texas at Dallas, United States.

10:00 AM NT2.3.07 Giant Piezoelectricity and Strain Induced Curie Temperature Enhancement of Epitaxial Films Yanxi Li; Virginia Tech, United States.

10:15 AM BREAK

SESSION NT2.4: Ferroelectrics/Multiferroics
Session Chair: Orlando Auciello
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 132 AB

10:30 AM *NT2.4.01 Epitaxial BaTiO3 on Silicon and Silicon Germanium: Nanoscale Characterization, Ferroelectricity and Integration into TNT-Gated Devices Catherine A. Dubourdieu; CNRS-INL, France.

11:00 AM NT2.4.02 Switchable Ferroelectric/Piezoelectric and Energy Storage Properties in Morphotropic Phase Boundary 0.5BaZr0.2Ti0.8O3-0.5Ba0.7Ca0.3TiO3 (BZT-BCT) Lead-Free Polycrystalline Thin Films Venkata S. Puli1,2; 1University of Texas, United States; 2Tulane University, United States; 3University of Puerto Rico, United States.

11:15 AM *NT2.4.03 Antiferromagnetic Coupling at the Interface of Two Ferromagnetic Layers: La0.7Sr0.3MnO3 and SrRuO3 A. Solignac; Université Paris-Saclay, CEA Saclay, France.

11:45 AM NT2.4.04 Nature of Magnetoelectric Coupling in Multiferroic Composites Dhiren K. Pradhan; University of Puerto Rico, United States.
Electrical and Electromechanical Properties of WS2 Nanotubes

Mazhar Ali; IBM/MPI-Halle, United States.

First Thin Films and the Correlation of Crystal Quality to Titanic MR in Weyl Semimetal, WTe2

Grain Resolution

Ahsan Ashraf1, 4; 1Brookhaven National Laboratory, United States; 4Stony Brook University, United States.

Formation and Electronic Characterization of Large Area MoS2 Single-Layer Films

Carolina State University, United States.

Atomically Thin Ohmic Contacts to Two Dimensional Semiconducting Films

Hui Gao; Cornell University, United States.

WS2/WO3 Nanostructured Films for Solar Hydrogen Production:

Zhao Zhao; Arizona State University, United States.

SESSION NT2.5: 2D Materials/Topological Insulators

NT2.5.01

TiO2 as a Catalyst for Topological Insulator Nanowire Growth

Piet Schoenherr; University of Oxford, United Kingdom.

NT2.5.02

Pulsed Laser Synthesis of Oxide and Chalcogenide-Based 2D van der Walls Materials

Ashutosh Tiwari; University of Utah, United States.

NT2.5.03

First Thin Films and the Correlation of Crystal Quality to Titanic MR in Weyl Semimetal, WTe2

Mazhar Ali; IBM/MPI-Halle, United States.

NT2.5.04

Electrical and Electromechanical Properties of WS2 Nanotubes

Roi Levi; Weizmann Institute of Science, Israel.

NT2.5.05

Atomically Thin Ohmic Contacts to Two Dimensional Semiconducting Films

Hui Gao; Cornell University, United States.

NT2.5.06

Novel Two-Dimensional Multifunctional Materials and Direct Conversion of Carbon into Diamond (Discovery of Q-Carbon)

Jaodish Narayan; North Carolina State University, United States.

NT2.5.07

Formation and Electronic Characterization of Large Area MoS2 Single-Layer Films

Michael J. Gomez; UC Riverside, United States.

NT2.5.08

Tuning the Properties of MoS2 through Covalent Surface Functionalization

Elizabth A. Keenan; University of North Carolina-Chapel Hill, United States.

NT2.5.09

Two-Dimensional Molybdenum Disulfide from ALD Molybdenum Oxide

Brent Keller; Massachusetts Institute of Technology, United States.

NT2.5.10

Nanoscale Investigation of Surface Potential and Electrical Characteristics of MoSe2, Ultrathin-Layers with Thickness Dependence

Hye-Jin Jin; Ewha Womans University, Korea (the Republic of).

SESSION NT2.6: Poster Session II: Energy

NT2.6.01

A New Member of the Family of Topological Insulators in the Chalcogenide Group: (Bi1-xSb0.5)2Se4

Piet Schoenherr; University of Oxford, United Kingdom.

NT2.6.02

Recombination Mechanisms in Cu(In0.5Ga0.5)Se2, Photovoltaics at Single-Grain Resolution

Ahsan Ashraf1, 4; 1Brookhaven National Laboratory, United States; 4Stony Brook University, United States.

NT2.6.03


Nageh K. Allam; American University in Cairo, Egypt.

NT2.6.04

On the Properties of Cu2ZnSnS4 Films Prepared by Atmospheric Sulfurization of CuS-SnS-ZnS Precursors Using Ditert-butylsulfide

Ho-Ching Ni; National Chung Hsing University, Taiwan; 3National Yuanlin Senior High School, Taiwan.

NT2.6.05

CdS/PbS Thin-Films Deposited by Chemical Bath Deposition for Photovoltaic Applications

Diego A. Muro; Universidad Autonoma de Ciudad Juarez, Mexico.

NT2.6.06

Studies of Nano-Engineered Fluorine-Doped SnO2 Thin Films with Tunable Haze Factor for Photovoltaic Application

Shanting Zhang1, 3; 1Grenoble Institute of Technology, France; 3Technical University of Darmstadt, Germany.

NT2.6.07

Facile Electrochemical Synthesis of p-Type AgSbTe2 Thin Films and Their Thermoelectric Characterization

Jiwon Kim; University of California-Riverside, United States.

NT2.6.08

Influence of the Critical Thickness on the Optical and Electrical Properties of Transparent Composite Electrodes

Zhao Zhao; Arizona State University, United States.

NT2.6.09

Development of Planar Peltier Devices Using Chalcogenide Thin Films with Overall Sputtering Process

Min-woo Jeong; Seoul National University, Korea (the Republic of).

NT2.6.10

Fabrication, Characterization and Integration of Ultrathin High Voltage and High-Density Power Capacitors with High Frequency Stability and Low ESR

Parthasarathi Chakraborti; Georgia Institute of Technology, United States.

NT2.6.11

Towards Lead-Doped ZnS Nanocrystals for Solar Hydrogen Generation

Allison Durr; Eastern Kentucky University, United States.

NT2.6.12

CuS Thin Films Obtained by Chemical Bath Deposition for Transistor Devices

Oliver R. Garcia Saucedo; Facultad de Ingenieria de la Universidad Autonoma de Coahuila, Mexico.

NT2.6.13

Characterization of PbS Thin Films Obtained by Chemical Bath at Low Temperature Using Sodium Citrate as Complexing Agent

Jose Escorecia-Garcia; CINVESTAV-IPN, Mexico.

NT2.6.14

Effect of Ammonium Acetate Concentration on the Structural and Optical Properties of CdS Thin Film Grown by Chemical Bath Deposition Technique

Harinda Al-Thani; National Energy and Water Research Center, United Arab Emirates.

NT2.6.15

Photoluminescence Imaging as a Tool to Study Catalytic Activity of MoS2

Koichi Yamaguchi; University of California, United States.

NT2.6.16

The Effects of Alkali Elements on Charge Carrier Collection at Grain Boundaries in Cu(In,Ga)Se2 Thin Film Solar Cells

Bradley West; Arizona State University, United States.

NT2.6.17

Selenization of Mechanically Alloyed CuIn0.7Ga0.3Se2 Nanoparticle Based Thin Films

Rohini Neendoor Mohan; CINVESTAV-IPN, Mexico.

NT2.6.18

Enhanced Grain Growth of CuIn0.7Ga0.3Se2 Films Using Mechanically Alloyed Off-Stoichiometric Nanopowders

Rohini Neendoor Mohan; CINVESTAV-IPN, Mexico.

NT2.6.19

Combinatorial Synthesis of Novel High-Efficiency Selenide-Based Oxygen Evolution Catalysts

Xi Cao; Missouri S&T, United States.
SESSION NT2.6: Battery and Fuel Cells
Session Chair: Karthik Ramasamy
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 121 B

8:30 AM NT2.6.01
Iron Pyrite FeS, Thin Films as High Capacity Cathodes for All-Solid-State Lithium Batteries Brigitte Pecquenard; ICMCB, France.

8:45 AM NT2.6.02
The Role of Water in a Nanostructured V₂O₅ Cathode for Rechargeable Mg Batteries Sanja Tepavcevic; University of Arizona, United States.

9:00 AM *NT2.6.03
High Performance Hybrid Electrodes for Advanced Energy Storage: Lithium Ion Batteries Yanglong Hou; Peking University, China.

9:30 AM NT2.6.04
New Lithiated Titanium Oxysulfide Cathodes for All-Solid-State Lithium-Ion Thin Film Batteries: Syntheses and Electrochemical Performance Frederic Le C rash; CEA, France.

4:30 AM NT2.6.05
Probing Ionic Transport Mechanisms in Y-Doped Barium Zirconate Jiahui Ding; 1, 2, 3; 1Georgia Institute of Technology, United States; 2Oak Ridge National Laboratory, United States.

10:30 AM NT2.6.06
Synthesis of Electrocatalytically Active Epitaxial (PrₓBa₃₋ₓ)CoO₂₋x Thin Films Felix Gunke1; 2, 3; 1RWTH Aachen University, Germany; 2FZ Jülich, Germany.

SESSION NT2.6: Battery and Fuel Cells
Session Chair: Karthik Ramasamy
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 121 B

8:30 AM NT2.6.01
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9:00 AM *NT2.6.03
High Performance Hybrid Electrodes for Advanced Energy Storage: Lithium Ion Batteries Yanglong Hou; Peking University, China.

9:30 AM NT2.6.04
New Lithiated Titanium Oxysulfide Cathodes for All-Solid-State Lithium-Ion Thin Film Batteries: Syntheses and Electrochemical Performance Frederic Le C rash; CEA, France.

4:30 AM NT2.6.05
Probing Ionic Transport Mechanisms in Y-Doped Barium Zirconate Jiahui Ding; 1, 2, 3; 1Georgia Institute of Technology, United States; 2Oak Ridge National Laboratory, United States.

10:30 AM NT2.6.06
Synthesis of Electrocatalytically Active Epitaxial (PrₓBa₃₋ₓ)CoO₂₋x Thin Films Felix Gunke1; 2, 3; 1RWTH Aachen University, Germany; 2FZ Jülich, Germany.

SESSION NT2.6: Battery and Fuel Cells
Session Chair: Karthik Ramasamy
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 121 B

8:30 AM NT2.6.01
Iron Pyrite FeS, Thin Films as High Capacity Cathodes for All-Solid-State Lithium Batteries Brigitte Pecquenard; ICMCB, France.

8:45 AM NT2.6.02
The Role of Water in a Nanostructured V₂O₅ Cathode for Rechargeable Mg Batteries Sanja Tepavcevic; University of Arizona, United States.

9:00 AM *NT2.6.03
High Performance Hybrid Electrodes for Advanced Energy Storage: Lithium Ion Batteries Yanglong Hou; Peking University, China.

9:30 AM NT2.6.04
New Lithiated Titanium Oxysulfide Cathodes for All-Solid-State Lithium-Ion Thin Film Batteries: Syntheses and Electrochemical Performance Frederic Le C rash; CEA, France.

4:30 AM NT2.6.05
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NT2.11.01 High-Mobility CdS Thin-Film Transistors by Sol-Gel Method SungMin Kwon; Chung-Ang University, Korea (the Republic of).

NT2.11.02 Large-Area Precise Printing of Sol-Gel Oxide Dielectrics via Bar-Coating Method with Selective Direct-Patterning for Solution-Processed Metal-Oxide Transistor Arrays Won-Jun Lee; Gwangju Institute of Science and Technology, Korea (the Republic of).

NT2.11.03 The Cu(In,Ga)Se2 Solar Cells Inserted Se Interlayer with Na Incorporation Jae-kwan Sung; Chonbuk National Univ., Korea (the Republic of).

NT2.11.04 Effects of Cathode Materials on Thermally Annealed Cu-SiO2 CBRAM Wen-hao Chen; Arizona State University, United States.

NT2.11.05 Efficiency Enhancement of Photovoltaic Devices by Reducing the Charge Recombination through Plasma Treatment of FTO Glass Substrate Van-Duong Dan; Chungnam National University, Korea (the Republic of).

NT2.11.06 Antimony Selenide (Sb2Se3) Thin Film Solar Cells Fabricated by Electrodeposition Sung-Woon Cho; Sungkyunkwan University, Korea (the Republic of).

NT2.11.07 Suitable Yellow-Green and Red Emitting Nanophosphors Blend for Producing Efficient Warm White-LEDs Sauri Mishra; National Physical Lab, India.

NT2.11.08 Effects of Negatively Charged Energy-Beam-Irradiation on the Sputtered Indium-Based Oxide Thin Films Young-Joon Yoon; Korea Institute of Ceramic Engineering and Technology, Korea (the Republic of).

NT2.11.09 Effects of Annealing Temperature on the Performance of W-SiO2-Cu PMC Devices Mehmet B. Balaban; Arizona State University, United States.

NT2.11.10 Synthesis and Micro-Raman Study of Phonon Softening in Sharp Vertical ZnO Nanowires Hongbin Yu; Arizona State University, United States.

NT2.11.11 Growth and Properties of Tin Oxynitride Thin Films Hyejin Gwon1, 2; ‘*KIST, Korea (the Republic of); 2*Korea University, Korea (the Republic of).

NT2.11.12 High Performance Gas Sensors by Combination of Micro/Nanostructured Porous Thin Film and MEMS-Based Chip Weiping Cai; Institute of Solid State Physics, Chinese Academy of Sciences, China.

NT2.11.13 Native Oxide Growth during Plasma Enhanced Atomic Layer Deposition of High-k Gate Dielectrics Kaveh Ahadi; University of Alberta, Canada.

NT2.11.14 Structural Relaxation-Driven Changes of Electronic State of Oxygen Vacancies in Non-Stoichiometric Amorphous Oxide Semiconductors Gi-Baek Lee; Seoul National University, Korea (the Republic of).

NT2.11.15 A Novel Low-Voltage Variable Capacitor Based on Dedritenic Filaments Weijie Yu; Arizona State University, United States.

NT2.11.16 Hollow Structured Co3O4 Nanoparticles Anchored on the 3D Graphene Aerogels with High Supercapacitor Capacitance Wei Liu; ZheJiang University, China.

NT2.11.17 Dual Wavelength (Ultra-Violet and Green) Photodetection Using Solution Processed ZnO Nanoparticles Mohammed A. Ibrahim1, 2; ‘The University of Technology, Iraq; 2 University of Hull, United Kingdom.

NT2.11.18 High Stable Double Layered-ZITO/ Er-Doped ZITO TFT Fabricated on Polymide Substrate Yun-been Nig; Electronics and Telecommunications Research Institute, Korea (the Republic of).

NT2.11.19 n-CdS/n-CdO Core/Shell Nanowires on FTO Glass for High-Efficiency Z-Scheme Hydrogen Generation Joo-Won Lee; Korea University, Korea (the Republic of).

NT2.11.20 Controlling the Exciton Dissociation Rates in Semiconductor Nanocrystal Films Natalia Khomicheva; Bowing Green State University, United States.

NT2.11.21 Growth of Large Area PbZrTiO3 Thin Films for Hydrophone Applications Martindo Rath; Indian Institute of Technology, Madras, India.

NT2.11.22 Structural and Electrical Characteristics of Hafnium Silicate MOS Capacitors Senol Kaya; Abant Izzet Baysal University, Turkey.

NT2.11.23 Structural and Optical Characterization of Metal Chalcogenide Nanowires Marvin H. Wu; North Carolina Central University, United States.

NT2.11.24 The Influence of UV Laser Irradiation on the Semiconducting Nature of Reactive Sputtered Nickel Oxide Thin Films Srikanth Itapu; University of Toledo, United States.

SESSION NT2.12: Zinc Oxide

NT2.12.01 Investigations of Radiation Effects in Amorphous Transparent and Conductive Oxides Valentin Craciun; National Institute for Lasers, Plasma and Radiation Physics, Romania.

NT2.12.02 Tunable Nanoporous Superhydrophobic Coatings to Promote Dropwise Condensation and Enhance Heat Transfer Lance Brockway1, 2; 1University of California Berkeley, United States; 2BEARS, Singapore.

NT2.12.03 Growth and Characterization of Aligned Hexagonal ZnO Nanostructures on Cubic MgO (001) Substrates by Pulsed Laser Deposition without Any Catalyst RamaChandra Rao M. S.; Indian Institute of Technology Madras, India.
9:15 AM NT2.12.04
Atomic Layer Deposited Thermoelectric Nanocomposite  
Mikko Ruoho; Aalto University, Finland.

9:30 AM NT2.12.05
Flexible, Transparent Nanogenerators with Exceptionally High Power Output Based on Ultrathin ZnO Nanoflakes  
Ngoc Huynh Van; Sungkyunkwan University, Korea (the Republic of).

9:45 AM NT2.12.06
Performance Boosting of Flexible ZnO UV Sensors with Rational Designed Absorbing Antireflection Layer and Humectant Encapsulation  
Youfan Hu; Peking University, China.

10:00 AM NT2.12.07
Recognition of Acceptors and Compensated Intrinsic Donors in Nitrogen Doped ZnO  
Shulin Gu; Nanjing University, China.

10:15 AM BREAK

SESSION NT2.13: Titanium and Other Oxides  
Session Chair: Orlando Auciello  
Friday Morning, April 1, 2016  
PCC West, 100 Level, Room 106 A

10:30 AM *NT2.13.01
Synthesis and Hierarchical Assembly of Ultrasmall Nanoparticle “Building Blocks” for Photoresponsive Oxide and Metal Chalcogenide Nanostructures  
David B. Geohegan; Oak Ridge National Laboratory, United States.

11:00 AM NT2.13.02
High Electron Mobility in Epitaxial SnO\textsubscript{2-x} in Semiconducting Regime  
Hyosik Mun; Seoul National University, Korea (the Republic of).

11:15 AM NT2.13.03
Exploring New Pathways for the Synthesis of Nanostructured Suboxide Magnéli Phases of Titanium with Advanced Functionality  
Elham Baktash; Sorbonne Universités, UPMC University Paris 06, CNRS, Collège de France, Laboratoire de Chimie de la Matière Condensée de Paris, France.

11:30 AM NT2.13.04
Epitaxial Integration of TiO\textsubscript{2} with Si(100) through a Novel Approach of Oxidation of TiN/Si(100) Epitaxial Heterostructure  
Adele Moatti; North Carolina State University, United States.

11:45 AM NT2.13.05
Nanowire WO\textsubscript{x} Sensors from Oxidation of WC Thin Films  
Jun Jiang; Harvard University, United States.

SESSION NT2.14: Dielectrics/Capacitors/Memristors  
Session Chair: Dhananjay Kumar  
Friday Afternoon, April 1, 2016  
PCC West, 100 Level, Room 106 A

1:30 PM NT2.14.01
Thermal Transport of Tantalum Oxide Films for Memristors  
Thomas Beechem; Sandia National Labs, United States.

1:45 PM *NT2.14.02
Multifunctional Epitaxial Oxide Heterostructures on Semiconductors  
Srinivasa Rao Singamaneni; North Carolina State University, United States.

2:15 PM NT2.14.03
Two-Port Tunable Interdigital Capacitors Fabricated on Low-Loss Ba\textsubscript{0.29}Sr\textsubscript{0.71}TiO\textsubscript{3}  
Cedric Meyers; University of California-Santa Barbara, United States.

2:30 PM NT2.14.04
Rapid Formation of Very Low-Temperature Processed High-Performance Solution-Based Metal-Oxide Dielectrics via Novel Synthesis of Aluminum Nanocluster Precursors  
Jeong-Wan Jo; Chung-Ang University, Korea (the Republic of).
**SYMPOSIUM NT3**

**Carbon Nanofluidics**
March 29 - March 31, 2016

**Chairs**
Chuanhua Duan, Boston University  
Rohit Karnik, Massachusetts Institute of Technology  
Hyung Gyu Park, ETH Zurich  
Zhiping Xu, Tsinghua University

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances).
Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

**SESSION NT3.1: Carbon Nanofluidics—Fundamental Properties and Transport I**
Session Chairs: Bruce Hinds and Rohit Karnik  
Tuesday Afternoon, March 29, 2016  
PCC West, 100 Level, Room 103 A

1:30 PM *NT3.1.01
**Dramatic Nanofluidic Properties of Carbon Nanotube Membranes as a Biomimetic Platform**
**** Bruce J. Hinds; Univ. of Wa, United States.

2:00 PM NT3.1.02
**Scaling Behavior for Ionic Transport and Its Fluctuations in Individual Carbon Nanotubes**
**** Alessandro Siria; CNRS - ENS, France.

2:15 PM *NT3.1.03
**Water is Transported through Narrow Carbon Nanotubes by Solitons**
**** Seth Lichter; Northwestern University, United States.

2:45 PM BREAK

3:15 PM *NT3.1.04
**Observation of Extreme Phase Transition Temperatures of Water Confined inside Isolated Carbon Nanotube Nanopores**
**** Michael S. Strano; Massachusetts Institute of Technology, United States.

3:45 PM NT3.1.05
**Study of Ion Transport through One to Several Single-Walled Carbon Nanotubes**
**** Vincent Jourdain; Université de Montpellier, France.

4:00 PM NT3.1.06
**Experimental Determination of Water Structure and H-Bond Network during Carbon Nanotube Filling**
**** Ewan Paineau; Laboratoire de Physique des Solides / CNRS-Université Paris Sud, France.

4:15 PM NT3.1.07
**Ultra-Fast Proton Transport in sub-1-nm Diameter Carbon Nanotube Porins**
**** Ranva Tungupanta; Lawrence Livermore National Laboratory, United States.

4:30 PM NT3.1.08
**Predicting the Anomalous Density and Diffusivity of Fluids Confined within Carbon Nanotubes**
**** Gerald Wang; Massachusetts Institute of Technology, United States.

8:00 AM *NT3.3.01
**Molecular Transport through Carbon Nanotube Porins in Lipid Membranes**
**** Aleksandr Noy; Lawrence Livermore National Laboratory, United States; "University of California Merced, United States.

9:00 AM NT3.3.03
**Ion Transport in 2-D Graphene Nanochannels**
**** Quan Xie; Boston University, United States.

9:15 AM NT3.3.04
**Correlating the Structure of Water Transport Channels in Graphene Oxide Membranes with Water Ultrafiltration Efficiency**
**** Kevin R. Zavadil; Sandia National Labs, United States.

9:30 AM *NT3.3.05
**Controlling Ionic and Gas Transport through Porous Graphene**
**** Joseph S. Bunch; Boston University, United States.

10:00 AM BREAK

10:30 AM *NT3.3.06
**Nanoporous Graphene for Filtration**
**** Jeffrey C. Grossman; MIT, United States.

11:00 AM NT3.3.07
**Ultra-High Burst Strength of CVD Graphene Membranes**
**** Linda Wang; MIT, United States.

11:15 AM NT3.3.08
**Real Origin of Permeation through Graphene Oxide Membrane**
**** Chang-Soo Han; Korea University, Korea (the Republic of).

11:30 AM NT3.3.09
**Ion Transport in Complex Layered Graphene Membranes**
**** Chi Cheng; Monash University, Australia.

**SESSION NT3.2: Poster Session: Carbon Nanofluidics**
Tuesday Afternoon, March 29, 2016  
8:00 PM  
Sheraton, Third Level, Phoenix Ballroom

**NT3.2.01**
**Fabrication of Nanofluidic Devices for Ionic and Molecular Transport Studies through Carbon Nanotubes**
**** Khadija Yazda; Laboratoire Charles Coulomb (L2C), UMR 5221 CNRS-Université de Montpellier, France.

**NT3.2.02**
**Surface Chemistry of AAO Membrane with Various Pore Size for High Permeability**
**** Gil-Seon Kang; SungKyunKwan University, Korea (the Republic of).

**NT3.2.03**
**Nanochannel Arrays Etched into Hexagonal Boron Nitride Meso-Membranes by a Focused Ion Beam**
**** Remy Fulcrand; Laboratoire des Multimateriaux et Interfaces, France.

**NT3.2.04**
**Water Desalination Using Nanoporous Single-Layer Graphene**
**** Ivan Vlassiouk; Oak Ridge National Lab, United States.

**NT3.2.05**
**Reduced Graphene Oxide Materials for Supercapacitors**
**** Fengen Chen; Tsinghua University, China.

**SESSION NT3.3: Carbon Nanofluidics—Fundamental Properties and Transport II**
Session Chairs: Aleksandr Noy and Hyung Gyu Park  
Wednesday Morning, March 30, 2016  
PCC West, 100 Level, Room 103 A

8:00 AM *NT3.3.01
**Molecular Transport through Carbon Nanotube Porins in Lipid Membranes**
**** Aleksandr Noy1, 2; 1Lawrence Livermore National Laboratory, United States; 2University of California Merced, United States.

9:00 AM NT3.3.03
**Ion Transport in 2-D Graphene Nanochannels**
**** Quan Xie; Boston University, United States.

9:15 AM NT3.3.04
**Correlating the Structure of Water Transport Channels in Graphene Oxide Membranes with Water Ultrafiltration Efficiency**
**** Kevin R. Zavadil; Sandia National Labs, United States.

9:30 AM *NT3.3.05
**Controlling Ionic and Gas Transport through Porous Graphene**
**** Joseph S. Bunch; Boston University, United States.

10:00 AM BREAK

10:30 AM *NT3.3.06
**Nanoporous Graphene for Filtration**
**** Jeffrey C. Grossman; MIT, United States.
SESSION NT3.4: Carbon Nanofluidics—Membranes and Applications I
Session Chairs: Yousung Jung and Zhiping Xu
Wednesday Afternoon, March 30, 2016
PCC West, 100 Level, Room 103 A

11:45 AM NT3.3.10
A Continuum and Atomistic Simulation Study of Ion Transport in Multilayered Graphene Membranes Jefferson Zhe Liu; Monash University, Australia.

11:00 AM NT3.5.06
Development of Macroscopic Nanoporous Graphene Membranes for Gas Separation Michael S. Boutilier; MIT, United States.

11:15 AM NT3.5.07
Parallel Perforation for Graphene Membrane Production via Block Copolymer Nanolithography Roman Wyss; ETH Zurich, Switzerland.

11:30 AM NT3.5.08
Tuning Porosity in Graphene and other Atomically Thin Materials for Size Selective Membrane Applications by Chemical Vapor Deposition Piran Ravichandran Kidambi; MIT, United States.

1:30 PM *NT3.4.01
Molecular Dynamics Analysis of Water Confined in or Flowing through Nanopores of Graphitic Materials Yousung Jung; KAIST, Korea (the Republic of).

2:00 PM NT3.4.02
High Density, Aligned SWNT Composites for Membrane Applications Nguoc Bui; Lawrence Livermore National Lab, United States.

2:15 PM NT3.4.03
Forward Osmosis via Carbon Nanotube Membranes Mahesh Lokesh; ETH Zurich, Switzerland.

2:30 PM *NT3.4.04
Sub-Nanometer Pores In Diamond-Like Carbon NF/RO Membranes Izumi Ichinose1, 2; 1NIMS, Japan; 2COI-STREAM, Japan.

3:00 PM BREAK

3:30 PM *NT3.4.05
Carbon Nanomembranes (CNMs) Armin Goelzhaeuser; Bielefeld University, Germany.

4:00 PM NT3.4.06
Polymersome Membrane Permeability and Ionic Transport Properties in the Presence of Sub-2nm Carbon Nanotube Porins Jeremy Sanborn1, 2; 1Lawrence Livermore National Laboratory, United States; 2University of California Davis, United States.

4:15 PM NT3.4.07
Impeded Water Transport through Temperature-Controlled Aligned Multi-Walled Carbon Nanotubes Seunghyun Baik; Sungkyunkwan University, Korea (the Republic of).

SESSION NT3.5: Carbon Nanofluidics—Membranes and Applications II
Session Chairs: Joseph Bunch and Chuanhua Duan
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 103 A

8:30 AM *NT3.5.01
Graphene-Based Membranes: Structure, Mass Transport Mechanism and Potential Applications Hongwei Zhu; Tsinghua University, China.

9:00 AM NT3.5.02
Tuning Water-Selective Pores in Monolayer Graphene Membranes for Nanofiltration Doojoon Jang; MIT, United States.

9:15 AM NT3.5.03
Scalable Production Methods of Graphene Oxide Water Vapor Separation Membranes Leo S. Fifield; Pacific Northwest National Laboratory, United States.

9:30 AM *NT3.5.04
Graphene Based Membranes Rahul Ravendran Nair; The University of Manchester, United Kingdom.

10:00 AM BREAK

10:30 AM *NT3.5.05
Harvest Flow and Environmental Energy by Graphene Wanlin Guo; Nanjing University of Aeronautics and Astronautics, China.
SESSION NT4.1: Excitonic Properties of 2D Materials and Heterostructures
Session Chairs: Linyou Cao and Thomas Mueller
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 129 B

1:30 PM *NT4.1.01
The Valley Hall Effect in MoS$_2$ Transistors Paul L. McEuen; Cornell University, United States.

2:00 PM NT4.1.02
Engineering Substrate Interactions for High Luminescence Efficiency of Transition Metal Dichalcogenide Monolayers Yifei Yu; North Carolina State University, United States.

2:15 PM *NT4.1.03
Exciton Decay Dynamics in Monolayer Semiconductors and their Heterostructures Goki Eda; National University of Singapore, Singapore.

2:45 PM NT4.1.04
Probing Bandgap Renormalization, Excitonic Effects, and Interlayer Coupling in 2D Transition Metal Dichalcogenide Semiconductors Miguel M. Ugeda; 1, 2, 3 University of California at Berkeley, United States; 1, 2 Lawrence Berkeley National Laboratory, United States.

3:00 PM BREAK

3:30 PM *NT4.1.05
Probing Intrinsic and Extrinsic Light Emission in Two-Dimensional Transition Metal Dichalcogenides Ting Yu; 1, 2, 3 Nanyang Technological University, Singapore; 1 National University of Singapore, Singapore; 3 National University of Singapore, Singapore.

4:00 PM NT4.1.06
Resonant Dipole-Dipole Energy Transfer in van der Waals Heterostructures Daichi Kozawa; 1, 2 Kyoto University, Japan; 2 Waseda University, Japan.

4:15 PM NT4.1.07
Modulating Optoelectronic Properties of Two-Dimensional Transition Metal Dichalcogenide Semiconductors by Photoinduced Charge Transfer Jong Hyun Choi; Purdue University, United States.

4:30 PM *NT4.1.08
Beyond Ground State Excitons: Anomalous High Energy Excitation, Quasiparticle Bandgap Determination, and Robust Thermalization of Excitons in Monolayer MoS$_2$ P. James Schuck; Molecular Foundry, Lawrence Berkeley National Lab, United States.
NT4.2.16 Observation of the Effect of Exposure to Ambient Air on MBE Grown WSe₂. Christopher Ahles; University of California, San Diego, United States.

NT4.2.17 Halide-Assisted Atmospheric Pressure Growth of Large WSe₂ and WS₈ Monolayer Crystals. Shisheng Li; National University of Singapore, Singapore.

NT4.2.18 Ultra-Fast Carrier Dynamics in Large Area, CVD Deposited, Monolayer MoS₂. Paul D. Cunningham; US Naval Research Laboratory, United States.

NT4.2.19 Black Phosphorus Films of Stacked Flakes for Stable and Selective Humidity Detection. Poya Vasaee; University of Illinois-Chicago, United States.

NT4.2.20 Heterojunction of Black Phosphorous on Single Layer Graphene. Vijayarangamuthu Kalimuthu; Inha University, Korea (the Republic of).

NT4.2.21 A Density Functional Theory Study of Electronic and Magnetic Properties of Rare Earth Doped Monolayer Molybdinum Disulphide. Abdul Majid¹, ²; ¹University of Gujrat, Pakistan; ²Osaka University, Japan.

NT4.2.22 Modeling of the Transfer Characteristics in Graphene/MoS₂ Heterostructures. Yia-Chung Chang¹, ⁵; ¹Research Center for Applied Sciences, Academia Sinica, Taiwan; ⁵National Cheng-Kung University, Taiwan.

NT4.2.23 Nonlinear Piezoelectric Coefficients of TMX₂ (TM=Mo,W, X=S,Se,Te) Monolayers Studied by First-Principles Calculation. Yousung Gu; University of Science and Technology Beijing, China.

NT4.2.24 Transport Properties across Misoriented Bilayer MoS₂ Using ab initio Calculations and Non-Equilibrium Greens Function. Kuan Zhou; UC Riverside, United States.

NT4.2.25 Two-Dimensional GaSe/MoS₂ Misfit Bilayer Heterojunctions by vdW Epitaxy. Xufan Li; Oak Ridge National Laboratory, United States.

NT4.2.26 Chiral Nanofibers Self-Assembled from Ultrathin Low-Dimensional Nanomaterials. Chaoliang Tan; Nanyang Technological University, Singapore.

NT4.2.27 Local Band Structure of Topological Surface States in Bi₁₋ₓSbx₁₋ₓTe₁₋ₓSeₓ (indx₁₋ₓ). Wonhee Ko; Samsung Advanced Institute of Technology, Korea (the Republic of).

NT4.2.28 Fabrication of Devices from Black Phosphorus and 2D SnS Nanosheets Using Inkjet Printing. Pei He; University of Manchester, United Kingdom.

SESSION NT4.3: Controlled Scalable Synthesis of 2D Materials and Heterostructures I
Session Chairs: Linyou Cao and Hua Zhang
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 129 B

8:00 AM *NT4.3.01 Emerging Frontiers in 2D-Materials Technology. Madan Dubey; U.S. Army Research Laboratory, United States.

8:30 AM NT4.3.02 Synthesis and Applications of Novel Two-Dimensional Metal Chalcogenide Nanomaterials. Chaoliang Tan; Nanyang Technological University, Singapore.

8:45 AM *NT4.3.03 Stability, Synthesis and Tailored Modification of 2D MoS₂. Jeffrey C. Grossman; MIT, United States.

9:15 AM NT4.3.04 2D Silicon Telluride (Si₂Te₃). Kristie J. Koski; Brown University, United States.

9:30 AM *NT4.3.05 Large Area Synthesis of 2D Materials. Eric M. Vogel; Georgia Institute of Technology, United States.

10:00 AM BREAK

10:30 AM *NT4.3.06 2D Crystal Heterostructures and Growth by Molecular Beam Epitaxy. Haiti G. Xing; Cornell University, United States.

11:00 AM NT4.3.07 CVD Grown MoS₂ for Flexible Radio-Frequency Electronic Applications. Rudresh Ghosh; University of Texas-Austin, United States.

11:15 AM *NT4.3.08 Stress Driven Synthesis of One- to Two-Dimensional Nanostructures from Nanoparticles. Hongyou Fan; Sandia National Labs, United States.

11:45 AM NT4.3.09 Artificial Layer-by-Layer Stacking for Wafer Scale Atomically Thin Films. Kibun Kang; Cornell University, United States.

SESSION NT4.4: Controlled Scalable Synthesis of 2D Materials and Heterostructures II
Session Chairs: Bruce Claffin and Thomas Mueller
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 129 B

1:30 PM *NT4.4.01 Interaction Effects in Atomically Thin Quasi 2D Materials. Steven G. Louie; University of California-Berkeley and Lawrence Berkeley National Lab, United States.

2:00 PM NT4.4.02 A Comprehensive Understanding of CVD Grown Process for Atomic Layer Transition Metal Dichalcogenides. Bo Li; Rice University, United States.

2:15 PM NT4.4.03 High Quality Physical Vapor Deposition of Tungsten Disulfide Monolayers. Brian Modtland; MIT, United States.

2:30 PM *NT4.4.04 Predictive Modeling in 2D Materials: Morphology, Defects, Synthesis. Boris Yakobson; Rice University, United States.

3:00 PM BREAK

3:30 PM *NT4.4.05 Synthesis and Characterization of 2D-Layered Materials for Nanodevice Applications. Anupama B. Kaul; University of Texas, El Paso, United States.

4:00 PM NT4.4.06 Deterministic Growth of WS₂, and WSe₂ Heterostructures. Nestor Perozo; Pennsylvania State University, United States.

4:15 PM *NT4.4.07 Development of Novel Two-Dimensional Crystals and Their Heterostructures. Zheng Lin; Nanyang Technological University, Singapore.

SESSION NT4.5: Poster Session II
Session Chairs: Linyou Cao, Bruce Claffin and Thomas Mueller
Wednesday Afternoon, March 30, 2016
8:00 PM Sheraton, Third Level, Phoenix Ballroom

NT4.5.01 Sweep-Dependent Electrical Switching in InSe Thin-Film FETs. Rameez R. Samrakay; University of California-Riverside, United States.

NT4.5.02 Voltage-Induced Charge-Density-Wave Phase Transitions in 17-TaS₃ Thin Films Monitored in situ with Raman Spectroscopy. Guanxiong Liu; University of California-Riverside, United States.
NT4.5.03 Grown by CVD on SiO2/Si NT4.5.04 Effects of Synthesis Parameters on CVD Molybdenum Disulfide Growth NT4.5.05 Device Applications of Black Phosphorus: Ultrascaled Transistors, Schottky Diodes, and Photodetectors NT4.5.06 Amplitude and Phase Resolved Infrared Imaging on 2D Materials NT4.5.07 Compliant Substrate Epitaxy: Au on MoS2 NT4.5.08 A Contamination-Free Large Area 2D Materials Transfer Using Water Soluble Polyvinyl Alcohol for Device Applications NT4.5.09 Strain Engineering of Phosphorene via Bending NT4.5.10 ALD of 2D MoS2 on 150 mm Quartz and SiO2/Si Substrates NT4.5.11 A Molecular Dynamics Study of the Thermal Transport Properties of Monolayer MoS2 and BN NT4.5.12 Band Offset Measurements of 2-D TFET Interfaces by Internal Photoemission Spectroscopy NT4.5.13 Two-Dimensional Transition Metal Dichalcogenides Based Magnetic Tunneling Junctions NT4.5.14 Direct Writing of 2D Flexible Electronic Devices NT4.5.15 3D Printing of 2D Circuits with Biomolecules NT4.5.16 Observation of Electronic Structure of Silicene and Its Defects by Scanning Tunneling Microscopy NT4.5.17 Quantum Oscillations and Capacitance Spectroscopy in High Quality Sandwiched Black Phosphorus NT4.5.18 Air Can Passivate Chalcogen Vacancies in Two-Dimensional Semiconductors NT4.5.19 Thickness-Dependent Band Structure and K-Point Spin-Splitting of WS2 Grown by CVD on SiO2/Si NT4.5.20 Copper-Based Growth of Graphene/h-BN Heterostructure NT4.5.21 Two Dimensional Materials as Hole Extraction Layer in Perovskite Solar Cells NT4.5.22 Controlling the Threshold Voltage of MoS2 Field-Effect Devices by Sulfur-Vacancy Engineering NT4.5.23 Exfoliation of Aluminum Oxide Nanosheets from a Glyothermal Precursor NT4.5.24 Computational Discovery of Novel 2D Materials with a Genetic Algorithm and a High-Throughput Approach NT4.5.25 Monolayer III-VI Chalcogenides for Ultra Low-Power Field Effect Transistors NT4.5.26 Excitons in Transition Metal Dichalcogenides: MoS2 and MoSe2 NT4.5.27 Gas Adsorption on MXene Surfaces: Density Functional Theory Calculations NT4.5.28 Improved Carrier Mobility and Photoresponsivity of Tungsten Disulfide by Molecular Doping NT4.5.29 Optical Writing by Photo-Induced Defects Passivation on 2D Materials NT4.5.30 Preparation of Wafer-Scale MoS2, Atomic Layers by Chemical Vapor Deposition NT4.5.31 Environmental Excitonic Dynamics Changes in MoTe2 SESSION NT4.6: Photophysics and Electrical Properties of 2D Materials NT4.6.01 Defect Passivation, Chemical Doping, Heterostructures and Devices of Layered Semiconductors NT4.6.02 Strong Broadband and Narrowband Atomically Thin MoS2, Film Light Absorber NT4.6.03 Optoelectronics of 2D Materials Beyond Graphene: Material Physics, Challenges and Opportunities NT4.6.04 Probing Interface Interaction in 2-Dimensional Layered Materials
Yong-Wei Zhang; Institute of High Performance Computing, Singapore. Manipulating Phosphorene for Nanoelectronics and Energy Applications

2:15 PM

Michael Snure; AFRL, United States. Probing Electrical, Optical and Phonon Anisotropy in Black Phosphorus

2:00 PM

Fengnian Xia; Yale University, United States. Bridging the Gap: Layered Black Phosphorus for Electronics and Optoelectronics

1:30 PM

SESSION NT4.7: Optoelectronic and Electronic Devices of 2D Materials

Session Chairs: Alexander Puretzky and Yong Zhang

Thursday Afternoon, March 31, 2016

PCC North, 100 Level, Room 129 B

1:30 PM *NT4.7.01

Bridging the Gap: Layered Black Phosphorus for Electronics and Optoelectronics Fengnian Xia; Yale University, United States.

2:00 PM *NT4.7.02

Probing Electrical, Optical and Phonon Anisotropy in Black Phosphorus Michael Snure; AFRL, United States.

2:15 PM *NT4.7.03

Manipulating Phosphorene for Nanoelectronics and Energy Applications Yong-Wei Zhang; Institute of High Performance Computing, Singapore.

2:45 PM *NT4.7.04

Chemistry of Black Phosphorus: Exfoliation, Oxidation and Non-Covalent Functionalization Gonzalo Abellan; University of Erlangen-Nurnberg, Germany.

3:00 PM BREAK

3:30 PM *NT4.7.05

2D Tunnel-FETs: Toward Green Electronics Kaustav Banerjee; University of California, Santa Barbara, United States.

4:00 PM *NT4.7.06

The Hysterisis of MoS2 Based FETs Qing Chen; Peking University, China.

4:15 PM *NT4.7.07

Quantum Transport in 2D Membranes Chun Ning (Jeanie) Lau; University of California, United States.

4:45 PM *NT4.7.08

Improved Electrical Properties of Multilayer Molybdenum Disulfide Transistors by Dielectric Passivation Seong Yeoul Kim; Kookmin University, Korea (the Republic of).

SESSION NT4.8: Poster Session III

Session Chairs: Linyou Cao, Bruce Claffin, Thomas Mueller and Hua Zhang

Thursday Afternoon, March 31, 2016

8:00 PM

Sheraton, Third Level, Phoenix Ballroom

NT4.8.01

3D WS2 Nanosheet-Networks as H2O2 Produced in the Brain Cells for Cell Signaling Jing Tang; Fudan University, China.

NT4.8.02

Schottky Barrier Heights at Two-Dimensional Metallic and Semiconducting Transition-Metal Dichalcogenide Interfaces Adiba Zahin; University of California Riverside (UCR), United States.

NT4.8.03

Nanometer-Thick Single-Crystalline Nanosheets Grown at the Water-Air Interface Fei Wang; University of Wisconsin - Madison, United States.

NT4.8.04

Bose-Einstein Condensate in Transition Metal Dichalcogenides Electron-Hole Bilayer System Rashwanat Debnath; University of California Riverside, United States.

NT4.8.05

Controlled Synthesis of ZnO Nanostructures for Development of Electrochemical Biosensor Nandhinesh Radha Shanmugam; University of Texas-Dallas, United States.

NT4.8.06

Towards Controlled Defect Generation and Doping in Two-Dimensional MoS2 Dilbagh Singh; North Carolina A&T University, United States.

NT4.8.07

Synthesis and Characterization of 2D Mo2C MXene Joseph Halim1, 2; 1Drexel University, United States; 2Linkoping University, Sweden.

NT4.8.08

Electronic and Optical Properties of Select 2D Thin Films and Single Flakes of Transition Metal Carbides Joseph Halim1, 2; 1Drexel University, United States; 2Linkoping University, Sweden.

NT4.8.09

Magnetic Tunnel Junctions with Monolayer h-BN Tunnel Barriers Maelis Piquemal-Banci; Unité Mixte de Physique, CNRS, Thales, Univ. Paris-Sud, Université Paris-Saclay, France.

NT4.8.10

Magnetic and Electrical Properties of MXenes - A Computational Study Shanshan Su; University of California, Riverside, United States.

NT4.8.11

Oxidation of Ultrathin GaSe Thomas Beechem; Sandia National Labs, United States.

NT4.8.12

Graphene Stabilization of Two-Dimensional Gallium Nitride Zakaria Al Balushi1, 2; 1The Pennsylvania State University, United States; 2The Pennsylvania State University, United States.

NT4.8.13

Properties of 2D Pbl2, and Its Potential Application Kedi Wu; Arizona State University, United States.

NT4.8.14

Synthesis of Carbon/Sulfur Nanolaminates by Electrochemical Extraction of Titanium from Ti2SC and Other “AX” Structures Mengqiang Zhao; Drexel University, United States.

NT4.8.15

Controllable Synthesis of Mono-Layer Hexagonal Boron Nitride Thin Film by Atmospheric Pressure Chemical Vapor Deposition Yijing Stehle; Oak Ridge National Lab, United States.

NT4.8.16

Engineering Electronic Properties of 2D Carbides (MXenes) by Manipulating Their Transition Metal Layers Babak Anasori1, 2; 1Drexel University, United States; 2Drexel University, United States.

NT4.8.17

Ultrathin Two-Dimensional Wide Bandgap Ga2O3 for High-Voltage Field Effect Transistor Xin Yin; University of Wisconsin-Madison, United States.

NT4.8.18

Defects and Dopant Segregation in Two-Dimensional C-Doped h-BN Matthew Horton; Imperial College London, United Kingdom.
NT4.8.19
Physical Properties of 2D Nanomaterials Heterostructures Muhammad Sajjad; University of Puerto Rico, United States.

NT4.8.20
In Situ Reduction of Gold Nanoparticles on Liquid Exfoliated Tungsten Disulfide Nanosheets Jeremy Dunklin; University of Arkansas, United States.

NT4.8.21
The Effect of High-K Dielectric on the Photoluminescence of MoS2 Directly Grown on Transition Metal Oxides Soumya Sarkar1, 2; 1National University of Singapore, Singapore; 2National University of Singapore, Singapore.

NT4.8.22
Layered Transition Metal Carbides (Ti2CTx, T: -OH, -F and –O): Surface Group Modification and Carrier Transport Property Shen Li; Sungkyunkwan University, Korea (the Republic of).

NT4.8.23
Facile Synthesis of Single Crystal Vanadium Disulfide Nanosheets by Chemical Vapor Deposition for Efficient Hydrogen Evolution Reaction Jianstun Yang; Rice University, United States.

NT4.8.24
MXene Synthesis In Silico Michael Ashton; University of Florida, United States.

NT4.8.25
Synthesis of Ultrathin and Thickness-Controlled Cu, Se Nanosheets via Cation Exchange Reaction Yuanxing Wang; University of Notre Dame, United States.

NT4.8.26
Substrates Affect the Optical Properties of 2D Hexagonal Boron Nitride Kevin Kain1, 2; 1Imperial College London, United Kingdom; 2National University of Singapore, Singapore.

NT4.8.27
Bias-Stress-Induced Instability of Multilayer Molybdenum Disulfide Field-Effect Transistors Jeongkyum Roh; Seoul National University, Korea (the Republic of).

NT4.8.28
Two Dimensional Transition Metal Dichalcogenides: H and I 7 Polymorphs, Structural Transitions, Anomalous Properties and Hydrogen Evolution Reactions Anjali Singh; Jawaharlal Nehru Centre for Advanced Scientific Research, India.

NT4.8.29
Modification of Electronic and Vibrational Properties of Doped Black-P Films Prashant K. Sarwar; University of Utah, United States.

NT4.8.30
Layer-Controlled Chemical Vapor Deposition Growth of MoS2 Vertical Heterostructure Leith Sambad; University of Wisconsin-Madison, United States.

NT4.8.31
Aging of Two-Dimensional Layered Transition Metal Dichalcogenides Bo Li; Rice University, United States.

NT4.8.32
The Role of Grain Boundaries in 2D Hexagonal Boron Nitride for Memristive Switching Device Stefan Tappertzhofen; University of Cambridge, United Kingdom.

SESSION NT4.9: New 2D Materials and Heterostructures
Session Chair: Vinod Tewary
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 227 B

8:30 AM *NT4.9.02
New Materials for Van der Waals Heterostructures Roman Gorbachev; University of Manchester, United Kingdom.

9:00 AM NT4.9.03
Two-Dimensional Metals: From Low Contact-Resistance Electrodes to High Activity Catalysts Yuanxue Liu1, 2; 1National Renewable Energy Laboratory, United States; 2Rice University, United States.

9:15 AM NT4.9.04
Ferroelasticity and Domain Physics in Two-Dimensional Transition Metal Dichalcogenide Monolayers Wenbin Li; MIT, United States.

9:30 AM *NT4.9.05
Metal-Organic Chemical Vapor Deposition of BN on Sapphire and Its Heterostructures with 2D and 3D Materials Michael Snure; Air Force Research Lab, United States.

10:00 AM BREAK

10:30 AM NT4.9.06
Atomic-Scale Derivatives of Group IV Semiconductors Joshua Goldberger; Ohio State University, United States.

11:00 AM NT4.9.07
Ferroelectric Control of Monolayer MoS2 via Direct Single-Layer Growth on LiNbO3 Ariana E. Nguyen; UC Riverside, United States.

11:15 AM NT4.9.08
Polarization and Resistive Switching Behavior of Ferroelectric Thin Films with 2D-Layered Dichalcogenides Tao Li; University of Nebraska-Lincoln, United States.

11:30 AM *NT4.9.09
Solution Processable 2D Materials Based Nanoplates and Heterostructures for High Performance Electronics Yu Huang; University of California-Los Angeles, United States.

SESSION NT4.10: Phonon and Thermal Conductivity of 2D Materials
Session Chairs: Bruce Claflin and Michael Snure
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 227 B

1:30 PM *NT4.10.01
The Effects of Substrate on the Properties of Monolayer Transition Metal Dichalcogenides Yong Zhang; UNC Charlotte, United States.

2:00 PM NT4.10.02
Twisted Bilayers of Transition Metal Dichalcogenides with Variable Coupling Revealed by Low-Frequency Raman Spectroscopy Alexander Puretzky; Oak Ridge National Lab, United States.

2:15 PM NT4.10.03

2:30 PM NT4.10.04
Size Dependence and Ballistic Limits of Thermal Transport in Anisotropic Layered Two-Dimensional Materials Zuanyi Li; Stanford University, United States.

2:45 PM NT4.10.05
Thermal Properties of Two-Dimensional Nanostructures via Temperature-Dependent Raman Spectroscopy Yuan Li; Northwestern University, United States.

SESSION NT4.11: Novel Side-Chain Monolayers
Session Chair: Armin Hamoudi
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 227 B
**SYMPOSIUM NT5**

Nanodiamonds—Fundamentals and Applications
March 28 - March 31, 2016

**Chairs**
Jean-Charles Arnault, CEA LIST
Amanda Barnard, The Commonwealth Scientific and Industrial Research Organisation
Vadym Mochalin, Missouri University of Science and Technology
Eiji Osawa, NanoCarbon Research Institute, AREC

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

**TUTORIAL**

The Synthesis, Properties and Applications of Nanodiamond
Monday Morning, March 28, 2016
8:30 AM – 11:30 AM
PCC North, 100 Level, Room 125 A

8:30 AM - 9:15 AM
* The Production of Nanoscale Diamond
Starting from the production of large-scale diamond, the synthesis and fabrication of diamond nanoparticles will be introduced and the advantages and disadvantages of these methods will be discussed.

9:15 AM - 10:00 AM
The properties of nanodiamond and its surface as well as its colloidal behavior will be presented.

10:00 AM - 10:30 AM BREAK

10:30 AM - 11:15 AM
Applications of nanodiamond in different fields (sensing, imaging, biomedical, composites, quantum engineering etc.) will be presented.

11:15 AM - 11:30 AM Questions

**Instructors**

Anke Krueger, Würzburg University
Dean Ho, University of California, Los Angeles

**SESSION NT5.1: Synthesis and Transformations, Catalysis**
Session Chairs: Vadym Mochalin and Eiji Osawa
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 132 C

1:30 PM *NT5.1.01
New Experimental Approaches to sp3-Bonded Carbon
Rodney S. Ruoff; UNIST, Korea (the Republic of)

2:00 PM *NT5.1.02
Measurements of Nanodiamond Formation during Detonation Using Time-Resolved Small-Angle X-Ray Scattering
Michael Bauge-Hansen; Lawrence Livermore National Lab, United States

2:15 PM *NT5.1.03
Nanodiamond and Its Derivatives for Catalysis
Dongsheng Su; Chinese Academy of Sciences, China

2:30 PM *NT5.1.04
Modeling the Photothermal Synthesis of Nanodiamond Materials at Extreme Conditions
Peter J. Pauzauskie; University of Washington, United States; Pacific Northwest National Lab, United States

3:00 PM BREAK

3:30 PM *NT5.1.05
Spicy Energy Storage: Electrochemical Applications of Nanodiamond-Derived Carbon Onions
Volker Presser; INM - Leibniz Institute for New Materials, Germany

4:00 PM *NT5.1.06
Boron Doped Nanodiamonds for Nanelectronics Applications
Thomas Hantschel; IMEC, Belgium

4:15 PM *NT5.1.07
Nanodiamond Modified Boron-Doped Diamond Substrates Surface Redox Chemistry: Influence of Physicochemical Properties on Electrocatalytic and Biocatalytic Processes
Sanju Gupta; Western Kentucky University, United States

4:30 PM *NT5.1.08
Nanodiamond-Derived Carbon Onions as Conductive Additive and Active Material for Double-Layer Capacitors
Nicolas Jaeckel; 1 INM – Leibniz Institute for New Materials, Germany; 2 Saarland University, Germany

4:45 PM *NT5.1.09
Nanodiamond Formation at Low P-T Parameters from Organic Matter: Theory, Experiments and Natural Facts
Sergei K. Simakov; LLC “ADAMANT” Skolkovo Participant, Russian Federation

8:30 AM *NT5.2.01
Insight into Structures and Stability of 5-am Nanodiamond
Xiang Zhou; Xi’an Jiaotong University, China

9:00 AM *NT5.2.02
Surface Structures and Defects of Detonation Nanodiamond
Shery Chang; Arizona State University, United States

9:30 AM BREAK

10:00 AM *NT5.2.03
Analysis of Microimpurities in Detonation Nanodiamonds
Dmitry S. Volkov; 1 Moscow State University, Russian Federation; 2 NUST MISiS, Russian Federation

10:30 AM *NT5.2.04
Plasma Hydrogenated Nanodiamond as a Promising Material for Radiosensitization: Chemical Investigation of the Reactive Oxygen Species
Jean-Charles Arnault; CEA, LIST, France

10:45 AM *NT5.2.05
Optically Active Diamond Particles
Olga A. Shenderova; Adamas Nanotechnologies, United States

11:15 AM *NT5.2.06
Solid State Magnetic Resonance Techniques: Looking Inside the Nanodiamond Particle
Alexander I. Shames; Ben-Gurion University of the Negev, Israel

**SESSION NT5.2: Structure and Characterization**
Session Chairs: Tristan Petit and Olga Shenderova
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 132 C

1:30 PM *NT5.3.01
Nanodiamond/Silicon Carbide Nanocomposites for Membranes
Volker Presser; INM - Leibniz Institute for New Materials, Germany

2:00 PM *NT5.3.02
Usage of Detonation Nanodiamonds for Improving Properties of Various Polymer Materials
Hisayoshi Ito; DAICEL Corporation, Japan

2:30 PM *NT5.3.03
Nanodiamond Formation at Low P-T Parameters from Organic Matter: Theory, Experiments and Natural Facts
Sergei K. Simakov; LLC “ADAMANT” Skolkovo Participant, Russian Federation
SESSION NT5.4: Poster Session
Wednesday Afternoon, March 30, 2016
Sheraton, Third Level, Phoenix Ballroom

NT5.4.01
Nanoscaler Lubrication with Aqueous and Alcoholic Solutions of 2.8-nm Diamond Spacers Eiji Osawa; NanoCarbon Res. Inst. Ltd, Japan.

NT5.4.02
UV Excitation Wavelengths for the Raman Analysis of Detonation Nanodiamond-Contributions and Pitfalls Michel Merroux; CNRS-LEPMI, France.

NT5.4.03
Tuning Endothelial Permeability with Functionalized Nanodiamonds Vadym Mochalin; Missouri University of Science & Technology, United States.

NT5.4.04
Round Diamond Nanoparticles Helena Raabova1, 2; 1Institute of Organic Chemistry and Biochemistry AS CR, v.v.i., Czech Republic; 2University of Chemistry and Technology, Prague, Czech Republic.

NT5.4.05
Plasmonic Enhancement of Single Photon Emission from NV Center Containing Nanodiamonds Maneesh K. Gupta1, 2; 1University of Dayton Research Institute, United States; 2Air Force Research Laboratories, United States.

NT5.4.06
Structure and Optical Properties of the Amorphous Hydrogenised Carbon Films Modified by Titanium and Silver Svetlana Mikhailova; al-Farabi Kazakh National University, Kazakhstan.

NT5.4.07
Determination of Atomic Structure of Detonation Nanodiamonds Using Simulated and Experimental Aberration-Corrected TEM Imaging at Low Voltage Kaylie Lam; Arizona State University, United States.

SESSION NT5.5: Single-Digit Particles—Colloids, Dispersions and Imaging
Session Chairs: Dean Ho and Anke Krueger
Thursday Morning, March 31, 2016
PCC West, 100 Level, Room 103 B

9:00 AM *NT5.5.01

2:15 PM NT5.5.03
Spontaneous (Bio)Functionalization of Hydrogenated Nanodiamonds Hugues Girard; CEA LIST, France.

2:30 PM BREAK

3:00 PM *NT5.5.04
Surface Chemistry of Nanodiamond for Biomedical Application Naoki Komatsu; Kyoto University, Japan.

3:30 PM *NT5.5.05
Nanodiamond Composites for Biomedical Applications Anke Krueger; Wuerzburg University, Germany.

4:00 PM *NT5.5.06
Polymer Coating of Fluorescent Nanodiamonds: Tuning the Functional Nanobiointerface Petr Cigler; IOCB AS CR vvi, Czech Republic.

4:30 PM NT5.5.07
Affinity of Glycan-Modified Nanodiamonds towards Lectins and Escherichia coli Kostiantyn Turcheniuk1, 2; 1Missouri University of Science & Technology, United States; 2Institute of Electronics Microelectronics and Nanotechnology, France.

SESSION NT5.6: NV Centers, Imaging and Biomedical Applications
Session Chairs: Jean-Charles Arnault and Amanda Barnard
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 103 B

1:30 PM *NT5.6.01
New Generation of Fluorescent Nanodiamonds Igor Aharonovich; University of Technology Sydney, Australia.

2:00 PM *NT5.6.02
Magnetically Modulated Fluorescence of Nitrogen-Vacancy Centers for Selective Imaging and Quantification of Nanodiamonds in Biological Samples Huan-Cheng Chang1, 4; 1Academia Sinica, Taiwan; 4Academia Sinica, Taiwan.

2:30 PM BREAK

3:00 PM *NT5.6.03
Integrating Nanodiamond Drug Delivery and Imaging with Precision Medicine Dean Ho; UCLA, United States.

3:30 PM NT5.6.04
Nanodiamonds for Sustainable Nanomedicine Dong-Keun Lee; UCLA, United States.

3:45 PM NT5.6.05
A Nanodiamond Platform for Personalized Cancer Therapy against Liver Cancer Edward K. Chow; National University of Singapore, Singapore.

4:00 PM *NT5.6.06
Biomedical Applications of Diamond Nanoparticles: From Drug Delivery to Implants Viny Gorots; Drexel University, United States.

4:30 PM NT5.6.07
Development of a Novel Nanodiamond-Based Drug Delivery System for the Treatment of Chronic Inflammation Amanda Pentecost; Drexel University, United States.

4:45 PM NT5.6.08
Nanodiamond for Drug Delivery into Central Neural System Vadym Mochalin; Missouri University of Science & Technology, United States.
SYMPOSIUM NT6
Colloidal Nanoparticles—From Synthesis to Applications
March 28 - April 1, 2016

Chairs
Hongyou Fan, Sandia National Laboratories
Han Hoon, Center for Integrated Nanotechnologies
Ying-Bing Jiang, Angstrom Thin Film Technology LLC
Songtao Wu, Toyota Research Institute of North America

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* Invited Paper

SESSION NT6.1: Nanoparticle Synthesis and Applications I
Session Chairs: Hongyou Fan and Songtao Wu
Monday Morning, March 28, 2016
PCC North, 100 Level, Room 131 ABC

8:00 AM *NT6.1.01
Colloidal Quantum Dots in Extreme Electromagnetic Environments
David J. Norris; ETH Zurich, Switzerland.

8:30 AM *NT6.1.02
Synthesis of Earth-Abundant Nanocrystals for Solar Energy Conversion
Jillian M. Buriak1, 2; 1University of Alberta, Canada; 2National Research Council, Canada.

9:00 AM *NT6.1.03
Synthesis of Colloidal Gold Nanorods with Plasmon Absorbance Wavelength near Infrared Region
Luis M. Angelats Silva; University Privada Antenor Orrego, Peru.

9:15 AM *NT6.1.04
Optical Gain in Colloidal Nanoplatelets: Promises and Challenges
Burak Guzeturk; Bilkent University, Turkey.

9:30 AM *NT6.1.05
Critical Casimir Forces Tailor the Growth of Quantum Dot Superstructures
Emanuele Marino; Universiteit van Amsterdam, Netherlands.

9:45 AM *NT6.1.06
Tansport & Phototransport of Two-Dimensional Colloidal Nanoplatelets Array
Adrien Robin1, 2; 1LPEM-UMR 8213 ESPCI, France; 2Nextdot, France.

10:00 AM BREAK

10:30 AM *NT6.1.07
Nanocrystal Assemblies: A Modular Approach to Materials Design
Dmitri V. Talapin; University of Chicago, United States.

11:00 AM *NT6.1.08
Template Synthesis of CuInS2 Nanocrystals from In2S3 Nanoplates and Their Application as Counter Electrodes in Dye-Sensitized Solar Cells
Bingkun Chen1, 2; 1City University of Hong Kong, China; 2Beijing Institute of Technology, China.

11:15 AM *NT6.1.09
Self-Standing Excimers at the Single Particle Level by Supramolecular Networking of Metal Quantum Clusters
Sergio Brovelli; Universita degli Studi di Milano Bicocca, Italy.

11:30 AM *NT6.1.10
Metal Nanocluster Seeded Growth of Electronic Doped Colloidal Quantum Dots in Water
Beatriz S. Gonzalez; University of Milano Bicocca- Department of Material Science, Italy.

11:45 AM *NT6.1.11
Morphology Controlled in The LARP Synthesis of Perovskite Nanocrystals and Their Tuable Photoluminescent Properties
Feng Zhang; Beijing Institute of Technology, China.

SESSION NT6.2: Nanoparticle Synthesis, Assembly and Applications I
Session Chairs: Hongyou Fan and Songtao Wu
Monday Afternoon, March 28, 2016
PCC North, 100 Level, Room 131 ABC

1:30 PM *NT6.2.01
Biomimetic Self-Assembly of Nanoparticles
Nicholas A. Kotov; University of Michigan, United States.

2:00 PM *NT6.2.02
Semiconductors with Honeycomb Nanogeometry: Importance, Synthesis, and Opto-Electronic Properties
Daniel D. Vanmaekelbergh; University of Utrecht, Netherlands.

2:30 PM *NT6.2.03
Influence of the Structure of the Core/Shell Interface on Auger Recombination in Colloidal Quantum Dots
Jaehoon Lim; Los Alamos National Laboratory, United States.

2:45 PM *NT6.2.04
Scalable Non-Injection Synthesis of Cd-Free Copper Indium Sulfide/Zinc Sulfide Quantum Dots for Third-Gen Photovoltaic Application
Yaxin Zhang1, 2; 1University of Waterloo, Canada; 2University of Waterloo, Canada.

3:00 PM BREAK

3:30 PM *NT6.2.05
Ion Exchange Reactions in Colloidal Inorganic Nanocrystals
Liberato Manna; Instituto Italiano di Tecnologia, Italy.

4:00 PM *NT6.2.06
Fabrication of Monodisperse Nanocrystals through the Successive Surface Ion Saturation
Mikhail Zamkov; Bowling Green State University, United States.

4:15 PM *NT6.2.07
Exciton-Phonon Coupling in CdSe/CdS Nanocrystals: The Effect of Electron Delocalization
Igor Coropceanu; MIT, United States.

4:30 PM *NT6.2.08
Thermal Transport in Colloidal Nanocrystal Solids – The Effects of Ligand Chemistry and Nanocrystal Packing
Robert Y. Wang; Arizona State University, United States.

4:45 PM *NT6.2.09
The Environmentally Benign Colloidal Quantum Dots and Their Light-Emitting Devices
Seonghoon Lee1, 2; 1Seoul National University, Korea (the Republic of); 2Seoul National University, Korea (the Republic of).

SESSION NT6.3: Nanoparticle Synthesis, Assembly and Applications II
Session Chairs: Hongyou Fan and Songtao Wu
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 131 ABC

1:30 PM *NT6.3.01
In Situ Study of Nanoparticle Growth and Interaction in a Liquid_Cell
Haimei Zheng; Lawrence Berkeley National Lab, United States.

2:00 PM *NT6.3.02
Crystal Phase-Controlled Synthesis of Novel Noble Metal Nanomaterials
Ying-Bing Jiang; Angstrom Thin Film Technology LLC

2:30 PM *NT6.3.03
Metal Nanocluster Seeded Growth of Electronic Doped Colloidal Quantum Dots in Water
Beatriz S. Gonzalez; University of Milano Bicocca- Department of Material Science, Italy.

2:45 PM *NT6.3.04
Scalable Non-Injection Synthesis of Cd-Free Copper Indium Sulfide/Zinc Sulfide Quantum Dots for Third-Gen Photovoltaic Application
Yaxin Zhang1, 2; 1University of Waterloo, Canada; 2University of Waterloo, Canada.

3:00 PM BREAK

3:30 PM *NT6.3.05
Ion Exchange Reactions in Colloidal Inorganic Nanocrystals
Liberato Manna; Instituto Italiano di Tecnologia, Italy.

4:00 PM *NT6.3.06
Fabrication of Monodisperse Nanocrystals through the Successive Surface Ion Saturation
Mikhail Zamkov; Bowling Green State University, United States.

4:15 PM *NT6.3.07
Exciton-Phonon Coupling in CdSe/CdS Nanocrystals: The Effect of Electron Delocalization
Igor Coropceanu; MIT, United States.

4:30 PM *NT6.3.08
Thermal Transport in Colloidal Nanocrystal Solids – The Effects of Ligand Chemistry and Nanocrystal Packing
Robert Y. Wang; Arizona State University, United States.

4:45 PM *NT6.3.09
The Environmentally Benign Colloidal Quantum Dots and Their Light-Emitting Devices
Seonghoon Lee1, 2; 1Seoul National University, Korea (the Republic of); 2Seoul National University, Korea (the Republic of).
2:30 PM NT6.3.03
Local Quantitative Investigations of the Pt Crystals Nucleation and Growth from In Situ Liquid Scanning Transmission Electron Microscopy
Anton V. Letyayev; Oak Ridge National Laboratory, United States.

2:45 PM NT6.3.04
Direct Mapping of the Evolution of Individual Nanocrystals Undergoing Highly Non-Equilibrium Chemical Transformations Matthew R. Jones; University of California-Berkeley, United States.

3:00 PM BREAK

3:30 PM *NT6.3.05
Nonblinking Core/Shell Quantum Dots Noah J. Orfield; 1Los Alamos National Laboratory, United States; 2Vanderbilt University, United States.

4:00 PM NT6.3.06
Quantum Yield Heterogeneity and Its Relation to Charging in Single Nonblinking Core/Shell Quantum Dots Ananya Singh; 1Lawrence Berkeley National Lab, United States; 2University of Texas at Austin, United States.

4:15 PM NT6.3.07
Real-Time Imaging of Nanocrystal Superlattice Self-Assembly William Tisdale; MIT, United States.

4:30 PM NT6.3.08
Self-Assembly of Alloyed Copper Chalcogenide Nanorods into 2D Free-Floating Sheets in Solution Ajay Singh; 1Lawrence Berkeley National Lab, United States; 2University of Texas at Austin, United States.

4:45 PM NT6.3.09
Strong Quantum-Confinement Effect on Seebeck Coefficient in PbSe and PbTe Nanowire Thin Films Nimai Mishra; Los Alamos National Laboratory, United States.

SESSION NT6.4: Poster Session I: Colloidal Nanoparticles I
Session Chairs: Hongyou Fan, Han Htoon, Ying-Bing Jiang and Songtao Wu
Tuesday Afternoon, March 29, 2016 8:00 PM Sheraton, Third Level, Phoenix Ballroom

NT6.4.01 Pressure-Directed Folding and Unfolding Self-Assembly of New Classes of Multi-Dimensional Nanostructures Kafiu Biam; Sandia National Laboratories, United States.

NT6.4.02 Multifunctional Magneto-Fluorescent Core-Shell Supernanoparticles Ou Chen; Brown University, United States.

NT6.4.03 New Synthesis of N-Heterocyclic Carbene Protected Gold Nanoparticles Francois Riber; UPMC, France.


NT6.4.05 Room Temperature Halide Ion Intercalation of Colloidal Cesium Lead Halide Perovskite Nanocrystals and Their Photodetector Application Jong-Soo Lee; DGIST, Korea (the Republic of).

NT6.4.06 Cu$_2$S/ZnS Heterostructured Nanorods: Cation Exchange vs. Solution-Liquid-Solid-like Growth You Zhai; University of Illinois at Urbana-Champaign, United States.

NT6.4.07 Effect of Ligand Exchange with Mercaptoacetic Acid on PbSe Nanocrystals Infrared Photodetector Ahmad Nusir; University of Arkansas, United States.

NT6.4.08 End-to-End Alignment of Polymer Grafted Nanorods in Polymer Thin Films by Self-Assembly Christina Time; Sandia National Labs, United States.

NT6.4.09 6.5% Efficient Solar Cells with Inkjet Printed Cu(In,Ga)Se$_2$-Based Nanoparticles Absorber Jeremy M. Barbe; KAUST, Saudi Arabia.

NT6.4.10 Graphene Quantum Dots-Embedded ZnS Nanobelts Having High Photocatalytic Activity Sooho Ham; Seoul National University, Korea (the Republic of).

NT6.4.11 Synthesis of Derivatizable Quantum Dots Using Norbornene-Based Ligands Jose Cordero; MIT, United States.

NT6.4.12 Synthesis of Cu Nanoparticles (CoNPs) with Surface Hydrides, a Possible Precursor for Bi-Metallic Nanomaterials Bishoy Morcos; 1CEA–LETI-Minatec Campus, France; 2Universite de Lyon, CNRS-UMR 5265, France.

NT6.4.13 Optimization of Anti-Reflection and Anti-Scratch in Self-Assembled SiO$_2$ Nanoparticle Films by Variation of Polyelectrolyte pH Jonathan Metzman; Virginia Tech, United States.

NT6.4.14 Laser Induced Size and Shape Control of Gold Nanoparticle Jeeyoung Lee; Yonsei University, Korea (the Republic of).

NT6.4.15 Observation of Orthorhombic Phase in Trigonal Prisms of Nanogold Particles and Their Plasmonic Properties Manish K. Singh; Indian Institute of Technology(BHU), India.

NT6.4.16 Tuning the Energy Level of Lead Sulfide Quantum Dots: A Combination of Experimental and Computational Investigations Abu Asaduzzaman; University of Arizona, United States.

NT6.4.17 Influence of Ligand Shape and Steric Hindrance on the Composition of the Nanocrystal Ligand Shell Kim De Nolf; 1Ghent University, Belgium; 2Ghent University, Belgium.

NT6.4.18 Synthesis of Tetrahedral Shaped InP Colloidal Quantum Dots by Halide-Amine Copassivation Hyeongwoong Choi; 1Korea University of Science and Technology (UST), Korea (the Republic of); 2Korea Institute of Machinery and Materials (KIMM), Korea (the Republic of).

NT6.4.19 Spectroelectrochemical Microscopy on Plasmonic Nanoparticle Electrodes Andrew Wilson; Temple University, United States.

NT6.4.20 Stable Aqueous Dispersion of Graphene-Based Composite through Direct Graphite Exfoliation with a Photosensitizer and Its Application to Cancer Phototherapy Naoaki Komatsu; Kyoto University, Japan.

NT6.4.21 Investigation into the Origins of Stress Gradients in Inkjet-Printed Films Formed from Sintered Silver Nanoparticles Muslim Ahmed; University of California, Berkeley, United States.

NT6.4.22 [Ag$_2$(SR)$_3$]$_n$–: Molecular Silver Nanoparticle Chakra P. Joshi; KAUST, Saudi Arabia.

NT6.4.23 Shape Control of BaTiO$_3$ Nanoparticles for Enhanced Chemical and Physical Properties Tommaso Costanzo; Central Michigan University, United States.

NT6.4.24 Reversible Assembly of Colloidal Particles Using Low Frequency Pulsed DC Electric Fields Elaine Lee; Lawrence Livermore National Lab, United States.
NT6.4.25
Utilizing Thiol-ene Click Chemistry to Fabricate Highly Emissive QD Patterns for Polymer Based Optical Systems Marcus J. Smith; Georgia Institute of Technology, United States.

NT6.4.26
ReaXFF Reactive Force Field Study of Oriented Attachment of TiO<sub>2</sub> Nanocrystals in Non-Aqueous Solvents Muralikrishna Raja; Stanford University, United States.

NT6.4.27
Microplasma-Assisted Electrochemistry Synthesis of Noble Metal Nanoparticles/Graphene Composites as Highly-Sensitive Surface-Enhanced Raman Scattering (SERs)-Active Materials Wei-Hung Chiang; National Taiwan University of S&T, Taiwan.

NT6.4.28
A Universal Approach to Synthesis of Cu-Pt Nanocrystals: From Solid to Hollow Ye-Chuan Kao<sup>1</sup>, Ya-Chuan Kao<sup>2</sup>; ‘Academia Sinica, Taiwan; ‘National Taiwan University, Taiwan.

NT6.4.29
Illustrations for Design of Function-Added Bimetallic Nanocrystals with Chemical Approaches Chun-Hong Kuo; Academia Sinica, Taiwan.

NT6.4.30
Formulation of Antibacterial Starch-Nanosilver Functional Coating Materials via Ultrasonication Jeyoung Jung; Yonsei University, Korea (the Republic of).

SESSION NT6.5: Nanoparticle Synthesis and Applications II
Session Chairs: Han Htoon and Ying-Bing Jiang
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 131 ABC

8:00 AM *NT6.5.01
Binary Colloidal Superparticles Yungao Sun; Temple University, United States.

8:30 AM *NT6.5.02
Noble Metal Nanostructure Synthesis at the Liquid-Substrate Interface: New Structures, New Insights and New Possibilities Svetlana Neretina; Temple University, United States.

9:00 AM NT6.5.03
Conductive PbS Mesocrystals Marcus Scheele; University of Tubingen, Germany.

9:15 AM NT6.5.04
Enhancing the Stability of Gold Nanoparticles in Biological Media through Surface Chemistry Modifications Idah Pekeciović; Simon Fraser University, Canada.

9:30 AM NT6.5.05
Counterion-Mediated Ligand Exchange for PbS Colloidal Quantum Dot Superlattice Daniel M. Balazs; University of Groningen, Netherlands.

9:45 AM NT6.5.06
Green-Emitting ‘Giant’ Quantum Dots Nanoengineered for Significantly Suppressed Blinking Nimai Mishra; Los Alamos National Laboratory, United States.

10:00 AM BREAK

10:30 AM *NT6.5.07
Recovering the Efficacy of Antibiotics Using Nanoparticles Targeted to Sites of Bacterial Infection Carlee Ashley; Sandia National Laboratories, United States.

11:00 AM NT6.5.08
Colloidal Chalcopryte (CuFeS<sub>2</sub>) Nanocrystals for Photothermal Therapy Sandeep Ghosh; Universita degli Studi di Genova, Italy.

11:15 AM NT6.5.09
Biohybrid Co-Crystals from Biological and Synthetic Nanoparticles Mauri Kostiainen; Aalto University, Finland.

11:30 AM NT6.5.10
Chiral Nanocrystal Bio-Assemblies with Plasmonic and Excitonic Resonances Alexander O. Govorov; Ohio University, United States.

11:45 AM NT6.5.11
Biodegradable Inorganic Nano-Architectures to Avoid Accumulation in Excretory System Organs Valerio Voliani; Center for Nanotechnology Innovation @NEST, Istituto Italiano di Tecnologia, Italy.

SESSION NT6.6: Nanoparticle Synthesis, Assembly and Applications III
Session Chairs: Ying-Bing Jiang and Zaicheng Sun
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 131 ABC

1:30 PM *NT6.6.01
Materials Interaction of Nanoparticles in Catalysis: From Atomic to Macroscopic Dohyung Kim; University of California, United States.

2:00 PM *NT6.6.02
Bifunctional Ag@Pd-Ag Nanocubes for Highly Sensitive Monitoring of Catalytic Reactions by Surface-Enhanced Raman Spectroscopy Dong Qin; Georgia Institute of Technology, United States.

2:30 PM NT6.6.03
Conjugated Polymer–CdSe Quantum Dot Core/Shell Composite Nanofibers for Organic Solar Cells Yang Qiu; University of New Mexico, United States.

2:45 PM NT6.6.04
Towards Smart Scale-Up: Deterministic Synthesis of Highly Concentrated, Monodispersed Gold Nanorods Based on Growth Mechanism Stages Richard A. Vaia; Air Force Research Laboratory, United States.

3:00 PM BREAK

3:30 PM *NT6.6.05
Orientational Control of Polymer Grafted Nanorods Christina Ting; Sandia National Labs, United States.

4:00 PM NT6.6.06
Uncovering the Fundamentals behind Quantum Dot Nucleation and Growth Mechanisms through Density Functional Theory and in situ X-Ray Scattering of PbSe Nanocrystals Henry C. Herbol; Cornell University, United States.

4:15 PM NT6.6.07
A Study on the Synthesis of Cu,ZnSnS<sub>2</sub>, Nanoparticles Using Solution Based Approaches Rameez Ahmad; Institute of Particle Technology, Friedrich Alexander Universität Erlangen-Nürnberg, Germany.

4:30 PM NT6.6.08
Solvant Interface Restructuring around Colloidal Nanoparticles Miriam Zobel; University of Erlangen, Germany.

4:45 PM NT6.6.09
Theory of Energy Level Tuning in Quantum Dots by Surfactants Danilo Zherebetskyy; Lawrence Berkeley National Lab, United States.

SESSION NT6.7: Poster Session: Colloidal Nanoparticles II
Session Chairs: Hongyou Fan, Han Htoon, Ying-Bing Jiang and Songtao Wu
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

NT6.7.01
Solution-Based Self-Assembly and Nanoengineering of Multifunctional Nanoparticle Coatings Kaifu Bian; Sandia National Laboratories, United States.

NT6.7.02
Effect of The Reaction Temperature on the Optical Properties of CdSTe Quantum Dots Synthesized under Microwave Irradiation Gleimara Rivera Rodriguez; Pontifical Catholic University of Puerto Rico, United States.
A Stable, Disposable Nanostructured Substrate for Surface Enhanced Raman Scattering (SERS) Detection of Drugs with Environmental Applications
Honey Madupalli; Central Michigan University, United States.

Palladium Nanoparticles Incorporated into Zeolite Imidazole Frameworks by Solvated Metal Atom Dispersion Method and Their Catalytic Activity in Nitroarene Reduction
Ancila Uranescu1, 2; 1Indian Institute of Science (IISc) Bangalore, India; 2Ruhr University, Germany.

Synthesis of Multi-Shell Nanoplates by Stepwise Epitaxial Growth of Bi2Se3 and Bi2Te3 Nanoplates and Their Thermoelectric Properties
Gyeongbae Park; Pohang University of Science and Technology, Korea (the Republic of).

Structural Transformation of Silica-Coated CdSe/CdS Dot-in-a-Rod Nanoparticles under fs-Laser 2-Photon Excitation
Wiebke Albrecht; Utrecht University, Netherlands.

A Molecular Self-Assembly Approach towards Designing Neuron-Specific Colloidal Metallic Nanoparticles
Madhura Som; University of California at San Diego, United States.

Internal Structure Alteration in Core/Shell Heterostructure Leading to Diverse Efficient Applications
Avijit Saha; JNCASR, India.

Synthesis and Characterization of Iridium Nanosponge and Its Catalytic Properties
Soumya Ghosh; Indian Institute of Science, India.

Low Dimensional Graphene Colloidal Particles: Large Scale Synthesis and Applications
Ki Hwan Ko; Hanyang University, Korea (the Republic of).

Morphological Control of Liquid Metal Nanoparticles for Soft Electronics
Yiliang Lin; North Carolina State University, United States.

An Electrohydrodynamic Strategy for Synthesis of Crumpled Graphene Nanoparticles and Their Assembly into Hierarchically Functional Monoliths
Vincent Tung; UCLA, United States.

The Reaction Mechanism of Seeded Growth Flash Methods for the Formation of Core/Shell Quantum Dots
Jaor Nakonechnyi; Ghent University, Belgium.

The Atomic Layer Deposition with Wave Bumps on Rotary Reactor Bed:
Igor Nakonechnyi; Ghent University, Belgium.

Directed Assembly of Colloidal Silica Spheres by Two-Photon Lithography Produced Templates
Steven E. Kooi; MIT, United States.

Novel Method of Graphene Production: An Aqueous Arc Discharge Process
Seung Kim; University of California, San Diego, United States.

Large Area, Self-Assembled Surface Enhanced Raman Scattering Biosensors Reaching Single Molecule Detection Limits
Will Thrift; University of California Irvine, United States.

The Relationship between the Spatial Distribution of an Exciton Delocalizing Ligand and the Radius of Delocalization for CdS Quantum Dots
Rachel Harris; Northwestern University, United States.

All-Metal Nanoparticle Electronics
Yong Yan; National Ctr for Nano S&T, China.

Size Controlled Synthesis of Gold Nanoparticles Using Light Induced Reduction
Hendrik du Toit; University College London, United Kingdom.

Soft Oppositely Charged Nanoparticles with Controlled Charge Yield Co-Crystals with Tunable Lattice Parameters
Ville Liljestrom; AALTO University, Finland.

Photo-Physical and Vibrational Studies of Fusion Materials Based on Ionic Liquids and Amorphous Porous Silicon Nanoparticles
Mohamed Rachid Tchahala; King Abdullah University of Science and Technology, Saudi Arabia.

A Layer-by-Layer Low-Temperature Passivation of Semiconductor Nanocrystals with Transition Metal Chalcogenides
Pavel Moroz; Bowling Green State University, United States.

Temperature Dependence of the Nanocrystal Nucleation Revealed through Plasmon Resonance of Bimetallic Nanoparticles
Natalia Razgoniayeva; Bowling Green State University, United States.

Reaction Chemistry in Innovative Indium Phosphide Quantum Dots
Synthesis
Dorian Dupont; Gent University, Belgium.

Ligand Addition Energy and the Stoichiometry of Colloidal Nanocrystals
Kim De Nolf; Ghent University, Belgium.

Microscopic Characterization of Crazing and Fracture in Polystyrene Grafted Nanoparticle Assemblies
Ming-Siao Hsiao1, 2; 1Air Force Research Laboratory, United States; 2UES, Inc, United States.

Positive/Negative Photopatterning: Utilizing the Decay-to-Recovery of Quantum Dot Emission to Control the Development Process
Sidney T. Malak; Georgia Institute of Technology, United States.

Synthesis, Assembly and Optoelectronic Applications of Branched Semiconductor Nanocrystals
Nimai Mishra; Los Alamos National Laboratory, United States.
SESSION NT6.9: Nanoparticle Synthesis, Assembly and Applications IV
Session Chairs: Yujiang Song and Huimeng Wu
Thursday Afternoon, March 31, 2016
PCC West, 100 Level, Room 104 AB

1:30 PM *NT6.9.01
Carbon Nanodots: Synthesis and Applications Zaicheng Sun: Beijing University of Technology, China.

2:00 PM *NT6.9.02
Noble Metal and Non-Noble Metal Nanoscale Electrocatalysts toward Oxygen Reduction Reaction Yujiang Song: Dalian University of Technology, China.

2:30 PM NT6.9.03
Tuning the Properties of Atomically Precise Silver Nanoparticles Megalamane S. Bootharaju: KAUST, Saudi Arabia.

2:45 PM NT6.9.04
Synthesis, Functionalization and Assembly of Graphene Quantum Dots Binsong Li1, 2; 1Innothium LLC, United States; 2Indiana University, United States.

3:00 PM BREAK

3:30 PM NT6.9.05
Synergistic Role of Dopants on the Morphology of Alloyed Copper Chalcogenide Nanocrystals Anita Singh: 1; 1Lawrence Berkeley National Lab, United States; 2University of Texas at Austin, United States.

3:45 PM NT6.9.06
Facile Synthesis of Graphene Quantum Dots by Microplasma-Assisted Electrochemistry Wei-Hung Chang: National Taiwan University of S&T, Taiwan.

4:00 PM *NT6.9.07

4:30 PM *NT6.9.08
Controlled Self-Assembly and Applications of Porphyrin Feng Bai: Henan University, China.

SESSION NT6.10: Poster Session III: Colloidal Nanoparticles III
Session Chairs: Hongyou Fan, Han Htoon, Ying-Bing Jiang and Songtao Wu
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

NT6.10.01
Stress-Induced Phase Transformation, Consolidation, and Optical Coupling of Quantum Dots Kaifu Tian: Sandia National Laboratories, United States.

NT6.10.02
Highly Stretchable Gold Nanosheet Electrodes Patterned by Stamping Process Jun Hyuk Song: Yonsei University, Korea (the Republic of).

NT6.10.03
Eco-Friendly Fabrication of Silver Nanoshells Having Enhanced Catalytic Performances Du-Jeon Jang: Seoul National University, Korea (the Republic of).

NT6.10.04
Tuning Collective Surface Plasmon Resonance by Assembling Silver Nanoparticles into a Three-Dimensional Nanostructure Fu-Cheng Tsai: National Taiwan University, Taiwan.

NT6.10.05

NT6.10.06
A Facile Low Temperature Solid-Phase Synthesis of g-c3n4 Quantum Dots and Their Use in Cell Viability Aiwu Wang: City University of Hong Kong, Hong Kong.

NT6.10.07
Solution-Processable Indirect Synthesis of Cu-Doped 2D PbS Nanoplates Exhibiting Low Resistivity and High Responsivity Wen-Ya Wu: National University of Singapore, Singapore.

NT6.10.08
Carbon Dots: Doping and Applications Zaicheng Sun: Beijing University of Technology, China.

NT6.10.09
Synthesis of Pt-Nanoparticle-Functionalized Co3O4-In2O3 Heterojunction Nanocomposites and Their CO Sensing Properties Jun-Pu Liu: National Chiao Tung University, Taiwan.

NT6.10.10
Characterization of Silver Nanoparticles Prepared by Polyl Method with Atmospheric Plasma Treatment Hsuan-Ying Chen: National University of Tainan, Taiwan.

NT6.10.11

NT6.10.12
Interchangeable Colloidal Nanocrystals for Tunable Optical Nanaoantenna Tyler J. Dill: University of California-San Diego, United States.

NT6.10.13
Bimetallic Ag-Au Alloy Nanoparticles: Synthesis, Characterization and Catalytic Activity Charu Dwivedi: 1; 1Doon University, Dehradun, India; 2Indian Institute of Technology Mandi, India.

NT6.10.14
Preparation of SiO2 Nanoparticles from Mudstones to Enhance Their Application Ping-Jung Lai: National Cheng Kung University, Taiwan.

NT6.10.15
Simple One-Step Oil Encapsulation in Polyethylene Glycol Using Coaxial Electrospray for the Short-Term Drug Delivery System Tae Hoon Ki: Yonsei University, Korea (the Republic of).
NT6.10.16
Analyzing the Roles of Additives in the Synthesis of Gold Nanorods Iris Guo; Simon Fraser University, Canada.

NT6.10.17
Identification of Defects in Lepidocrocite Nanoparticles and Correlation with Their Magnetic Properties Yulia M. Trushkina; Stockholm University, Sweden.

NT6.10.18
Flexible Synthesis of Novel Superhydrophobic Nanocomposite Polymer Films Sebastian C. Dixon; University College London, United Kingdom.

NT6.10.19
Optimization of Fluid Characteristics of 2D Materials for Inkjet Printing Monica Michel; University of Texas at El Paso, United States.

NT6.10.20
Se Doping Assisted Morphology Control of Te Nanorods Junghyeok Kwak; POSTECH, Korea (the Republic of).

NT6.10.21
Formation of Nanoparticle Films via Hypersonic Particle Deposition Peter Firth; Arizona State University, United States.

NT6.10.22
LED Lighting System Integrated with Cd-Free Quantum Dot Enhanced Panel (QDEP) for High Color Rendering Index Min-Sang Lee; Ecolumy, Korea (the Republic of).

NT6.10.23
Chemically Tunable Colloidal Silicon Telluride through Zero Valant Metal Intercalation Isabel Al-Dhahir; Brown University, United States.

NT6.10.24
Fabrication and Characterization of Transparent Nanocomposite Films of Red-emitting YVO₄:Bi³⁺,Eu³⁺ Nanoparticles and Silicone-Modified Acrylic Resin by Electrophoretic Deposition Yoshihiko Ito; Keio University, Japan.

NT6.10.25
Study on Thermal Insulation and Mechanical Properties of Polyurethane Composites with Hollow Particles Younghwan Kwon; Daegu University, Korea (the Republic of).

NT6.10.26
Rare Pt Nanostructures for Efficient Electrocatalysis Moumita Rana; Indian Institute of Science Education and Research-Mohali, India.

NT6.10.27
Preparation of Few-Layer-Graphene via Surface-Only-Oxidation and Shear Exfoliation for Composites Applications Tae-Ho Yoon; Gwangju Institute of Science and Technology, Korea (the Republic of).

NT6.10.28
A New View of the Low-Temperature Sintering Phenomenon of Particle Sizes of Nanometers Based on the Molecular Dynamics Study Norie Matsubara; Kyushu University, Japan.

NT6.10.29
Bimetallic Au/Pd Nanostructures for Ultrasonically Sensitive Plasmonic Hydrogen Sensing Hang Kuen Yin; The Chinese University of Hong Kong, Hong Kong.

NT6.10.30
Circular Gold Nanodisks with Synthetically Tunable Sizes and Plasmon Wavelengths Ximin Cui; The Chinese University of Hong Kong, China.

NT6.10.31
Polyaniline-Coated Gold Nanorods and Nanobipyramids with Tunable Plasmon for Plasmonic Switching Wenzheng Lu; The Chinese University of Hong Kong, Hong Kong.

NT6.10.32
Synthesis and Characterization of Colloidal Cu Nanocubes Mun Lahpai; Arizona State University, United States.

NT6.10.33
Optical Properties of PbSe/PbS Core/Shell Nanocrystals Haley Morris; University of Arkansas, United States.

NT6.10.34
Photonic Sintering of Solution Processed Bi₂Te₃ Thermoelectrics Stanley S. Choe; Sandia National Labs, United States.

NT6.10.35
Ligand Engineering of BiI₃ Nanostructures for Hybrid Solar Cells Active Layers Ivana Aguier; Universidad de la Republica, Uruguay.

NT6.10.36
N-Doped Mesoporous Inverse Opal Structures for Visible-Light Photocatalysts Su-Jin Ha; Sogang University, Korea (the Republic of).

NT6.10.37
Silica-Silver Nanoparticles as a New Tool for the Molecular Characterization of Tumor Cells by Raman Spectroscopy Jorge Jimenez-Canal; Universidad de Sonora, Mexico.

SESSION NT6.11: Nanoparticle Synthesis and Applications IV
Session Chairs: Feng Bai and Jian Zhang
Friday Morning, April 1, 2016
PCC West, 100 Level, Room 104 AB

8:00 AM NT6.11.01
Surface Plasmon Strain Sensors Maryam Zahedian; Indiana University, United States.

8:15 AM NT6.11.02
A Comprehensive Study of InP Nanocrystals Formation Aude Buffard; ESPCI, France.

8:30 AM NT6.11.03
Control of Dynamical Self-Assembly of Strongly Brownian Nanoparticles through Convective Forces Induced By Ultrasonic Laser Serin Iladay; Bilkent University, Turkey.

8:45 AM NT6.11.04
A Reproducible Au-Ag Core-Shell Nanorods Based 3D SERS Substrate Shuya Xu; University of Delaware, United States.

9:00 AM NT6.11.05
Size, Shape and Composition Control of CsPbX₃ (X = Cl, Br, I) Nanocrystals: From Cubic NCs to Ultrathin Nanoplatelets and Their Anion Exchange Reactions Quinten Akkerman; Istituto Italiano di Tecnologia, Italy.

9:15 AM NT6.11.06
Two-Color Blinking Suppression in CdSe/CdS Tetrapods as a Function of Geometry Feng Wang; Los Alamos National Laboratory, United States.

9:30 AM NT6.11.07
Flexible Nanostructured Thermoelectric Devices Printed Using Colloidal Nanoparticles Yanliang Zhang; Boise State University, United States.

9:45 AM NT6.11.08
Multistate Blinking and Scaling of the Recombination Rates in Individual Silica-Coated CdSe/CdS Nanocrystals Anton Malko; University of Texas-Dallas, United States.

10:00 AM BREAK

10:30 AM NT6.11.09
Transfer Printing Arrays of Gold Plasmonic Nanoparticles by Thermosensitive pNIPAAm for Integration into Organic Photovoltaics Sirous Khabbaz; Sabanci University, Turkey.

10:45 AM NT6.11.10
Intraband Photoluminescence from HgSe/CdS Core/Shell Quantum Dots Zhiyou Deng; University of Chicago, United States.

11:00 AM NT6.11.11
Tailoring of Ordered Arrays of Colloidal Silica Particles Used in Nanosphere Lithography Juan-Carlos Cheung-Wong; Instituto de Fisica, Universidad Nacional Autonoma de Mexico, Mexico.
SESSION NT6.12: Nanoparticle Synthesis, Assembly and Applications V
Session Chairs: Feng Bai and Zaicheng Sun
Friday Afternoon, April 1, 2016
PCC West, 100 Level, Room 104 AB

1:30 PM NT6.12.01
In Silico Investigation of the Location of Charge Carriers in Bare and Functionalized CdS Nanoparticles
Andre F. de Moura; Federal University of Sao Carlos, Brazil.

1:45 PM NT6.12.02
A One-Step Method for Depositing Highly Conductive Lead Chalcogenide Quantum Dot Films
Qianglu Lin; Los Alamos National Laboratory, United States.

2:00 PM NT6.12.03
Strategies for Performance Enhancement in Quantum Dot Solar Cells
Chia-Hao M. Chuang; MIT, United States.

2:15 PM NT6.12.04
Synthesis and Modeling of Barium Titanate Nanoparticles in a Composite to Determine Dielectric Constants
Scott H. Tan; Pomona College, United States.

2:30 PM NT6.12.05
Mn2+-doped (CdSe)13 Clusters: The Smallest Doped Semiconductor
Jiwoong Yang1, 2; 1Institute for Basic Science, Korea (the Republic of); 2Seoul National University, Korea (the Republic of).

2:45 PM NT6.12.06
Composition-Matched, All-Scale “Solders” for Semiconductors: From Synthesis to High-Performance Transistors and Moldable Thermoelectrics
Hao Zhang; University of Chicago, United States.

3:00 PM BREAK

3:30 PM NT6.12.07
Synthesis of High-Aspect-Ratio Twin Gold Nanorods
Yoshiko Takenaka1, 2; 1AIST, Japan; 2JST, Japan.

3:45 PM NT6.12.08
Near-Infrared-Emitting Quantum Dots Nanotracers for Bimodal Imaging
Celine Rosticher; Laboratoire de Physique et de l'Etude des Matériaux LPEM - Ecole Superieure de Physique et de Chimie Industrielles de la ville de Paris (ESPCI), France.

4:00 PM NT6.12.09
One Strategy Many Shapes: Morphology Controlled Synthesis of Colloidal Oxide Structures
Jaswinder Sharma; Oak Ridge National Laboratory, United States.

4:15 PM NT6.12.10
Chemical Crosslinking inside an Organic/Inorganic Nano-Superystal: On a New Nanocomposite with Excellent Mechanical Hardness and Strength
Axel Dreyer; Hamburg University of Technology, Germany.

4:30 PM NT6.12.11
Nano Materials Based Interfacial Materials for High Efficiency Organic Solar Cells
Jian Zhang; Guilin University of Electronic Tech, China.
SYMPOSIUM NT7
Nanoparticle Characterization and Removal
March 28 - March 30, 2016

Chairs
Manish Keswani, University of Arizona
Paul Mertens, IMEC
Kash Mittal, Reviews of Adhesion and Adhesives
Jin-Goo Park, Hanyang University

Symposium Support
Micron Foundation
PCT Systems, Inc.
Semiconductor Research Corporation

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

TUTORIAL
Fundamentals of Nanoparticle Adhesion and Removal
Monday Afternoon, March 28, 2016
1:30 PM – 5:00 PM
PCC North, 100 Level, Room 128 A

1:30 PM - 3:00 PM  Parts I and II: Cetin Cetinkaya
The first segment reviews the fundamentals of nano/micro-particle adhesion and main techniques for adhesion characterization at nano/micro-length scales. A review of the current particle adhesion research will be provided and some of the key emerging adhesion characterization techniques will be discussed in detail.

The second segment focuses on the practical issues and technical challenges associated with nano/micro-particles adhesion and removal in semiconductor industry. Following a general discussion and an overall review, some specific cases, such as post-CMP particle removal, silicon wafer cleaning and photomask cleaning, will be discussed in detail.

3:00 PM – 3:30 PM BREAK

3:30 PM - 5:00 PM  Parts III and IV: Stephen Beaudoin
The first segment focuses on van der Waals forces on particle adhesion to surfaces, with an emphasis on effects of particle size, shape, roughness and composition. A review of classic methods for describing the adhesion and new developments in particle and powder adhesion characterization will be presented.

The second segment will focus on the effects of relative humidity and capillary forces on particle adhesion. A review of classical approaches to describing humidity/moisture effects will be included, as will an evaluation of low relative humidity conditions where condensed liquid droplets are unlikely to exist on surfaces, yet where moisture strongly influences the particle adhesion.

Instructors
Cetin Cetinkaya, Clarkson University
Stephen Beaudoin, Purdue University

SESSION NT7.1: Nanoparticle Adhesion and Characterization
Session Chairs: Jeffery Butterbaugh and Kash Mittal
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 128 A

1:30 PM *NT7.1.01
Effect of Relative Humidity on Nanoparticle Adhesion Stephen Beaudoin; Purdue University, United States.

2:00 PM NT7.1.02
Moving Au Nanoparticles Using a Focused Electron Probe Nan Jiang; Arizona State University, United States.

2:15 PM *NT7.1.03
Adhesion Characterization of Single Microparticles Cetin Cetinkaya; Clarkson University, United States.

2:45 PM NT7.1.04
An NMR Toolbox for Characterizing Nanomaterials Chengchen Gao1, 2; 1Arizona State University, United States; 2Arizona State University, United States.

3:00 PM BREAK

3:30 PM *NT7.1.05
RapidNano; Towards 20nm Particle Detection on EUV Mask Blanks Jacques C. van der Donck; TNO, Netherlands.

4:00 PM NT7.1.06
Carbon Nanotubes Doped with Metal Oxide Nanoparticles as New Materials for Oil Removal Ahmad Kayvani Fard1, 2; 1Qatar Environmental and Energy Research Institute, Qatar; 2Hamad Bin Khalifa University, Qatar.

4:15 PM *NT7.1.07
Wet Process Challenges for Advance Node IC Manufacturing Stefan Degendt1, 2; 1IMEC, Belgium; 2KU/Leuven, Belgium.

4:45 PM NT7.1.08
Facile Synthesis of Monodisperse Cu3SbSe4 Nanoparticles and Thermoelectric Performance of Cu3SbSe4 Nanoparticles-Based Materials Yimin Wu; Université de Rennes 1, France.

SESSION NT7.2: Poster Session
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

1:30 PM - 3:00 PM  Parts I and II: Cetin Cetinkaya
The first segment reviews the fundamentals of nano/micro-particle adhesion and main techniques for adhesion characterization at nano/micro-length scales. A review of the current particle adhesion research will be provided and some of the key emerging adhesion characterization techniques will be discussed in detail.

The second segment focuses on the practical issues and technical challenges associated with nano/micro-particles adhesion and removal in semiconductor industry. Following a general discussion and an overall review, some specific cases, such as post-CMP particle removal, silicon wafer cleaning and photomask cleaning, will be discussed in detail.

3:00 PM – 3:30 PM BREAK

3:30 PM - 5:00 PM  Parts III and IV: Stephen Beaudoin
The first segment focuses on van der Waals forces on particle adhesion to surfaces, with an emphasis on effects of particle size, shape, roughness and composition. A review of classic methods for describing the adhesion and new developments in particle and powder adhesion characterization will be presented.

The second segment will focus on the effects of relative humidity and capillary forces on particle adhesion. A review of classical approaches to describing humidity/moisture effects will be included, as will an evaluation of low relative humidity conditions where condensed liquid droplets are unlikely to exist on surfaces, yet where moisture strongly influences the particle adhesion.

Instructors
Cetin Cetinkaya, Clarkson University
Stephen Beaudoin, Purdue University

SESSION NT7.2: Poster Session
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

**NT7.2.01**
The Effect of Copper Incorporation on Structural, Optical and Magnetic Properties of ZnO Nanoparticles Orlem A. Yildirim; Selcuk University, Turkey.

**NT7.2.02**
Mini Flowers ZnO Supported on Inorganic Compounds Used in the Removal of Dyes Navely Torres Gomez; Universidad Autónoma del Estado de México, Mexico.

SESSION NT7.3: Nanoparticle Removal I
Session Chairs: Manish Keswani and Jacques van der Donck
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 128 A

9:00 AM *NT7.3.01

9:30 AM *NT7.3.02
Enhanced Nanoparticle Removal Using Surfactants Michael Free; University of Utah, United States.

10:00 AM BREAK
10:30 AM NT7.3.03
Investigations of Acoustic Cavitation in Aqueous Surfactant Solutions for Megasonic Cleaning Applications Mingrui Zhao; University of Arizona, United States.

10:45 AM *NT7.3.04
Advances in Aerosol Spray for Particle Removal without Damage James Snow; SCREEN SPE USA, United States.

11:15 AM NT7.3.05
Relationship between Surface Damage and Particle Removal on Si Wafer during SC1 Cleaning Process for Si Wafer Fabrication Minsu Kim; Hanyang University, Korea (the Republic of).

11:30 AM *NT7.3.06
Fundamentals of Particle Removal by High Speed Air Jet and Enhancement Methods of the Removal Performance Kuniaki Gotoh; Okayama University, Japan.

SESSION NT7.4: Nanoparticle Removal II
Session Chairs: Dongsik Kim and James Snow
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 128 A

1:30 PM *NT7.4.01
Particle Removal Evolution Since the 1970s and up to Now Steven Verhaverbeke; Applied Materials Inc, United States.

2:00 PM *NT7.4.02
Laser-Induced Spray Cleaning for Nanoscale Contaminant Removal from Solid Surfaces Dongsik Kim; POSTECH, Korea (the Republic of).

2:30 PM BREAK

3:00 PM NT7.4.03
Characterization of Stable and Transient Cavitation in Dual- and Multiple-Frequency Systems Using a Hydrophone Petrie Yam; Onda Corporation, United States.

3:15 PM NT7.4.04
Effect of Corrosion Inhibitor on Particle Contamination and Removal for Cu CMP Application Byoung-Jun Cho; Hanyang University, Korea (the Republic of).

3:30 PM *NT7.4.05
Nanoscale Contaminant Removal Using CO2 Gas Cluster for Semiconductor Device Taesung Kim; Sungkyunkwan University, Korea (the Republic of).
SYMPOSIUM NT8

Silicon Nanostructures—Doping, Interface Effects and Sensing
March 29 - March 31, 2016

Chairs
Daniel Hiller, University of Freiburg
Dirk Koenig, University of New South Wales
Al Meldrum, University of Alberta
Jan Valenta, Charles University in Prague

Symposium Support
Laserglow Technologies

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* Invited Paper

SESSION NT8.1: Si Nanostructures—Sensing Applications
Session Chairs: Jan Linnros, Al Meldrum, Jan Valenta and Jonathan Veinot
Tuesday Afternoon, March 29, 2016
PCC North, 100 Level, Room 128 B

1:30 PM *NT8.1.01
Combining Whispering Gallery Mode Lasers and Microstructured Optical Fibers: Limitations, Applications and Perspectives for Biosensing Applications
Alexandre François1, 3, 2; 1The University of Adelaide, Australia; 2University of South Australia, Australia; 3ARC Centre of Excellence for Nanoscale BioPhotonics, Australia.

2:00 PM *NT8.1.02
Frequency Splitting in Whispering Gallery Microlasers for High Performance Sensing
Sahin K. Ozdemir; Washington University in St. Louis, United States.

2:30 PM NT8.1.03
Detection of Nitroaromatics in the Solid, Solution and Vapour Phases Using Silicon Quantum Dot Sensors
Al Meldrum; University of Alberta, Canada.

2:45 PM NT8.1.04
Iron-Doped Silica Nanoparticles as a Model System for Lung Inflammation Studies
Valerie J. Lepport; University of California, United States.

3:00 PM BREAK

3:30 PM *NT8.1.05
Exploring the Nanoscale Dynamics of Biomolecules with Optical Microcavities
Frank Vollmer; Max-Planck-Inst, Germany.

4:00 PM *NT8.1.06
Optofluidic Lasers on Chip
Xudong S. Fan; University of Michigan, United States.

4:30 PM NT8.1.07
Lab-in-a-Tube: Sensing with Silicon Nanotube Transistors
Steffen Strehe; Ulm University, Germany.

4:45 PM NT8.1.08
P and B Doped Silicon Nanocrystals in Biological Environment
Jan Valenta; Charles Univ-Prague, Czech Republic.

SESSION NT8.2: Si Nanoscale Doping—Theory and Experiment
Session Chairs: Minoru Fujii and Al Meldrum
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 128 B

8:30 AM *NT8.2.01
Dopants in Silicon Nanostructures: The Role of Quantum Confinement and Dimensionality
James R. Chelikowsky; University of Texas-Austin, United States.

9:00 AM *NT8.2.02
Theory of Localized Surface Plasmon Resonance in Doped Semiconductor Nanocrystals
Christophe Delerue; IEMN-CNRS, France.

9:30 AM NT8.2.03
Boron and Phosphorus Doping of Embedded Silicon Nanocrystals
Sebastian Gutsch; University of Freiburg, Germany.

9:45 AM NT8.2.04
Confinement of Donors and Doping Efficiency in Embedded and Freestanding Silicon Nanocrystals
Rui N. Pereira1, 3; 1University of Aveiro, Portugal; 3Technische Universität München, Germany.

10:00 AM BREAK

SESSION NT8.3: Si QDs—Plasma Synthesis, Doping and Plasmonics
Session Chairs: Dirk Koenig and Wilfried Vandervorst
Wednesday Morning, March 30, 2016
PCC North, 100 Level, Room 128 B

10:30 AM *NT8.3.01
Plasmonic Properties and Electronic Transport in Doped Silicon Nanocrystal Films
Uwe R. Kortshagen; University of Minnesota, United States.

11:00 AM *NT8.3.02
Colloidal Silicon Nanocrystals with High Boron and Phosphorus Concentration Shells
Minoru Fujii; Kobe University, Japan.

11:30 AM NT8.3.03
Interplay of Doping and Surface Characteristics in Silicon Nanocrystals: Impact on Photovoltaic Applications
Vladimir Svrcek; AIST Japan, Japan.

11:45 AM NT8.3.04
Structural and Optical Properties of Boron-Doped Silicon Nanocrystals
Zhenyi Ni; Zhejiang University, China.

SESSION NT8.4: 3D Metrology of Dopants
Session Chairs: Kaining Ding and Daniel Hiller
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 128 B

1:30 PM *NT8.4.01
Advances in Metrology for Complex Systems Embedded in Small Volumes
Wilfried Vandervorst; Imec, Belgium.

2:00 PM *NT8.4.02
Atom Probe Tomography of Nanostructures
Hubert Gnaser1, 2; 1Technische Universität Kaiserslautern, Germany; 2Institut für Oberflächen- und Schichtanalytik (IFOS), Germany.

2:30 PM NT8.4.03
Boron and Phosphorus Distribution in Si Nanocrystals by Atom Probe Tomography
Keita Nomoto; UNSW Australia, Australia.

2:45 PM NT8.4.04
Characterization of Boron Doping in Individual Ge / Si Core-Shell Nanowires Investigated by Atom Probe Tomography
Bin Han; Tohoku University, Japan.

3:00 PM BREAK
SESSION NT8.5: Interface Effects, Defects and Doping
Session Chairs: James Chelikowsky and Jan Valenta
Wednesday Afternoon, March 30, 2016
PCC North, 100 Level, Room 128 B

3:30 PM *NT8.5.01
Defect-Induced Conical Intersections Facilitate Non-Radiative Recombination in Silicon Nanocrystals
Benjamin G. Levine; Michigan State University, United States.

4:00 PM *NT8.5.02
Theoretical Analysis of Electronic Structure and Charge Transport in Passivated Si Nanocrystals of Few NM in Size
Pavel Jelinek; Institute of Physics of the CAS, Czech Republic.

4:30 PM NT8.5.03
Silicon Quantum Structures with Massive Energy Offset Due to SiO2- vs. Si3N4-Embedding: Alternative to Electronic Impurity Doping
Dirk Koenig; 1University of New South Wales, Australia; 2University of New South Wales, Australia; 3Albert-Ludwigs University Freiburg, Germany.

4:45 PM NT8.5.04
Mechanism of Arsenic Monolayer Doping of Oxide-Free Silicon
Peter Thissen; KIT, Germany.

SESSION NT8.6: Poster Session
Session Chairs: Daniel Hiller and Dirk Koenig
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

NT8.6.01
Self-Formation of Ohmic Contact for Reduction of Schottky Barrier Height in a TiN/Ti/SiO2/n-Si Structure
Chang-Hoon Jeon; KAIST, Korea (the Republic of).

NT8.6.02
Surface Plasmon Enhanced Absorption Cross-Section of Silicon Quantum Dots in Gold Nanoparticle Composites
Asuka Inoue; Kobe University, Japan.

NT8.6.03
A Detailed Study on Dosimetry Aspects of Gd2O3 MOS Capacitor under Zero Gate Bias
Ercan Yılmaz; 1Abant Izzet Baysal University Center for Nuclear Radiation Detector Research and Applications, Turkey; 2Abant Izzet Baysal University Faculty of Arts and Sciences, Turkey.

NT8.6.04
Electrical Properties of Solution Processed Layers Based on GeSi-Alloy Nanoparticles
Zeypınar Meric; University of Erlangen-Nürnberg, Germany.

NT8.6.05
Silicon Suboxides: Definitions and Differentiation
Jan Laube; University of Freiburg, Germany.

NT8.6.06
Structural, Optical, and Electrical Properties of Si Nanocrystals with Boron and Phosphorus Doping Fabricated by High Si Content Si Rich Oxide and SiO2 Bilayers
Keita Nomoto; UNSW Australia, Australia.

NT8.6.07
Fabrication of Excellent p-i-n Interfaces Made by Sputtering with Supplying Atomic Hydrogen
Kousaku Shimizu; College of Industrial Technology, Japan.

NT8.6.08
Selective Fabrication of Si Nanodots and Nanowires
Haeyeon Yang; South Dakota School of Mines and Technology, United States.

NT8.6.09
The QDs Biggest Ordering Growth on Freestanding Si Nanoribbons
Junjuian Wang; University of Electronic Science and Technology of China, China.

NT8.6.10
Electronic and Optical Properties of Double- and Bridge-Bonded O and N at Fully OH- and NH2-Terminated Silicon Nanocrystals
Dirk Koenig; University of New South Wales, Australia.

NT8.6.11
Theoretical and Experimental Evidence for the Inability of Impurity Doping to Provide Majority Carriers to Si Nanocrystals
Dirk Koenig; 1University of New South Wales, Australia; 2University of New South Wales, Australia; 3Albert-Ludwigs University Freiburg, Germany.

NT8.6.12
Doping Germanium Nanocrystals with Phosphorus
Tianhao Yuan; Zhejiang University, China.

NT8.6.13
Time Resolved Photoluminescence of Porous Silicon under Hydroxyl Radicals
Ricardo E. Marotti; University de la Republica, Uruguay.

NT8.6.14
Silicon Peaks and Needles in Porous Silicon for Sensing Applications
Petro Goering; SmartMembranes GmbH, Germany.

SESSION NT8.7: Si QDs—Optical and Electrical Properties
Session Chairs: Pavel Jelinek and Al Meldrum
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 128 B

8:30 AM *NT8.7.01
Adventures is Silicon Nanocrystal Surface Chemistry
Jonathan Veinot; University of Alberta, Canada.

9:00 AM NT8.7.02
External vs. Internal Luminescence Quantum Yield of Si Nanocrystal
Jan Valenta; Charles University, Czech Republic.

9:15 AM NT8.7.03
Absorption Spectrum of Single Silicon Nanocrystals of Different Geometry: Experiment and Theory
Federico Pevery; KTH Royal Institute of Technology, Sweden.

9:30 AM NT8.7.04
Electrical Transport through Silicon Nanocrystal Ensembles at the Percolation Threshold
Jan Laube; University of Freiburg, Germany.

9:45 AM NT8.7.05
Silicon Nanocrystal-Based Metal-Semiconductor Hybrid Nanoparticles
Hiroshi Sugimoto; Kobe University, Japan.

10:00 AM BREAK

SESSION NT8.8: Nanowires
Session Chairs: Hubert Gnaser and Dirk Koenig
Thursday Morning, March 31, 2016
PCC North, 100 Level, Room 128 B

10:30 AM *NT8.8.01
Si and Ge Nanoantennas and Metamaterials
Mark L. Brongersma; Stanford University, United States.

11:00 AM *NT8.8.02
Semiconducting Nanowires on Si for Future Electronic Devices
Heike Riel; IBM Research GmbH, Switzerland.

11:30 AM NT8.8.03
Influence of Localized Defects on the Properties of Silicon Nanowires
Norbert H. Nickel; Helmholtz Zentrum Berlin, Germany.

11:45 AM NT8.8.04
Highly Efficient SiNWs/PEDOT:PSS Hybrid Solar Cells Achieved by Conformal Coating
Myeong Hoon Jeong; UNIST, Korea (the Republic of).

243
SESSION NT8.9: Nanoscopic Si-Related Properties in PV
Session Chairs: Christophe Delerue and Jan Valenta
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 128 B

1:30 PM *NT8.9.01
First Principle Modelling of B-O Defect Passivation in P-Doped Si Sean C. Smith; UNSW Australia, Australia.

2:00 PM *NT8.9.02
Implementation of Nanostructured Silicon Alloys in Silicon Heterojunction Solar Cells Kaining Ding; Research Center Juelich, IEK-5 Photovoltaics, Germany.

2:30 PM NT8.9.03
First Principles Study of the Electronic Density of States of Amorphous Hydrogenated Silicon Reza Vatan Meidanshahi; Arizona State University, United States.

2:45 PM NT8.9.04
Investigation on Unintentional Doping in N-Type Microcrystalline Silicon Carbide Thin-Films Manuel Pomaska; Forschungszentrum Julich, Germany.

3:00 PM BREAK

SESSION NT8.10: Si Nanostructures—Applications and Nanomicroscopy
Session Chairs: Daniel Hiller and Heike Riel
Thursday Afternoon, March 31, 2016
PCC North, 100 Level, Room 128 B

3:30 PM *NT8.10.01
Nanopore Arrays in a Silicon Membrane for Parallel Single-Molecule Optical Detection Jan T. Linnros; Royal Institute of Technology - KTH, Sweden.

4:00 PM *NT8.10.02
Transmission Electron Microscopy of Silicon Nanocrystals Composites Christian Kuebel; Karlsruhe Institute of Technology, Germany.

4:30 PM NT8.10.03

4:45 PM NT8.10.04
Scanning Microwave Impedance Microscopy of Buried Dopant Nanostructures in Silicon David A. Scrymgeour; Sandia National Labs, United States.
SYMPOSIUM SM1

Liquid Crystalline Materials—Displays and Beyond
March 30 - March 31, 2016

Chairs
L.C. Chien, Kent State University
Helen Gleeson, University of Leeds
Ivan Smalyukh, University of Colorado
Timothy White, Air Force Research Laboratory

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8:30 AM *SM1.1.01
Synthesis, Alignment, and Spontaneous Shape Change in Epoxy-Based Liquid Crystal Elastomers Rafael Verduzco; Rice University, United States.

9:00 AM SM1.1.02
Polymer-Dispersed Liquid Crystal Elastomers Valentina Domenici; Universita di Pisa, Italy.

9:15 AM SM1.1.03
Photoinduced Topographical Feature Development in Blueprinted Azobenzene-Functionalized Liquid Crystalline Elastomers Suk-Kyun Ahn1; 1Pusan National University, Korea (the Republic of); 2Air Force Research Laboratory, United States.

9:30 AM SM1.1.04
Programming Liquid Crystal Elastomer Folding by Precise Patterning of Topological Defects Yu Xia; U Penn, United States.

9:45 AM SM1.1.05
Liquid Crystal Contact Lenses with Graphene Electrodes and Switchable Focus Helen F. Gleeson; University of Leeds, United Kingdom.

10:00 AM BREAK

10:30 AM *SM1.1.06
Chemical Microswimmers: From Motion Control to Targeted Cargo Delivery Mykola Tasinkevych1, 2; 1Max Planck Institute for Intelligent Systems, Germany; 2Universität Stuttgart, Germany.

11:00 AM SM1.1.07
Blueprinting Topology into Liquid Crystal Elastomers Timothy White; Air Force Research Laboratory, United States.

11:15 AM SM1.1.08
Postpolymerization Modification of Alignment in Liquid Crystal Covalent Adaptable Networks Matthew K. McBride; University of Colorado-Boulder, United States.

11:30 AM SM1.1.09
Thiol-Acrylate Main-Chain Liquid-Crystalline Elastomers with Tunable Thermo-Mechanical Properties Mohand Saed; University of Colorado-Denver, United States.

1:30 PM *SM1.2.01
A Liquid Crystal and Polymer Composite Film with Electrical Adjustability of Surface Free Energy Yi-Hain Lin; National Chiao Tung University, Taiwan.

2:00 PM SM1.2.02
Total Reflection of Electrically Induced Band Gap Changes in Polymer Stabilized Cholesteric Liquid Crystals Vincent P. Tondiglia1, 2; 1Azimuth, United States; 2AFRL, United States.

2:15 PM SM1.2.03
Bimodes-Mediated Flexoelectro-Optical Behavior of Cholesteric Liquid Crystals Andrii Varanytsia; Kent State University, United States.

2:30 PM SM1.2.04
Morphology of Polymer Structure in Polymer-Stabilized Blue Phase Hui-Yu Chen; National Chung Hsing University, Taiwan.

2:45 PM SM1.2.05
Topology-Mediated Electro-Optical Behaviour of a Wide-Temperature Liquid Crystalline Amorphous Blue Phase Min Su Kim; Kent State University, United States.

3:00 PM BREAK

3:30 PM *SM1.2.06
Electrooptics of Nematics and Cholesterics with Oblique Helicoidal Structure Oleg D. Lavrentovich; Kent State University, United States.

4:00 PM SM1.2.07
Controlling the Electronic Properties in Liquid Crystal Conjugated Small Molecules for Application in Electronics Nadine Y. Tehana; Carl von Ossietzky Universität Oldenburg, Germany.

4:15 PM SM1.2.08
The Influence of Polymer Network Development on the Electro-Optic Response of Polymer Stabilized Cholesteric Liquid Crystals Kyung Min Lee1, 2; 1Air Force Research Laboratory, United States; 2Azimuth Corp., United States.

3:00 PM BREAK

4:30 PM SM1.3.01
Design and Properties of SmAPF Liquid Crystal Materials Eva D. Korblova1, 2; 1Soft Materials Research Center, United States; 2University of Colorado Boulder, United States.

4:45 PM SM1.3.02
Transflective Properties in Amorphous Liquid-Crystal BPIII Hui-Yu Chen; National Chung Hsing University, Taiwan.

4:30 PM SM1.3.01
Design and Properties of SmAP, Liquid Crystal Materials Eva D. Korblova1, 2; 1Soft Materials Research Center, United States; 2University of Colorado Boulder, United States.

4:45 PM SM1.3.02
Transflective Properties in Amorphous Liquid-Crystal BPIII Hui-Yu Chen; National Chung Hsing University, Taiwan.

SESSION SM1.4: Poster Session
Wednesday Afternoon, March 30, 2016
Sheraton, Third Level, Phoenix Ballroom

SM1.4.01
Electric-Field Induced Reorientation of Reflective Microplatelets Dispersed in a Nematic Liquid Crystal Host Aubrey Steele1, 2; 1SOCHÉ, United States; 2Air Force Research, United States.
SM1.4.02
Asymmetric Organic-Inorganic Hybrid Polyhedral Oligomeric Silsesquioxane Nanoparticles for Vertical Alignment of Liquid Crystals
Joo-kyoung Hwang; Chonbuk National University, Korea (the Republic of).

SM1.4.03
Optically Isotropic Liquid Crystal Medium Prepared by Doping Star-Shaped Liquid Crystal Surfactants in Twin Nematic Liquid Crystals
Joo-kyoung Hwang; Chonbuk National University, Korea (the Republic of).

SM1.4.04
Dual Photo-Functionalized Amphiphiles for Photo-Reversible Liquid Crystal Alignments
Daseal Jung; Chonbuk National University, Korea (the Republic of).

SM1.4.05
Reversible Actuating and Writing Behaviors of a Head-to-Side Connected Main-Chain Photochromic Liquid Crystalline Polymer
Daseal Jung; Chonbuk National University, Korea (the Republic of).

SM1.4.06
Bistable and Photoswitchable Diffraction Grating Based on Electric Field-Induced Cholesteric Bubbles
Andrii Varanytsia; Liquid Crystal Institute, Kent State University, United States.

SM1.4.07
Phase Behaviors of Tapered Dendritic Liquid Crystals with Photochromic Azobenzene Mesogens
Yu-Jin Choi; Chonbuk National University, Korea (the Republic of).

SM1.4.08
Bilayered Composite Materials Based on Liquid Crystalline Elastomers: Experiments and Simulations
Valentina Domenici; Università di Pisa, Italy.

SM1.4.09
Enhanced Optical and Electro-Optical Properties of Nano-Ceria Dispersed Ferroelectric Liquid Crystals for Display Applications
Pija Goel; G.B. P.U.A.T., India.

SM1.4.10
High Transmittance Optical Films Based on Quantum Dot Doped Nanoscale Polymer Dispersed Liquid Crystals
Sahil Sandesh Gandhi; Chemical Physics Interdisciplinary Program and Liquid Crystal Institute, Kent State University, United States.

SM1.4.11
Preparation and Characterization of New Photochromic Polymers Containing Side Chain Azo-Diphenyl Diacyetylene
Jimoo Kim1, 2; 1KRICT, Korea (the Republic of); 2Korea University of Science and Technology, Korea (the Republic of).

SM1.4.12
Structure Property Relationship in Liquid Crystal Nanoinclusion Hybrids
Clare Mahoney; Air Force Research Lab, United States.

SM1.4.13
Responsive Optical Elements Prepared from Liquid Crystal Elastomers
Benjamin A. Kowalski; Air Force Research Lab, United States.

SM1.4.14
Structure-Performance Relation of Liquid Crystal Photoalignment with in situ Formation of Protection Layers
Kai-Han Chang; Kent State University, United States.

SESSION SM1.5: Liquid Crystals in Displays and Beyond—Property Enhancement with Nanoinclusions
Session Chairs: L.C. Chien, Helen Gleeson, Ivan Smalyukh
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 231 A

8:30 AM SM1.5.01
Topological Nanocolloids with Facile Electric Switching of Plasmonic Properties
Ye Yuan; University of Colorado Boulder, United States.

8:45 AM SM1.5.02
Development of 3D Nano-Assembled Gold Micro-Shells for Plasmonic Driven Optical and Therapeutic Applications
Makiko T. Quint; University of California Merced, United States.

9:00 AM SM1.5.03
Tunable Surface Plasmon Resonance From Assembled Nanorods in the Topological Defects of Nematic Liquid Crystals
Elaine Lee1, 2; 1Lawrence Livermore National Laboratory, United States; 2University of Pennsylvania, United States.

9:15 AM SM1.5.04
Electrically Tunable Nematic Colloidal Dispersions of Upconversion Nanorods
Haridas Mundoor; University of Colorado, United States.

9:30 AM SM1.5.05
“Michel-Levy” Bands in Nanoplate Suspensions: Use of Gravity and Magnetic Field to Control Orientation of Colloidal Nanoplates
Zhengdong Cheng1, 2; 1Texas A & M University, United States; 2Texas A & M University, United States.

9:45 AM BREAK

SESSION SM1.6: Liquid Crystals in Displays and Beyond—Light and Alignment
Session Chairs: L.C. Chien, Helen Gleeson, Ivan Smalyukh
Thursday, March 31, 2016
PCC North, 200 Level, Room 231 A

10:00 AM *SM1.6.01
Light-Controlled Topological Charge in a Nematic Liquid Crystal
Igor Ljubljan. 1Jozef Stefan Institute, Slovenia; 2University of Ljubljana, Slovenia.

10:30 AM *SM1.6.02
Topological Diversity of Chiral Liquid Crystals Microvolumes
Tetiana Orlova; University of Bordeaux, CNRS, France.

11:00 AM SM1.6.03
Three-Dimensional Patterning of Solid Microstructures through Laser Reduction of Colloidal Graphene Oxide in Aqueous Liquid-Crystalline Dispersions
Bohdan Senyuk1, 2; 1University of Colorado, United States; 2Rice University, United States.

11:15 AM SM1.6.04
Nanoscale Etched Surfaces for Arbitrary and Robust Liquid Crystal Alignment
Jeffrey Chou; MIT Lincoln Laboratory, United States.

11:30 AM *SM1.6.05
Chirogyral Effect on Microfibres in Nematic Cells
Simon Copar; University of Ljubljana, Slovenia.

SESSION SM1.7: Liquid Crystals in Displays and Beyond—Fibers and Self Assembly
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 231 A

1:30 PM *SM1.7.01
Topological Defects in Liquid Crystals as Templates for Molecular Self-Assembly
Nicholas L. Abbott; University of Wisconsin, United States.

2:00 PM *SM1.7.02
Micro/Nano Filaments Morphologies Revealed by Nematic Liquid Crystals
Maria Helena Godinho; Universidade Nova de Lisboa, Portugal.

2:30 PM *SM1.7.03
Liquid Crystalline Polymer Vesicles: Thermotropic Phases in Lyotropic Structures and Their Potential Bio-Based Applications
Min-Hui Li1, 2; 1Institut de Recherche de Chimie Paris (IRCP), France; 2Beijing University of Chemical Technology, China.

3:00 PM BREAK
3:30 PM SM1.7.04
Guiding Liquid Fibers of Smectics Francesca Serra; University of Pennsylvania, United States.

3:45 PM SM1.7.05
Responsive Liquid Crystalline Cellulose Networks Susete N. Fernandes; I3N/CENIMAT, Department of Materials Science, Faculty of Sciences and Technology, Universidade NOVA de Lisboa, Portugal.

SESSION SM1.8: Liquid Crystals in Displays and Beyond—Energy
Session Chairs: L.C. Chien, Helen Gleeson, Ivan Smalyukh and Timothy White
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 231 A

4:00 PM SM1.8.01
Ion-Conductive Liquid-Crystalline Assemblies: Orientation Control of Ionic Channels and Approaches to Energy Applications Takashi Kato; University of Tokyo, Japan.

4:30 PM SM1.8.02

4:45 PM SM1.8.03
Symposium SM2
Bioinspired Dynamic Materials—Synthesis, Engineering and Applications
March 29 - April 1, 2016

Chairs
Zhibin Guan, University of California, Irvine
Ximin He, Arizona State University
Wilhelm Huck, Radboud University Nijmegen
Stefan Zauscher, Duke University

Symposium Support
RT-MRSEC

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances). Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

SESSION SM2.1: Bioinspired Dynamic Materials—Synthesis, Engineering and Applications I
Session Chair: Zhi Zhao
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 231 B

1:30 PM \textsuperscript{*SM2.1.01}
Exploiting Elastic Instabilities to Add Form and Function to Mesoscale Materials
Paul V. Braun; University of Illinois-Urbana Champ, United States.

2:00 PM \textsuperscript{SM2.1.02}
A Bio-Inspired Hydrogel Interferometer for Ultrafast Gas Sensing
Zhi Zhao; Arizona State University, United States.

2:15 PM \textsuperscript{SM2.1.03}
Tunable Elastomer Foams for Simple Fabrication of Complex, Bioinspired Soft Machines
Benjamin C. Mac Murray; Cornell University, United States.

2:30 PM BREAK

3:00 PM \textsuperscript{SM2.1.04}
Dynamic Polymer Systems with Self-Regulated Secretion
Joanna Aizenberg; Harvard University, United States.

3:30 PM \textsuperscript{SM2.1.05}
Infrared Invisibility Stickers Inspired by Cephalopods
Long Phan; University of California, Irvine, United States.

3:45 PM \textsuperscript{SM2.1.06}
Versatile, Muscle-Inspired Shape-Memory Polymer Systems
Kenneth P. Mineart; North Carolina State University, United States.

4:00 PM \textsuperscript{*SM2.1.07}
A Supramolecular Approach to Make Conducting Polymers Strong, Tough and Responsive
Mingming Ma; USTC, China.

4:30 PM \textsuperscript{*SM2.1.08}
A Versatile Responsive Surface Coating Based on an Alkyl-Terminated NIPAM Oligomer
Dale L. Huber; Sandia National Labs, United States.

4:45 PM \textsuperscript{*SM2.1.09}
Monolithic Graded-Refractive-Index Glass-Based Biomimetic Antireflective Coatings: Broadband/Omnidirectional Light Harvesting and Self-Cleaning Characteristics
Tolga Aytug; Oak Ridge National Laboratory, United States.

SESSION SM2.2: Poster Session I: Bioinspired Dynamic Materials—Synthesis, Engineering and Applications I
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

SM2.2.01
The Use of Scallop Shell Powder as a Method of Extracting Strontium
Fumihiro Mihara; Tokyo University of Science, Japan.

SM2.2.02
High-Performance, Skeleton-Reinforced Polypyrrole Electroactuators for Driving a Flexible Insulin Pump
Bingxi Yan; Ohio State University, United States.

SM2.2.03
Self-Propelled Nanomotors Autonomously Seek and Repair Cracks
Jinxing Li; University of California-San Diego, United States.

SM2.2.04
All Printed Paper-Based Organic Electrochemical Transistors (OECTs) for Metabolite Sensing
Eloise Bihar; Ecole des Mines de Saint Etienne, France; Microvitae, France.

SM2.2.05
Mechanically Adaptive Polymers for Electronics and Energy Applications
Yue Cao; University of California, Riverside, United States.

SM2.2.06
Ink-Jet Fabrication of Water-Responsive Bacterial Spore Actuators
Ahmet-Hamdi Cavusoglu; Columbia University, United States.

SM2.2.07
Bioinspired, Dynamic Antibacterial and Antifouling Surface
Mary Nora Dickson; University of California-Irvine, United States.

SM2.2.08
Autonomous Indication of Mechanical Damage Using Fluorogenic Microcapsules
Wenle Li; University of Illinois Urbana-Champaign, United States.

SM2.2.09
Preparation of Soft-Bonded Azo Polymer Complexes for Photo-Reversible Bio-Compatible Materials
Frederic-Guillaume Rollet; McGill University, Canada.

SM2.2.10
Kinetics of Mechanochromic Reactions in Thermoplastic Polymers
Tae Ann Kim; University of Illinois-Urbana-Champ, United States.

SM2.2.11
Dynamics of a Cell-Sized Micro-Osmotic Actuator
Youngjoon Koh; University of Illinois Urbana Champaign, United States.

SESSION SM2.3: Bioinspired Dynamic Materials—Synthesis, Engineering and Applications II
Session Chair: Amelia Gladman
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 231 B

8:30 AM \textsuperscript{*SM2.3.01}
Programming Dynamic Nucleic Acid Biomaterials
Elisa Franco; University of California, Riverside, United States.

9:00 AM \textsuperscript{SM2.3.02}
Continuous Affinity Protein Separation with Bio-Mimetic Dynamic Electrochemical Membranes
Bruce J. Hinds; Unv. of Washington, United States.

9:15 AM \textsuperscript{*SM2.3.03}
Rationally Designed Protein Hydrogels with Tailored Mechanical Properties
Hongbin Li; University of Illinois Urbana Champaign, United States.

* Invited Paper
Bio-Inspired Modified Surfaces for Dew Water Harvesting

Chrystelle Salameh; iTODYS, France.

10:00 AM BREAK

Shape Memory Elastomeric Composites: Biomimetic Mechanically Active Materials

Patrick T. Mather; Syracuse University, United States.

11:00 AM Biomimetic 4D Printing

Amelia S. Gladden; Harvard University, United States; Wyss Institute for Biologically Inspired Engineering, United States.

11:15 AM Mechanotransduction in Polymeric Materials with Covalent Chemical Response

Stephen Craig; Duke University, United States.

11:45 AM Multimaterial Magnetically Assisted 3D Printing of Composite Materials

Dimitri Kokkinis; ETH Zurich, Switzerland.

SESSION SM2.4: Bioinspired Dynamic Materials—Synthesis, Engineering and Applications III

Session Chair: Zhibin Guan

Wednesday Afternoon, March 30, 2016

PCC North, 200 Level, Room 231 B

1:30 PM Advanced Functional Hydrogels Based on Reversible Sacrificial Bonds

Tasuku Nakajima; Hokkaido University, Japan.

2:00 PM Beyond Self-Healing Polymer Materials: Underwater Self-Healing and Ultra-High Stretchability

Chao Wang; University of California Riverside, United States.

2:15 PM Multi-Stimuli-Responsive Self-Healing Metallo-Supramolecular Polymer Nanocomposites

Qifeng Zheng; University of Wisconsin-Madison, United States.

2:30 PM BREAK

3:00 PM Self-Healing and Mechano-Responsive Behavior of Polymer Materials with Dynamic Carbon–Carbon Covalent Bonds

Hideyuki Otsuka; Tokyo Institute of Technology, Japan.

3:30 PM Segmented Molecular Design of Self-Healing Protein Materials

Abdon Pena-Francoesch; Pennsylvania State University, United States.

3:45 PM Bioinspired Design of Dynamic and Self-Healing Polymers

Zhibin Guan; University of California-Irvine, United States.

4:00 PM Self-Repairing and Nanopatterning of 2D Peptoid Sheets

Fang Jiao; East China Normal University, China; Pacific Northwest National Laboratory, United States.

4:15 PM A New Class of Self-Repairable Membrane-Mimetic 2D Materials Assembled from Diblock-Like Peptoids

Chun-Long Chen; Pacific Northwest National Lab, United States.

SESSION SM2.5: Poster Session II: Bioinspired Dynamic Materials—Synthesis, Engineering and Applications II

Wednesday Afternoon, March 30, 2016

8:00 PM Sheraton, Third Level, Phoenix Ballroom

SM2.5.01

Soft Composite with Ionic Liquid Inclusions for Shock Wave Dissipation

Jaquan Lee; University of Illinois, United States.

SM2.5.02

Predicting the Energy Harvested from Evaporation by Water-Responsive Biomaterials

Ahmet-Handal Caygussoy; Columbia University, United States.

SM2.5.03

Artificial Phototactic Swimmer: Towards Programmable Nanorobots

Jinva Tan; University of Hong Kong, Hong Kong.

SM2.5.04

Synthesis, Retro-Michael Reaction and Humidity-Gradient Actuation of Ester-Sulfonyl Polymides and Their Derivatives

David H. Wang; Air Force Research Laboratory, United States; UES, Inc., United States.

SM2.5.05

Metallosupramolecular Polymer Materials with Light-Controlled Mechanical Properties

Anton Razgoniaev; Bowling Green State University, United States.

SM2.5.06

Molecular Dynamics Simulations of Stacked DNA Base Surrogates

Amir MazaheriPour; University of California, Irvine, United States.

SM2.5.07

High Electrical Stability of Silver Nanowires-Based Multi-Channel Electrodes for Implantable Neural Interface Monitoring with Wireless Recording System

Teppei Araki; Osaka University, Japan.

SM2.5.08

Study of ZnO Thin Films Interfaces with Biological Solutions and Its Influence on Electrical Transduction for Sensing of Stress Biomarkers on Flexible Polymer Membrane

Rujuta D. Munje; University of Texas-Dallas, United States.

SM2.5.09

Reconfigurable Bacteriophage for Templated ZnS/Au Janus Particles

Joshua M. Plank; University of California Riverside, United States.

SESSION SM2.6: Bioinspired Dynamic Materials—Synthesis, Engineering and Applications IV

Session Chair: Shelby Hutchens

Thursday Morning, March 31, 2016

PCC North, 200 Level, Room 231 B

8:15 AM Dynamic Polymeric Materials Bearing Hindered Urea Bonds

Hanjie Ying; University of Illinois at Urbana-Champaign, United States.

8:30 AM Design and Characterization of Polymer Hydrogels Formed via Dynamic Linkages between Boronate Esters and Biological Phenols/Polyphenols

Phillip B. Messersmith; University of California, United States; University of California, United States.

9:00 AM Capable Cross-Links: Polymersomes Reinforced with Catalytically Active Metal-Ligand Bonds

Walton Paxton; Sandia National Labs, United States.

9:15 AM Self-Oscillating Polymer Gels as Bioinspired Dynamic Softmatens

Ryo Yoshida; University of Tokyo, Japan.

9:45 AM Controlling Interfaces in Mechanical Properties in Biomaterials with Photoactive Metal-Coordination Bonds

Alexis D. Ostrowski; Bowling Green State University, United States.

10:00 AM BREAK

10:30 AM Protein Hydrogel Photonic Crystal Sensors for Chemical and Biological Analyses

Sanford A. Asher; University of Pittsburgh, United States.

11:00 AM Photoresponsive Polyacrylamide-Based Hydrogels with Tunable Mechanical Properties for Cartilage Tissue Engineering

Giuseppe Giammanco; Bowling Green State University, United States.
**SESSION SM2.7: Bioinspired Dynamic Materials—Synthesis, Engineering and Applications V**

**Session Chair:** Xinmin He

**Thursday Afternoon, March 31, 2016**

- **PCC North, 200 Level, Room 231 B**

1:30 PM *SM2.7.01*

**Graphene Based Nacre Materials and Actuators**

**Gaoquan Shi**; Tsinghua University, China.

2:00 PM **SM2.7.02**

**Bioinspired Stimuli-Responsive and Antifreeze-Secreting Anti-Icing Coatings**

**Xiaoda Sun**; Arizona State University, United States.

2:15 PM **SM2.7.03**

**A Hydrogel Packaging Anisotropic Electrostatic Repulsion**

**Takuzo Aida**\(^1, 2\); 1University of Tokyo, Japan; 2RIKEN, Japan.

2:45 PM **BREAK**

3:15 PM **SM2.7.04**

**Bioinspired Dynamic Material Systems: Warm-Blooded Plastics, Biomolecule Catch and Release, and Optical Chemical Sensing**

**Ximin He**\(^1\); 1Arizona State University, United States; 2Arizona State University, United States.

3:30 PM **SM2.7.05**

**Bioinspired Polymers: From Regeneration to Autonomous Cooling**

**Scott R. White**; University of Illinois, United States.

4:00 PM **SM2.7.06**

**Smart Optical Windows: Reversibly Switching between High Transparency, Color Display, and Opaqueness**

**Shu Yang**; University of Pennsylvania, United States.

4:15 PM **SM2.7.07**

**Fuel-Driven Active Materials**

**Jan van Esch**; Delft University of Technology, Netherlands.

4:45 PM **SM2.7.08**

**Using Bioinspired Water-Responsive Materials to Build Evaporation-Driven Engines**

**Xi Chen**; Columbia University, United States.

**SESSION SM2.8: Poster Session III: Bioinspired Dynamic Materials—Synthesis, Engineering and Applications III**

**Thursday Afternoon, March 31, 2016**

8:00 PM **PCC North, Third Level, Phoenix Ballroom**

**SM2.8.01**

**Synthetic Spider Silk: Techno-Economics & Life Cycle Analysis**

**Alan M. Edlund**; Utah State University, United States.

**SM2.8.02**

**Microtubule-Inspired Self-Assembly of Multifunctional Peptides**

**Erik D. Spoerke**; Sandia National Laboratories, United States.

**SM2.8.03**

**Controlling DNA Translocation Dynamics through Solid-State Nanopore by Modification of the Device Structure**

**Kidan Lee**; Seoul National University, Korea (the Republic of).
SESSION SM3 1: Flexible and Stretchable Electronics for Biomedical Applications I
Session Chairs: Liang Guo and Dae-Hyeong Kim
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 231 C

1:30 PM *SM3.1.01
Ultrasonic Electronics and Materials for Implantable Bio-Signal Monitoring System Tatsushi Sekitani; Osaka University, Japan.

2:00 PM SM3.1.02

2:15 PM SM3.1.03
Ionic and Electronic Conducting Materials in Health Monitoring Fana Jamalonga; EMSE CMP/BEL, France.

2:30 PM SM3.1.04
300-nm, Ultra-Flexible and Skin-Compatible Organic Transistors for Artificial Skin in Medical Applications Robert A. Nawrocki; The University of Tokyo, Japan.

2:45 PM SM3.1.05
Substrate-Free Organic Transistors and Circuits with a Sub-Micron Thickness Kenjiro Fukuda1, 3, 1; 1RIKEN, Japan; 2Yamagata University, Japan; 3JST PRESTO, Japan.

3:00 PM BREAK

3:30 PM *SM3.1.06
Materials Design for Skin-Inspired Stretchable Electronics Zhenan Bao; Stanford University, United States.

4:00 PM SM3.1.07
Wearable and Multiplexed Inorganic Nonvolatile Memory Array Using Nanocrystal Based Charge Confinement Jaemin Kim1, 2; 1Institute for Basic Science, Korea (the Republic of); 2Seoul National University, Korea (the Republic of).

4:15 PM SM3.1.08
Hydrogel-Based Stretchable Electrodes: Preparation and Biomedical Applications Matsukito Nishizawa; Tohoku University, Japan.

4:30 PM SM3.1.09
Magnetic Functionalities for Flexible Interactive Electronics G. Canon-Bermudez; IFW Dresden, Germany.

4:45 PM SM3.1.10

SESSION SM3 2: Flexible and Stretchable Electronics for Biomedical Applications II
Session Chairs: Liang Guo and Dae-Hyeong Kim
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 231 C

8:30 AM *SM3.2.01
Soft Bioelectronics Medical Systems for Clinical and Home-Based Monitoring Roozbeh Ghaifari; MC10 Inc., United States.

9:00 AM SM3.2.02
Ultra-Thin Magnetic Angle Sensor for On-Skin Interactive Electronics Gilbert S. Canon Bermudez; Institute for Integrative Nanosciences, IFW Dresden, Germany.

9:15 AM SM3.2.03
Soft and Stretchable Heater for Wearable Articular Heat Therapy Using Ligand-Exchanged Silver Nanowire Nanocomposite Suji Choi1, 2; 1Seoul National University, Korea (the Republic of); 2Institute for Basic Science, Korea (the Republic of).

9:30 AM SM3.2.04
Porous PVDF-Based Piezoelectric Nanogenerator for Biocompatible and Durable in vivo Mechanical Energy Harvesting Yinhao Yu; Department of Materials Science and Engineering, University of Wisconsin-Madison, United States.

9:45 AM SM3.2.05
Intrinsically Stretchable Organic Semiconductors for Wireless Human Gesture Decoding and Wearable Power Darren J. Lipomi; University of California-San Diego, United States.

10:00 AM BREAK

10:30 AM *SM3.2.06
Soft Sensors and Actuators for the Brain and Skin John A. Rogers; University of Illinois, United States.

10:45 AM SM3.2.07
Epidermal UV Colorimetric Dosimeter with Near Field Communication Capabilities Hitoshi Araki; University of Illinois at Urbana-Champaign, United States.

11:00 AM SM3.2.08
Printable, Ultra-Flexible Temperature Sensor for Thermal Mapping of Bio Tissue Tomoyuki Yokota; University of Tokyo, Japan.

11:15 AM SM3.2.09
Ambulatory Blood Pressure Measurement Using a Paired Stretchable Sensors Woo Soo Kim; Simon Fraser University, Canada.

11:30 AM SM3.2.10
Conformal, Large-Area Temperature Sensors with High Sensitivity for Thermal Mapping of Soft Tissue Jonathan Reeder; University of Texas-Dallas, United States.

SESSION SM3 3: Compliant and Bio-Inspired Electronics for Neural Applications
Session Chairs: Ingrid Graz and Ivan Minev
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 231 C

1:30 PM *SM3.3.01
Biomimetic Strategies towards Seamless Integration between Neural Electrodes and Brain Tissue X. Tracy Cui; University of Pittsburgh, United States.

2:00 PM SM3.3.02
Heterogeneous and Soft Amorphous-Silicon Mesostructures for Phospholipid Based Bioelectric Device and Deterministic Neuromodulation Yuanwen Jiang; University of Chicago, United States.
SESSION SM3.4: Poster Session: Soft Materials for Compliant and Continuous Monitoring of Bioelectrical Signals

SM3.4.01 Development of Flexible and Stretchable Dry Electrode Using Metal Electroplating on a Porous Elastomer Jeonghun Kim; KU-KIST Graduate School of Converging Science & Technology, Korea University, Korea (the Republic of).

SM3.4.02 Soft Conductive Materials Based Epidermal Electronics for Long-Term and Continuous Monitoring of Bioelectrical Signals HanSeop Kim; KU-KIST Graduate School of Converging Science and Technology, Korea University, Korea (the Republic of).

SM3.4.03 Biospired Tactile Sensor Using Single-Layer Graphene for Artificial Skin Sungwoo Chun; Hanyang University, Korea (the Republic of).

SM3.4.04 A Highly Conductive and Soft CNT/AgNW/PDMS-Based Electrodes for Continuous and Insensible EEG Recording Lee Joong Hoon; Korea University, Korea (the Republic of).

SM3.4.05 Development of a Janus-Like PDMS Sponge through Physicochemical Modifications and Its Application to Selective Absorbent Dehoon Kim; Inha Univ., Korea (the Republic of).

SM3.4.06 Development of a Graphite-Based Polymer Matrix Composite and Its Applications to Smart Sensors Kyungmok Nam; Inha University, Korea (the Republic of).

SM3.4.07 Resistance Changes and Shear Forces upon Bending in Stretchable Interconnects Thanh Nguyen; Arizona State University, United States.

SESSION SM3.5: Flexible and Stretchable Electronics for Biomedical Applications III

SM3.5.01 Flexible Hybrid Electronics for Air Force Applications Benjamin Leever; Air Force Research Laboratory, United States.

SM3.5.02 Flexible Motion Sensors in Understanding Body Language Qun-Dong Shen; Nanjing University, China.

SM3.5.03 Kirigami-Based Stretchable Lithium-Ion Batteries Hangning Jiang; Arizona State University, United States.

SM3.5.04 Dopant Induced Solubility Control: A Non-Destructive Optical Patterning Technique for Conductive Polymers with Diffraction Limited Resolution Ian Jacobs; University of California-Davis, United States.

SM3.5.05 Patterning Highly Conducting Conjugated Polymer Electrodes for Soft and Flexible Microelectrochemical Devices Alexandre Khald; University of Linkoping, Sweden.

SM3.5.06 “Cut-and-Paste” Manufacture of Long-Term, Multimodal Epidermal Electronic Systems Nanhua Lu; University of Texas-Austin, United States.

SM3.5.07 Wearable Magnetic Field Sensors for Flexible Electronics Gilbert S. Canon Bermudez; Institute for Integrative Nanosciences, IFW Dresden, Germany.

SM3.5.08 Smart Medical Skins Integrated with Cephalopod-Inspired Miniaturized Suction Cups Champaenei Chot; ‘Seoul National University , Korea (the Republic of); ‘Institute of Basic Science, Korea (the Republic of).

SM3.5.09 Mechanically Robust Design for Wearable Tattoo Electronics Huanyu Cheng; The Pennsylvania State University, United States.

SM3.5.10 3D Curvilinear Electronics from Conformable Balloon Transfer Printing Cunjiang Yu; University of Houston, United States.
SESSION SM3.6: Compliant and Bio-Inspired Electronics for Biomedical Applications I
Session Chairs: Liang Guo and Dae-Hyeong Kim
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 231 C

1:30 PM *SM3.6.01
Stretchable Ionics: From Transparent Artificial Muscles to Biocompatible Ionic Skin Christoph Keplinger; University of Colorado Boulder, United States.

2:00 PM SM3.6.02

2:15 PM SM3.6.03
Chemical Modification of Room Temperature Liquid Metal Interfaces for Microfluidic Electronics Christopher Tabor; Air Force Research Laboratory, United States.

2:30 PM SM3.6.04
Heating-Rate Triggered Single-Walled Carbon-Nanotube-Based 3-Dimensional Porous Conducting Networks for a Highly Sensitive Flexible Noncontact Sensing Device Yunting Tan; King Abdullah University of Science and Technology, Saudi Arabia.

2:45 PM SM3.6.05
Directly Printed, Flexible, and Collapsible Liquid Metal Microchannels Made of Its Own Oxide Skin Konrad Rylaczewski; Arizona State University, United States.

3:00 PM BREAK

3:30 PM *SM3.6.06
Deformable Silicon for Subcellular Interfaces Bozhi Tian; University of Chicago, United States.

4:00 PM SM3.6.07
Highly Stretchable Printed CNT-Based Electrochemical Sensors and Biofuel Cells: Combining Intrinsic and Design-Induced Stretchability Amay J. Bandodkar; University of California-San Diego, United States.

4:15 PM SM3.6.08
Acoustic Signal Detection via Nanoscale Crack Based Sensor Inspired by Spider’s Sensory Organ Tae-il Kim1,2; 1Sungkyunkwan University, Korea (the Republic of); 2Institute of Basic Science, Korea (the Republic of).

4:30 PM SM3.6.09
Protein-Based Protonic Transistors David D. Ordinario; University of California, Irvine, United States.

4:45 PM SM3.6.10
Stretchable Electronic Platform for Soft and Smart Contact Lens Applications Andres Vasquez Quintero; imec/UGent, Belgium.

SESSION SM3.7: Compliant and Bio-Inspired Electronics for Biomedical Applications II
Session Chairs: Ingrid Graz and Ivan Minev
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 231 C

8:30 AM *SM3.7.01
From Lab-To-Marketplace: Challenges and Discoveries during the Commercialization of a Stretchable Microelectrode Array Oliver Graudejus1,2; 1Arizona State University, United States; 2BMSFED, United States.

9:00 AM SM3.7.02
Progress in Self-Powered Implantable Medical Electronic Devices Zhou Li; Beijing Institute of Nanoenergy and Nanosystem, CAS, China.

9:15 AM SM3.7.03
R2R-Nanoimprint Lithography for the Large-Area Fabrication of Bioinspired Drag-Reducing Surfaces, Metallic Nanopatterns and Hierarchical Microfluidic Structures Barbara Stadlober; Joanneum Research, Austria.

9:30 AM SM3.7.04
Interphase-Induced Dynamic Self-Stiffening in Graphene-Based Polydimethylsiloxane Nanocomposite and Hydrogel Linlin Cao; Rice University, United States.

9:45 AM SM3.7.05
From Playroom to Lab: A Tensile Tester for Stretchable Electronics Made from Toy-Bricks for Research, Education and Exhibition Use Richard Moser; Johannes Kepler University Linz, Austria.

10:00 AM BREAK

10:30 AM *SM3.7.06
Mechanically Compliant Electrodes and Dielectric Elastomers from PEG-PDMS Copolymers Anne L. Skov; DTU, Denmark.

11:00 AM SM3.7.07
Measuring Coefficient of Thermal Expansion of Silicone Elastomers in a Very Wide Range of Modulus by Digital Image Correlation Tae-Ik Lee; KAIST, Korea (the Republic of).

11:15 AM SM3.7.08
Work of Adhesion/Separation between Soft Elastomers of Different Mixing Ratios Daniel Sanchez; The University of Texas at Austin, United States.

11:30 AM SM3.7.09
Soft Poly(dimethylsiloxane) Elastomers from Architecture-Driven Entanglement Free Design Thomas E. Kodger1, 2; 1University of Amsterdam, Netherlands; 2Harvard University, United States.

11:45 AM SM3.7.10
Inorganic Thin-Film Coatings of Elastomeric Polymers for Materials with Mechanically Switchable Optical Properties Stephen A. Morin1, 2; 1University of Nebraska Lincoln, United States; 2University of Nebraska - Lincoln, United States.
SYMPOSIUM SM4
Engineering Biointerfaces with Nanomaterials
March 30 - March 31, 2016

Chairs
Elaine Haberer, University of California, Riverside
Seung-Wuk Lee, University of California, Berkeley
Naoki Matsuda, National Institute of Advanced Industrial Science and Technology
Andreas Offenhaueser, Institute of Bio- and Nanosystems-Bioelectronics (IBN2)

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* Invited Paper

SESSION SM4.1: Engineering Biointerfaces with Nanomaterials I
Session Chairs: Elaine Haberer, Seung-Wuk Lee, Naoki Matsuda and Andreas Offenhaueser
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 232 A

8:30 AM *SM4.1.01
Functionalized SMA-Nanodics for Conjugation of Membrane Proteins to Dyes and Surfaces Marie-Eve Aubin-Tam; TU Delft, Netherlands.

9:00 AM SM4.1.02
Drug Delivery via Cell Membrane Fusion using Lipopeptide Modified Liposomes Alexander Kros; Leiden University, Netherlands.

9:15 AM SM4.1.03
Nano-Patterning of Biopolymer Poly (L-lactic acid) for Functional Biointerfaces and Drug Release Rana Biswas1, 2; 1Iowa State University, United States; 2Ames Laboratory, United States.

9:30 AM *SM4.1.04
Engineering Biointerfaces Using Controlled Radical Polymerization Harm-Anton Klok; EPFL, Switzerland.

10:00 AM BREAK

10:30 AM *SM4.1.05
Collagen Hybridizing Peptide: Self-Assembly and Denatured Collagen Targeting S. Michael Yu; University of Utah, United States.

11:00 AM SM4.1.06
Collagen-Like Phages for Hard Tissue Regeneration Hyo Eon Jin1, 2; 1University of California-Berkeley, United States; 2Ajou University, Korea (the Republic of).

11:15 AM SM4.1.07
Reflectin as a Material for Neural Stem Cell Growth Bylan J. Kautz; University of California, Irvine, United States.

11:30 AM SM4.1.08
Biomimetic Nanolaminous Composites for Tendon-Bone Interface Regeneration Ece Bayrak; TOBB University of Economics and Technology, Turkey.

11:45 AM SM4.1.09
Quantitative Investigation of Biomaterials-Based Strategy for Brain Injury Repair Virginia M. Ayres; Michigan State University, United States.

4:00 PM SM4.1.07
Friction and Wear Behavior of Electroless Ni-p Nano-Composite SiC and SiO2 Coatings on 316L Stainless Steel Ali Zandkarimi; Please Provide Institution, United States.

4:15 PM SM4.1.08
Crystallographic Orientation of Self-Assembled Peptides on CVD MoS2 Single Crystal Linhao Sun; Tokyo Institute of Technology, Japan.

4:30 PM SM4.1.09
In Situ Observation of Fluorescent-Tagged Peptides Diffusing on Boron Nitride by Single Molecule Tracking Peiying Li; Tokyo Institute of Technology, Japan.

SESSION SM4.2: Engineering Biointerfaces with Nanomaterials II
Session Chair: Naoki Matsuda
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 232 A

1:30 PM *SM4.2.01
Nanoengineered Environments for Biomedical Applications Nikolaj Gadegaard; University of Glasgow, United Kingdom.

2:00 PM SM4.2.02
In Situ Observation of Direct Electron Transfer Reaction of Heme Proteins Immobilized on ITO Electrode Naoki Matsuda; AIST, Japan.

2:15 PM SM4.2.03
Dynamin Polymerization on High-Curvature Templates Investigated by High-Speed Atomic Force Microscopy Yulang Zhang1, 2; 1Lawrence Livermore National Lab, United States; 2University of California Davis, United States.

2:30 PM SM4.2.04
Pushing Scanning Electron Microscopy to the Limit for Cell-Nanopillar Interface Investigations Francesca Santoro; Stanford University, United States.

2:45 PM SM4.2.05
Formation of Rare Earth Phosphate Nanostructures on Bacterial Membranes C. Jeffrey Brinker1, 2; 1University of New Mexico, United States; 2Sandia National Labs, United States.

3:00 PM BREAK

3:30 PM *SM4.2.06
Virus Nanoreactors and the Hierarchical Assembly of Coupled Catalytic Materials Trevor Douglas; Indiana University, United States.

3:45 PM SM4.2.07
Formation of Rare Earth Phosphate Nanostructures on Bacterial Membranes C. Jeffrey Brinker1, 2; 1University of New Mexico, United States; 2Sandia National Labs, United States.

4:00 PM SM4.2.08
Formation of Rare Earth Phosphate Nanostructures on Bacterial Membranes C. Jeffrey Brinker1, 2; 1University of New Mexico, United States; 2Sandia National Labs, United States.

4:15 PM SM4.2.09
Crystallographic Orientation of Self-Assembled Peptides on CVD MoS2 Single Crystal Linhao Sun; Tokyo Institute of Technology, Japan.

4:30 PM SM4.2.10
In Situ Observation of Fluorescent-Tagged Peptides Diffusing on Boron Nitride by Single Molecule Tracking Peiying Li; Tokyo Institute of Technology, Japan.

SESSION SM4.3: Poster Session: Engineering Biointerfaces with Nanomaterials
Session Chairs: Elaine Haberer and Naoki Matsuda
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

SM4.3.01
Functional Nanoarchitectures for Enhanced Drug Eluting Stents Yomna E. Saleh; The American University in Cairo, Egypt.

SM4.3.02
Tailoring Superhydrophobic Properties of Organic Electrochemical Biosensor for Cancer Cell Culture Medium Identification Francesco Gentile; University Federico II in Naples, Italy.

SM4.3.03
Sustained Release of Dexamethasone from Biodegradable Microspheres and Conducting Polymer Microcups Milad Khorrami; University of Houston, United States.
1:30 PM *SM4.5.01
Exploring Nanostructured, Porous Thin Films for Applications in Label-Free Optical Biosensing Heather K. Hunt; University of Missouri, United States.

2:00 PM SM4.5.02
Bioinspired M13 Bacteriophage Colorimetric Sensing System by Pattern Recognition Ju Hun Lee1, 2; 1University of California, Berkeley, United States; 2Lawrence Berkeley National Laboratory, United States.

2:15 PM SM4.5.03
Label-Free Sensing Using 3D Plasmic Nano-Cavity Structures on a Periodic Nanocup Arrays Abid Ameen; University of Illinois at Urbana-Champaign, United States.

2:30 PM SM4.5.04
Hybrid Optical-Electrical Systems for Potential Application in Neuro-Modulation Aneesha Kondapi; Center for High Technology Materials at University of New Mexico, United States.

2:45 PM SM4.5.05
3D Printing Silver Nanowire Based Electronics on Biological Surfaces Kaiyan Qiu; University of Minnesota, United States.

3:00 PM BREAK

3:30 PM *SM4.5.06
Membrane Protein-Carbon Nanotube Interfaces for Bioelectronic Noses and Cell Monitoring Devices Seunghun Hong; Seoul National University, Korea (the Republic of).

4:00 PM SM4.5.07
Sensor Circuits for in vitro Bioelectronics Marcel Braendlein; Mines Saint-Etienne, France.

4:15 PM SM4.5.08
Stretchable Textile Biofuel Cell for Lactate Sensing in Perspiration Yuto Kato; Tohoku University, Japan.

4:30 PM SM4.5.09
pH Sensing with Silicon Nanoribbon Devices Modified with Carbon Nanotube Porins Huanan Zhang; Lawrence Livermore National Laboratory, United States.

4:45 PM SM4.5.10
Electrochemical Detection of Bisphenol A with High Sensitivity and Selectivity Using Recombinant Protein-Immunobilized Graphene Electrodes Kwang Su Kim; Sungkyunkwan University, Korea (the Republic of).
SYMPOSIUM SM5
Surfaces and Interfaces for Biomaterials
March 28 - April 1, 2016

Chairs
Hakan Engqvist, Uppsala University
Geetha Manivasagam, VIT University
Diego Mantovani, Laval University
Ketul C. Popat, Colorado State University

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances).
Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

TUTORIAL
Image Analysis for Materials Science and Engineering Using Open-Access Software
Monday Afternoon, March 28, 2016
1:30 PM – 5:00 PM
PCC North, 100 Level, Room 126 C

Successful developments in material sciences are, in part, dependant on the ability to characterize physical morphology and heterogeneous chemical groups at milli-, micro- and nanolevels. Imaging systems ranging from standard microscopy to new spectral imaging systems can generate information-dense data sets which are quantitative and highly spatially and temporally resolved. Proper management, analysis and representation of these data sets are critical to their efficient use.

This tutorial, which will be held in the spirit of a laboratory class where participants are expected to take notes and work on exercises that will be provided, presents an image-analysis workshop using powerful open-access image-analysis software, ImageJ.

Participants will gain hands-on experience to analyse sample data sets which include 2D, 3D images and videos. Various concepts will be covered related to: 1) setting up your workspace environment, 2) image display enhancements, 3) image manipulation and analysis and 4) special topics. Specifically, participants will learn:

- File management, manipulation of bit-depth, global image calibrations
- Look-up tables, image overlays, stacking images (for time series, z-stacks, λ-stacks)
- Image calculations, intensity profiles, background correction for uneven lighting situations and recording simple macros, and batch editing

In addition, participants are encouraged to bring their laptops preloaded with ImageJ software which can be freely downloaded at http://rsb.info.nih.gov/ij/download.html. Example files will be made available to participants during the session.

Instructor
Jesse Greener, Laval University
Oxygen Plasma Immersion Ion Implanted of L605 Co-Cr Alloy for Biomedical Applications

Ruben S. Rodriguez; Universidade Estadual do Norte Fluminense, Brazil.

9:45 AM \* SM5.4.01
Live-Streaming: Time-Lapse Video Evidence of Novel Streamer Formation Mechanism and Varying Viscosity and Other Analytical Developments Applied to Biofilms Growing in Microchannels

Jesse Greener; Laval University, Canada.

9:50 AM \* SM5.4.02
Exploration of Poly(tetrafluoroethylene) as a Potential Material Replacement for Hemodialysis Applications

Patrick Nichols; University of Utah, United States.

10:00 AM \* SM5.4.03
Azobenzene-Modified Silk Gels for Light-Induced Surface Patterning

Michael Landry; McGill University, Canada.

10:45 AM \* SM5.4.04
Nanoscale Deformation Mechanisms of Apatite Crystals

Arun K. Nair; University of Arkansas, United States.

9:30 AM \* SM5.4.01
A Single-Step Process to Achieve Biocompatible Surfaces from Alcohols and Phenolic Compounds

Austin Lee; Simon Fraser University, Canada.

11:00 AM \* SM5.4.02
Biological Evaluation of Hydroxyapatite/Collogen Paste with (3-Glycidoxypropyl)trimethoxysilane

Taira Sato; Meiji University, Japan.

11:15 AM \* SM5.4.03
Induced Pinning by Hevein Proteins-Calcium Phosphate Trapped on Natural Rubber Surfaces

Rodney M. Nascimento; Universidade de Sao Paulo USP, Brazil.

11:30 AM \* SM5.4.04
Two-Dimensional Infrared Correlation Analysis of Time-Resolved Planar Array Infrared Spectra to Probe the Structure Development of the Thermally Reversible Gel Made of a Bio-Based, Biodegradable Polymer

Brian J. Sobieski; University of Delaware, United States.

8:30 AM \* SM5.4.01
Animal Trials in Closed Body Cavity Surgery: VitreOx™ - A Super-Hydrophilic, Bio-Compatible Anti-Fog Coating for Lenses Used In Vivo

Ali Ramazani; University of Hong Kong, China.

8:30 AM \* SM5.4.02
Corrosion Behavior of Biodegradable Poly(Succinimide-Citramide) Coating on AZ31 Magnesium Alloys

Hyung-Seop Han; Korea Institute of S&T, Korea (the Republic of).

2:00 PM \* SM5.5.02
Development and Commercialization of Biodegradable Mg Alloy Implant Replacement for Hemodialysis Applications

Hyung-Seop Han; Korea Institute of S&T, Korea (the Republic of).

1:30 PM \* SM5.5.01
Corrosion Behavior of Biodegradable Poly(Succinimide-Citramide) Coating on AZ31 Magnesium Alloys

Chao-Sung Lin; Department of Materials Science and Engineering, National Taiwan University, Taiwan.

2:15 PM \* SM5.5.03
Growth and Characterization of Aluminum Oxide Functional Thin Film Coating for Controlling the Degradation of Magnesium for Implant Applications

Ruben Krotka; North Carolina A & T State University, United States.

12:30 PM \* SM5.5.02
Live-Streaming: Time-Lapse Video Evidence of Novel Streamer Formation Mechanism and Varying Viscosity and Other Analytical Developments Applied to Biofilms Growing in Microchannels

Jesse Greener; Laval University, Canada.

12:45 PM \* SM5.5.03
Exploration of Poly(tetrafluoroethylene) as a Potential Material Replacement for Hemodialysis Applications

Patrick Nichols; University of Utah, United States.

1:00 PM \* SM5.5.04
Azobenzene-Modified Silk Gels for Light-Induced Surface Patterning

Michael Landry; McGill University, Canada.

1:15 PM \* SM5.5.05
Nanoscale Deformation Mechanisms of Apatite Crystals

Arun K. Nair; University of Arkansas, United States.

9:00 AM \* SM5.4.01
A Single-Step Process to Achieve Biocompatible Surfaces from Alcohols and Phenolic Compounds

Austin Lee; Simon Fraser University, Canada.

9:45 AM \* SM5.4.04
Two-Dimensional Infrared Correlation Analysis of Time-Resolved Planar Array Infrared Spectra to Probe the Structure Development of the Thermally Reversible Gel Made of a Bio-Based, Biodegradable Polymer

Brian J. Sobieski; University of Delaware, United States.
SESSION SM5.6: Surfaces and Metals
Session Chairs: Michael Tatoulian and Fabio Variola
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 232 B

2:30 PM SM5.6.01
Laser Surface Modification of Cobalt Chromium Alloy Martina M. Salerno; Wichita State University, United States.

2:45 PM SM5.6.02
Engineering Bio-Interfaces with Phase-Reversion Induced Nanostructured Materials: Self-Assembly of Protein at Bio-Interfaces Krishna C. Nune; University of Texas at El Paso, United States.

3:00 PM BREAK

SESSION SM5.7: Poster Session
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

SM5.7.01
Functionalization of Biomaterials for Enhanced Drug Binding and Controlled Drug Delivery to Control Fungal Biofilms Yuyu Sun; University of Massachusetts-Lowell, United States.

SM5.7.02
Probing Peptide-Graphene Binding Using Single Molecule Force Spectroscopy Kristi Singh1, 2; 1Air Force Research Laboratory, United States; 2UES, Inc., United States.

SM5.7.03
Thermal and Mechanical Characterization of Nano-Hydroxyapatite / Poly(Hydroxybutyrate) Composite or Odontological Application Teresa E. Castillo; Universidade Estadual do Norte Fluminense, Brazil.

SM5.7.04
Substrate-Independent Robust and Heparin-Mimetic Hydrogel Thin Film Coating via Combined LBL Self-Assembly and Mussel-Inspired Post-Crosslinking Lang Ma; Sichuan University, China.

SM5.7.05
Enhanced Anti-Tumor Efficiency with Phospholipidene as Hydrophobic Shell for Delivery Dox: In Vivo and In Vivo Study Menptan Cai; Sichuan University, China.

SM5.7.06
The Hydrophobic to Superhydrophilic Change Induced by PIB in PEG:PHB Electrospun Membranes by Plasma Treatment Jose Escorcia-Garcia; CIVESTAV-Unidad Saltillo, Mexico.

SM5.7.07
Antimicrobial Effect of Photo-Functional Polymers Generating Reactive Oxygen Species Yong-Rok Kim; Yonsei University, Korea (the Republic of).

SM5.7.08
Progress towards the Evaluation of Nanopatterned Stents In Vivo Bryan W. Woo; University of California, Riverside, United States.

SM5.7.09
Preparation and Characterization of Lignin-Based Activated Carbon Recycled from Industrial Waste Black Liquor for Biomaterial Applications Donghwan Cho; Kumoh National Institute of Technology, Korea (the Republic of).

SM5.7.10
Continuous Fabrication of Scalable 2D Nanopatterns by Sequential 1D Patterning Strokes for Electronic and Biosensing Applications Jong G. Ok; Seoul National University of Science and Technology, Korea (the Republic of).

SM5.7.11
Surface Modification of Titanium Dental Implants for Enhancing Bacteriostatic Properties Ken Welch; Uppsala University, Sweden.

SM5.7.12
A Study for Detecting Sodium in Silicon-Based Continuous Glucose Sensors after Fluid Percolation via a MeV 23Na (α, α) 23Na Nuclear Resonance and Ion Beam Analysis Yash Pershad1, 2; 1Arizona State University, United States; 2BASIS Scottsdale High School, United States.

SM5.7.13
Synthesis of Lactosylated Albumin Microparticles as Vehicle for Specific Drug Delivery to Bacterial Pathogens Jose Andrei Sarabia-Sanz; Universidad de Sonora, Mexico.

SM5.7.14
Antibody-Antigen Interaction Applicable for Drug-Nanocarriers Targeting to Tumor Cells Alexandra Karasonova; University of Chemistry and Technology, Prague, Czech Republic.

SM5.7.15
Cancer Extravasation Dynamics in an in vitro Blood Vessel Model Yan Yan; Sherry Huang; University of Cambridge, United Kingdom.

SM5.7.16
Stimuli-Sensitive Hydrogel-Silicone Composites of Co-Continuous Structures Inseok Kim; Chung-Ang University, Korea (the Republic of).

SM5.7.17
One Step Fabrication of Superporous Inorganic-Organic Hybrid Surfaces Sangwon Chi; Chung-Ang University, Korea (the Republic of).

SM5.7.18
Synthesis and Characterization Disk-Shaped Microparticles by RAFT Polymerization Taeyoon Kim; Pusan National University, Korea (the Republic of).

SESSION SM5.8: Surfaces and Cells
Session Chair: Jesse Greener
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 232 B

8:15 AM *SM5.8.01
Micropatterned Surfaces with Peptides as Extra-Cellular Matrix Mimics Gaetan Laroche; Université Laval, Canada.

8:45 AM SM5.8.02
Superhydrophobic Laser-Patterned Grids on PDMS for Droplet Array Formation Bahador Farschian; Texas State University, United States.

9:00 AM SM5.8.03
Rapid, Light-Triggered, Reversible Switching of IntegriMediated Cell Adhesion Laih F. Kadem; University of Kiel, Germany.

9:15 AM SM5.8.04
Biomolecular Structure at the Abiotic Interface Peter A. Mirau; Air Force Research Laboratories, United States.

9:30 AM BREAK
10:00 AM SM5.8.05
Cell-Laden Gels for Human Bone Marrow-Derived Mesenchymal Stem Cell Delivery Murugan Ramalingam (1, 2); Centre for Stem Cell Research, India; (1)Tohoku University, Japan.

10:30 AM SM5.8.06
Regulation of Differentiation Direction of Stem Cells by Nanostructures and Physical Cues Hong Liu; Shandong University, China.

10:45 AM SM5.8.07
Investigations on Electrochemical Corrosion and in vitro Biomineralisation with Osteoblast Cells on Implantable Substrates with Surface Coatings Balasubramanian Subramanian, Central Electrochemical Research Institute, India.

11:15 AM SM5.8.08
Electrochemical Responsiveness of Carbon Nano-Onions and Their Performance for Electrochemical Detection of Biological Redox Molecules Yan Zhang; University of Kentucky, United States.

11:30 AM SM5.8.09
Are Rapidly Deployable Lubricated Omniphobic Protective Suits against Liquid Phase Biohazards Feasible Viraj G. Damle; Arizona State University, United States.

11:45 AM SM5.8.10
Effect of Applied DC Bias on PC12 Cell Response on Aerogel Scaffolding Firouzeh Sabri; University of Memphis, United States.

SESSION SM5.9: Surfaces and Polymers
Session Chairs: Carlo Paternoster and Balasubramanian Subramanian
Friday Afternoon, April 1, 2016
PCC North, 200 Level, Room 232 B

1:30 PM SM5.9.01
Poly(Aspartic Acid) Hydrogel in Nanofibrous Structure for the Design of Biomimetic Scaffolds Caidan Zhang (1, 2); (1)Donghua University, China; (2)University of British Columbia, Canada.

1:45 PM SM5.9.02
Enzymatically Activated Emulsions Stabilized by Interfacial Self-Assembled Structures Ines Moreira; University of Strathclyde, United Kingdom.

2:00 PM SM5.9.03
The Influence of Polymer Chain Mobility on Protein Adsorption Dan Liu; Wuhan University of Technology, China.

2:15 PM SM5.9.04
Surfactant Enhancement of Antenna Effect in DNA FRET Structure Taeseok Oh; University of California San Diego, United States.

2:30 PM BREAK

3:00 PM SM5.9.05
Intercalated Water Layers Promote Thermal Dissipation at Bio-Nano Interface Zhiping Xu; Tsinghua University, China.

3:15 PM SM5.9.06
Phosphorycholine Polymer Nanocapsules Prolong the Circulation Time and Reduce the Immunogenicity of Therapeutic Proteins Yang Liu; University of California-Los Angeles, United States.

3:30 PM SM5.9.07
Solution Exchange Lithography Christian W. Pester; University of California-S Barbara, United States.

3:45 PM SM5.9.08
Nanoscale Chemical and Topological Imaging of Collagen with Photo-Induced Force Microscopy Derek B. Nowak; Molecular Vista Inc, United States.
SYMPOSIUM SM6

Transient and Biologically-Inspired Electronics
March 29 - March 31, 2016

Chairs
Alon Gorodetsky, University of California, Irvine
SukWon Hwang, Korea University
Mihai Irimia-Vladu, Joanneum Research Forschungsgesellschaft
Lan Yin, University of Illinois at Urbana-Champaign

Papers submitted and accepted for publication will be published in the new online journal, MRS Advances (www.mrs.org/mrs-advances).

Visit the MRS/Cambridge University Press Publications booth in the Hub (PCC, Lower Level, Hall 5) to learn more about MRS Advances, including print options available at special rates during the meeting week only.

* Invited Paper

SESSION SM6.1: Bioinspired and Flexible Electronics
Session Chairs: SukWon Hwang and Lan Yin
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 232 C

1:30 PM SM6.1.01
Fabrication and Characterization of Organic Conducting Polymer Microcontainers for Drug Delivery Systems Martin Antensteiner; University of Houston, United States.

1:45 PM SM6.1.02
Thermal and Elastic Properties of Water-Soluble Polymers and Polymer Blends Xu Xue; University of Illinois-Urbana-Champaign, United States.

2:00 PM *SM6.1.03
Skin-Inspired Pressure Sensors and Applications Zhemian Bao; Stanford University, United States.

2:30 PM *SM6.1.04
Imperceptible Electronics Martin Kaltenbrunner; Johannes Kepler University, Austria.

3:00 PM BREAK

3:30 PM SM6.1.05
An Implantable Theragnostic Elastic Multielectrode Array for Skeletal Muscle Conditioning and Epimyasilal Electromyogram Recording during Peripheral Nerve Repair Jonathan K. Tsosie; Massachusetts Institute of Technology, United States.

3:45 PM SM6.1.06
Self-Assembled Conductive Biomolecules-Conjugated Polymers Nanostructures Chiara Musumeci; Linköping University, Sweden.

4:00 PM *SM6.1.07
Melanin Pigments: Thin Film Growth, (Photo)Redox Properties and Ion Binding Affinity Clara Santato; Ecole Polytechnique-Montreal, Canada.

4:30 PM SM6.1.08
Biomimetic Frequency-Based Tactile Sensing Alex Chortos; Stanford University, United States.

4:45 PM SM6.1.09
Biotemplated/Biological Designs & Approaches for Piezoelectric Energy Harvesters Chang Kyu Jeong1, 2; 1KAIST (Korea Advanced Institute of Science and Technology), Korea (the Republic of); 2KAIST Institute for the NanoCentury (KINC), Korea (the Republic of).

SESSION SM6.2: Transient Electronics
Session Chairs: SukWon Hwang and Mihai Irimia-Vladu
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 232 C

8:30 AM SM6.2.01
Rapidly Transient Electronic Systems Using Stress Engineered Glass Gregory L. Whiting; Palo Alto Research Center, United States.

8:45 AM SM6.2.02
Dissolution Behaviors and Applications of Silicon Oxides and Nitrides in Transient Electronics Huanya Cheng; The Pennsylvania State University, United States.

9:00 AM *SM6.2.03
Phospholipid-Supported Silicon for Transient Bioelectric Devices Bozhi Tian; University of Chicago, United States.

9:30 AM *SM6.2.04
Materials for Biodegradable Electronics John A. Rogers; University of Illinois, United States.

10:00 AM BREAK

10:30 AM SM6.2.05
Biodegradable Implants for Bio-Potential Measurements and Drug Delivery Chi Hwan Lee; Purdue University, United States.

10:45 AM *SM6.2.06
Chemistry of Porous Silicon Degradation Michael J. Sailor; University of California-San Diego, United States.

11:15 AM SM6.2.07
Non-Volatile Memory and Integrated Sensors for Biodegradable Electronic Stent Donghee Son1, 2; 1Seoul National University, Korea (the Republic of); 2Center for Nanoparticle Research, Institute for Basic Science (IBS), Korea (the Republic of).

11:30 AM *SM6.2.08
Mechanics of Soft Transient Materials and Structures Reza Montazami1, 2; 1Iowa State University, United States; 2Ames Laboratory, United States.

SESSION SM6.3: Bioinspired and Natural Materials for Electronics
Session Chairs: Alon Gorodetsky and Mihai Irimia-Vladu
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 232 C

1:30 PM SM6.3.01
Effects of Electrode Materials on Charge Conduction Mechanisms of Memory Device Based on Natural Aloe Vera Kuan Yew Cheong; University Sains Malaysia, Malaysia.

1:45 PM SM6.3.02
Exploring the Potential of Hydrated Eumelanin Thin Films as Ion Conducting Layers in Electrochemical Metallization Memory Cells Eduardo Di Mauro; Polytechnique Montreal, Canada.

2:00 PM *SM6.3.03
Organic Conducting Polymer Nanomaterials for Neural Interfaces Mohammad Reza Abidian; University of Houston, United States.

2:30 PM SM6.3.04
Edible Electronics: Bioinspired Materials and Structures for Next-Generation Ingestible Devices Christopher J. Bettinger; Carnegie Mellon University, United States.

3:00 PM BREAK

3:30 PM SM6.3.05
Shellac, a Versatile Natural Resin for High-Performance Organic Electronics Mihai Irimia-Vladu; Joanneum Research mbH, Austria.
SESSION SM6.5: Biointerface for Organic Bioelectronics II
Session Chairs: SukWon Hwang and Lan Yin
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 232 C

1:30 PM SM6.5.01
Proton Conduction in a Cephalopod Structural Protein David D. Ordinario; University of California, Irvine, United States.

1:45 PM SM6.5.02
Epidural Organic ECoG Arrays for Non-Invasive Monitoring of Electrophysiological Activity Ilke Uguz; EMSE, France.

2:00 PM *SM6.5.03
Patch-Type Active Sensor System for a Wide Range of Biological Signals Tatsunori Sekitani; Osaka University, Japan.

2:30 PM SM6.5.04
Degradable Polyhydroxybutyrate-Graphene Composites Anastasia L. Elias; University of Alberta, Canada.

3:00 PM BREAK

3:30 PM SM6.5.06
Heat Triggered Degradation of Cyclic Polyphthalaldehyde and its Applications Hector Lopez Hernandez; University of Illinois-Urbana Champ, United States.

3:45 PM *SM6.5.07
The Degenerated Human Retina: What an Eye Doctor Would Need to Restore His Patient’s Vision Matthias Bolz; Department of Ophthalmology, General Hospital Linz, Austria.

4:15 PM SM6.5.08
Single-Molecule Conductance Measurements of DNA:RNA Hybrids and in Label-Free RNA Pathogen Detection Yuanhui Li; University of California-Davis, United States.

SESSION SM6.6: Poster Session
Thursday Afternoon, March 31, 2016
Sheraton, Third Level, Phoenix Ballroom

8:30 AM SM6.6.01
Towards Organic Edible Electronics: Complementary Transistors Directly Printed on Pharmaceutical Capsules Mario Caironi; Istituto Italiano di Tecnologia, Italy.

8:45 AM SM6.6.02
Conformational Gating of DNA Electrical Properties Juan M. Artes Vivanco; Vrije Universiteit, Netherlands; UC Davis, United States.

9:00 AM *SM6.6.03
Extracellular Electron Transport: What Can an Ancient Form of Microbial Respiration Teach Us about Bioelectronics Moh El-Naggar; University of Southern California, United States; University of Southern California, United States; University of Southern California, United States.

9:30 AM *SM6.6.04
Implantable Organic Electronics George G. Malliaras; Ecole National Superieure des Mines de Saint-Etienne, France.

10:00 AM BREAK

10:30 AM SM6.6.05
OLED Micro-Arrays for Control of Cell Behaviour and Optogenetics Malte C. Gather; University of St Andrews, United Kingdom.

10:45 AM SM6.6.06
Direct Cellular Interfaces Based on Electrolyte-Gated Sol-Gel Oxide Electronics Sungjun Park; Gwangju Institute of Science and Technology, Korea (the Republic of); Gwangju Institute of Science and Technology, Korea (the Republic of).

11:00 AM *SM6.6.07
Controlling Life with Photons Guglielmo Lanzani; Italian Institute of Technology, Italy.

11:30 AM SM6.6.08

SESSION SM6.4: Biointerface for Organic Bioelectronics I
Session Chairs: Alon Gorodetsky and Lan Yin
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 232 C

8:30 AM SM6.4.01
Towards Organic Edible Electronics: Complementary Transistors Directly Printed on Pharmaceutical Capsules Mario Caironi; Istituto Italiano di Tecnologia, Italy.

8:45 AM SM6.4.02
Conformational Gating of DNA Electrical Properties Juan M. Artes Vivanco; Vrije Universiteit, Netherlands; UC Davis, United States.

9:00 AM *SM6.4.03
Extracellular Electron Transport: What Can an Ancient Form of Microbial Respiration Teach Us about Bioelectronics Moh El-Naggar; University of Southern California, United States; University of Southern California, United States; University of Southern California, United States.

9:30 AM *SM6.4.04
Implantable Organic Electronics George G. Malliaras; Ecole National Superieure des Mines de Saint-Etienne, France.

10:00 AM BREAK

10:30 AM SM6.4.05
OLED Micro-Arrays for Control of Cell Behaviour and Optogenetics Malte C. Gather; University of St Andrews, United Kingdom.

10:45 AM SM6.4.06
Direct Cellular Interfaces Based on Electrolyte-Gated Sol-Gel Oxide Electronics Sungjun Park; Gwangju Institute of Science and Technology, Korea (the Republic of); Gwangju Institute of Science and Technology, Korea (the Republic of).

11:00 AM *SM6.4.07
Controlling Life with Photons Guglielmo Lanzani; Italian Institute of Technology, Italy.

11:30 AM SM6.4.08
SYMPOSIUM SM7

Future Healthcare Needs through Biomaterials, Bioengineering and the Cellular Building Block
March 31 - April 1, 2016

Chairs
Steven Curley, Baylor College of Medicine
Erica Forzani, Arizona State University
Wonmo Kang, Naval Research Laboratory
Larry Nagahara, Johns Hopkins University

Sessions:

SESSION SM7.1: Future Healthcare Needs through Biomaterials, Bioengineering and the Cellular Building Block I
Session Chairs: Steven Curley and Wonmo Kang
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 228 B

8:30 AM SM7.1.01
Intra-Cellular Lasers for Barcode-Type Cell Tracking Malte C. Gather; University of St Andrews, United Kingdom.

8:45 AM SM7.1.02
Automated Microfluidic Approaches for Gene Delivery on a Single-Cell Level Lucia T. Benk; Max Planck Institute for Intelligent Systems, Germany; University of Heidelberg, Germany.

9:00 AM *SM7.1.03
Cell Signaling: Can Your Materials Expertise Make a Difference in a Field Dominated by Fluorescent Proteins? Marc Raphael; Naval Research Laboratory, United States.

9:30 AM SM7.1.04
Intracellular Delivery of Exogenous Molecules via Ultrahigh Throughput Mechanoporation Harish G. Dixit; University of California, Riverside, United States.

9:45 AM SM7.1.05
Single Step Microscale Patterning of Neutravidin: A Versatile Approach for Self-Assembly And Protein Patterning Sankalp Verma; IIT Kanpur, India.

10:00 AM BREAK

10:30 AM *SM7.1.06
Neuronal Tension: A New Paradigm for Understanding Memory and Learning Wylie Ahmed; University of Illinois-Urbana-Champ, United States.

11:00 AM *SM7.1.07
Quantifying Active Mechanical Properties and Molecular-Scale Driving Forces in Living Cells Wylie Ahmed; Institut Curie, France.

11:30 AM SM7.1.08

11:45 AM SM7.1.09
Development of Bioassay Sheet for Human Keratinocytes Using Stretchable Hydrogel Yuina Abe; Tohoku University, Japan.

SESSION SM7.2: Future Healthcare Needs through Biomaterials, Bioengineering and the Cellular Building Block II
Session Chairs: Steven Curley and Larry Nagahara
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 228 B

1:30 PM SM7.2.01
Theranostic Nanoparticles for Photothermal Ablation Therapy and Fluorescence Imaging of Murine Breast Cancer Sneh S. Kelkar; Wake Forest School of Medicine, United States.

1:45 PM SM7.2.02
Magnetite Nanoparticles for Breast Cancer Detection and Treatment Jingjie Hu; Princeton University, United States.

2:00 PM *SM7.2.03
Overcoming the Endosomal Escape Problem: Lysosome-Targeting Gold Nanostar Nanoconstructs Duncan Hieu M. Dang; Northwestern University, United States.

2:30 PM SM7.2.04
Enhanced Survival through Improved Tumor Detection Using Real-Time Fluorescence Image-Guided Surgery in Ovarian Cancer Neelkanth M. Baridhan; MFT, United States.

2:45 PM SM7.2.05
Mucocidal Dual Drug-Loaded Nanocapsules for Potential Synergistic Intravesical Chemotherapy for Bladder Cancer Koon Gee Neo; National University of Singapore, Singapore.

3:00 PM BREAK

3:30 PM *SM7.2.06
Surface-Complexation ZnS:Mn Quantum Dots for Detection of Dopamine with High Sensitivity Juan Beltran-Huaraca; University of Puerto Rico, United States.

4:00 PM *SM7.2.07
Synthesis, Optics and Biomedical Applications of Plasmonic Nanogap Nanostructures Jwa-Min Nam; Seoul National University, Korea (the Republic of).

4:30 PM SM7.2.08
Use of Whey Protein Nanoparticles for the Encapsulation and Sustained Delivery of β-Carotene and Zinc Alshaimaa A. Salem; AUC, Egypt.

4:45 PM SM7.2.09
Targeted Drug Delivery and Macrophage Reprogramming with Engineered Polymer Surface Properties Hannah Bygd; Iowa State University, United States.

SESSION SM7.3: Poster Session: Future Healthcare Needs through Biomaterials, Bioengineering and the Cellular Building Block
Session Chairs: Steven Curley and Larry Nagahara
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 228 B

2:00 PM SM7.3.01
Functionalized Graphene Oxide Wrapped for Sensitive Impedimetric Dengue Biosensor Seon-Ah Jin; Purdue University, United States.

2:15 PM SM7.3.02
Microfluidic Synthesis of Lipid Polymer Hybrid Nanoparticles for Targeted Drug Delivery Eri A. Takami; San Jose State University, United States.

2:30 PM SM7.3.03
Fabrication of Conductive Scaffolds for Peripheral Nerve Regeneration Sahitya Allam; New Jersey Institute of Technology, United States.
SM7.3.04 Rapid and Easy Oligonucleotide Biosensor Using Rolling Circle Amplification for Detection of Middle East Respiratory Syndrome in Pseudoserum Condition Il Young Jun; Ewha Womans University, Korea (the Republic of).

SM7.3.05 Comparison of Prostate Cancer and Non-Prostate Cancer Biomarkers Using Raman Spectroscopy Katherine Moore; San Jose State University, United States.

SM7.3.06 Double Tail Analogues of Insoluble Chemotherapeutic Agents to Facilitate Incorporation in Drug Delivery Vehicles Mendi G. Marquez; New Mexico Institute of Mining and Technology, United States.

SM7.3.07 Synthesis of Diatomite-Poly (Acrylic Acid) Hydrogel Composites with Slow Release of Bioactive Compounds Chatimon Satirappaphakul; Chulalongkorn University, Thailand.

SM7.3.08 Photothermal Ablation of Streptococcus pyogenes and Staphylococcus aureus Using Fluorescent Bio-Polymer Nanoparticles Nicole Polyachenko; Wake Forest Health Sciences, United States.

SM7.3.09 Agarose Dry Gel Films for Drug Delivery Joshua Kaufman; University of Central Florida, United States.

SM7.3.10 Electric Field-Mediated Growth of Osteoblast: The Significant Impact of Dynamic Flow of Medium Alok Kumar; University of Texas at El Paso, United States.

SM7.3.11 Bacterial Amyloid Nanofibers Material with Engineered Mechanical and Electrical Properties Ebuzer Kalyoncu1, 2; 1UNAM - National Nanotechnology Research Center, Bilkent University, Turkey; 2Institute of Materials Science and Nanotechnology, Bilkent University, Turkey.

SM7.3.12 Fabrication of Gelatin-Polysaccharide-Silicatein like Protein by Mussel-Inspired Intermolecular Cross-Linking and Its Bio-Mineralization Mi-Ran Ki; Korea University, Korea (the Republic of).

SESSION SM7.4: Future Healthcare Needs through Biomaterials, Bioengineering and the Cellular Building Block III
Session Chairs: Steven Curley and Erica Forzani
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 228 B

8:30 AM *SM7.4.01 Non-Destructive, Longitudinal Sampling and Analysis of the Cell Cytosol Nick Melosh; Stanford University, United States.

9:00 AM SM7.4.02 Importance of Diode Circuit Element in Electrolyte-Oxide Interface for Nanopore Ion Transistors Sung-wook Nam; IBM T.J. Watson Research Center, United States.


9:30 AM SM7.4.04 Combinatorial Analysis of Diabetes and Stress Biomarkers Using Zinc Oxide Based Flexible Bio-Electronics Rujuta D. Munje; University of Texas-Dallas, United States.

9:45 AM SM7.4.05 Versatile, Interference-Free Aptamer-Based Nanosensor for Non-Invasive Tracking of Intracellular Gene Expression Christian Wiraja; Nanyang Technological University, Singapore.
SYMPOSIUM SM8

Bioinspired Metal Nanoparticles—Synthesis, Properties and Application
March 30 - April 1, 2016

Chairs
Robert Chandler, San José State University
Nassera Ghellai, URMER Laboratory, University of Tlemcen
Donglu Shi, University of Cincinnati

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* Invited Paper

SESSION SM8.1: Metal Nanoparticle Synthesis and Application I
Session Chair: Yingzi Feng
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 227 C

9:00 AM SM8.1.01
Controlled Synthesis of Hierarchical Gold Nanosuperstructures through Peptoid Engineering
Feng Yan1, 2; 1Pacific Northwest National Laboratory, United States; 2Linyi University, China.

9:15 AM SM8.1.02
Nanoparticles of Silver and of Silver-Gold Alloys: Synthesis, Ultrastructure, and the Mechanism of Their Biological Action
Matthias Emple; University of Duisburg-Essen, Germany.

9:30 AM SM8.1.03
Ag-Nylon Nanocomposites by Dynamic Emulsion Polycondensation
Linqi Zhang1, 2; 1Oklahoma State University, United States; 2Linyi University, China.

9:45 AM BREAK

10:15 AM SM8.1.04
Gold Synthesis on Geometrically Transformed Viral Template
Tan-Triet Ngo-Duc; University of California, Riverside, United States.

10:30 AM SM8.1.05
Polymer Resin Mediated Solution-Phase Synthesis of Gold Nanowires
Yingzi Feng; Simon Fraser University, Canada.

10:45 AM SM8.1.06
Surfactant Monolayer-Guided Synthesis of Au Nanosheets and Their Application in Photothermal Therapy
Fei Wang; University of Wisconsin - Madison, United States.

SESSION SM8.2: Metal Nanoparticle Synthesis and Application II
Session Chair: Yiran Yan
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 227 C

1:30 PM SM8.2.01
Characterisation of Silver and Zinc Oxide Nanoparticles biosynthesized Using Ocimum Gratissimum and Vernonia Amygdalina Leaf Extracts
Rebecia E. Mfon1, 2; 1University of Bristol, United Kingdom; 2Federal University Lafia, Nigeria.

1:45 PM SM8.2.02
Silk Fibroin Microcontainers Functionalized with Gold Nanoparticles as Targeted Delivery Vesicles
Irina Drachuk; Wright Patterson AFRL, United States.

2:00 PM SM8.2.03
Anisotropic Magnetic Nanostructures for Enhanced Hyperthermia
David Torres; Texas State University, United States.

2:15 PM SM8.2.04
Bio-Assisted Assembly of Gold/Polypyrrole Nanopeapods for Ammonia Gas Detection
Yiran Yan; University of California, Riverside, United States.

SESSION SM8.3: Metal Nanoparticles for Medical Applications I
Session Chair: José Bachelet
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 227 C

9:00 AM SM8.3.01
Direct Synthesis of N-Heterocyclic Carbene Protected Gold NPs
Francois Ribot; UPMC, France.

9:15 AM SM8.3.02
Hyaluronate - Gold Nanoparticle / Tocilizumab Complex for the Treatment of Rheumatoid Arthritis
Huiwon Lee; POSTECH, Korea (the Republic of).

9:30 AM SM8.3.03
Effects of Ag-GQD Nanocomposites on the Bacterial Growth of S. aureus and P. aeruginosa when Electroporated
Juan C. Villalobos; Universidad de Puerto Rico, United States.

9:45 AM BREAK

10:15 AM SM8.3.04
Hybrid Biomimetic Gold Nanoparticles for Cytoplasmic Delivery Enhancement
Marie Bachelet; Imperial College, United Kingdom.

10:30 AM SM8.3.05
Structural Diversity in Organometallic Nanoparticles Based on Iron Isopropoxide Treated Lignin
Aalto University, Finland.

SESSION SM8.4: Metal Nanoparticles for Medical Applications II
Session Chair: Devin Guillory
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 227 C

1:30 PM SM8.4.01
Multifunctional SPM Bio-compatible Scaffolds for Bone Tissue Engineering
Jose Rivas1, 2; 1Universidade de Santiago de Compostela, Spain; 2International Iberian Nanotechnology Laboratory, Portugal.

2:00 PM SM8.4.02
Biocompatible Hybrid Magnetic Nanoparticles
Marie-Louise Sabounqi; IMPMC - Université Pierre et Marie Curie, France.

2:30 PM SM8.4.03
Single Particle Deformation and Analysis of Silica Coated Gold Nanorods before and after fs-Laser Pulse Excitation
Wiebke Albrecht; Utrecht University, Netherlands.

2:45 PM SM8.4.04
Optical Detection of Glucose in the Millimolar Concentration Range via Glucose-Mediated Gold Nanoparticle Synthesis
Todd K. Houghton; Arizona State University, United States.

3:00 PM BREAK

3:30 PM SM8.4.05
Fabrication and Characterization of ZnO/Galactomannan Nanocomposite with Antibacterial Properties
Diego C. Bouttier Figueroa; Sonora University, Mexico.
Site-Directed T_1-Weighted MRI Contrast with Non-Toxic Iron Oxide Nanoparticles. Eric Hansen, MIT, United States.


SESSION SM8.5: Metal and Metal Oxide Nanoparticles for Biological Applications
Session Chair: Zhanhu Guo
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 227 C

Quantitative Assessment of the Ligands Shell Composition for Bi-Functional Thiol Protected Gold Nanoparticles. Francois Ribot, Univ. Pierre et M. Curie / CNRS, France.

Clusters with a Twist: DNA-Stabilized Fluorescent Silver Clusters. Steven Swasey, University of California - Santa Barbara, United States.

Labeling Monomeric Insulin with Renal Clearable Luminescent Gold Nanoparticle. Rodrigo D. Vinluan, University of Texas-Dallas, United States.

Biogenic Gold Nanoparticles as Selective Sensors for Metal Ions in Aqueous Solutions. Luisa E. Silva De Hoyos, Universidad Autónoma del Estado de México, Mexico.

Fluorescent Metal Nanoclusters for the Detection and Bioimaging. Yuanqing Sun, Jilin University, China.

In Vitro Depth-Dependent Hyperthermia of Human Mammary Gland Adenocarcinoma. Donglu Shi, University of Cincinnati, United States.

Self-Assembling Magnetic Nanostructures with Functional Polyolefins. Zhanhu Guo, University of Tennessee, United States.
SYMPOSIUM SM9

Structure and Properties of Biological Materials and Bioinspired Designs
March 29 - April 1, 2016

Chairs
Eduard Arzt, INM - Leibniz-Institut für Neue Materialien
David Kisailus, University of California, Riverside
Yürung Ma, Peking University
Joanna McKittrick, University of California, San Diego

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* Invited Paper

SESSION SM9.1: Natural Materials I
Session Chair: David Kisailus
Tuesday Afternoon, March 29, 2016
PCC North, 200 Level, Room 229 B

1:30 PM SM9.1.01
Mechanical Investigation of Growing Twisting Cracks in Naturally-Occurring Bouligand Structures Pablo D. Zavattieri; Purdue University, United States.

2:00 PM SM9.1.02
Structural and Physical Properties of Nanofiber Silk Produced by Webspinners Thomas M. Osborn Poppe; University of California, Berkeley, United States; Arizona State University, United States.

2:15 PM SM9.1.03
A Model of Interfacial Permeability for Soft Seals in Marine-Organism, Suction-Based Adhesion Michael Beckert; Georgia Tech Research Institute, United States.

2:30 PM SM9.1.04
The Worlds Hardest Teeth: A Look into the Interfacial Strength of a Biologically Synthesized Magnetite Tooth to Soft Body Tissue in Cryptachtion stellaris Steven A. Herrera; University of California-Riverside, United States.

2:45 PM SM9.1.05
Comparative Analysis of the Woodpecker Skull Jae-Young Jun; UC San Diego, United States.

3:00 PM BREAK

3:30 PM SM9.1.06
Characterization of the Cephalopod Structural Protein Reflectin Kyle L. Naughton; UC Irvine, United States.

3:45 PM SM9.1.07
Lightweight Biological Composites: The Feather Vane and Inspired Designs Tarah N. Sullivan; University of California, San Diego, United States.

4:00 PM SM9.1.08
Structural Features and Toughening Mechanisms of the Stomatopod Dactyl Club Executive Nicholas A. Yanosh; University of California-Riverside, United States.

4:15 PM SM9.1.09
Why be Rigid: Structural Analysis of the Boxfish Carapace Steven F. Naleway; University of California, San Diego, United States.

4:30 PM SM9.1.10
The Structure and Mechanical Functions of Keratinous Materials: Pangolin Scales and the Feather Shaft Bin Wang; University of California, San Diego, United States.

4:45 PM SM9.1.11
Complex Water Repellency of Prickly Pear Cacti (Opuntia): Impact of Species, Biogeography, and Age on Nano-to-Macroscopic Structure and Wetting Properties Erik T. Woods; Arizona State University, United States.

SESSION SM9.2: Poster Session I: Natural Materials
Tuesday Afternoon, March 29, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

SM9.2.01
Investigating Hierarchical Protein Structures in Spider Silk Brian Cherry; Arizona State University, United States.

SM9.2.02
Structure and Mechanical Properties of a Compression Resistant Beetle Exoskeleton Jesus Rivera; University of California, Riverside, United States.

SM9.2.03
Mechanical and Microstructural Properties of Sea Urchin Teeth at Various Ocean Depths Michael B. Frank; University of California, San Diego, United States.

SM9.2.04
Ultrasonic Waves to Predict Fracture in Bone Lamellae Matthew Brownell; University of Arkansas, United States.

SM9.2.05
Maize Arabinoxylan Gels: Effect of Alkaline Hydrolysis Conditions on the Rheology and Microstructure Rita Paz-Samaniego; CIAD, Mexico.

SM9.2.06
Saharan Silver Ants Use Uniquely Shaped Hairs to Cool via Enhanced Optical Reflection and Radiative Heat Dissipation Norman N. Shi; Columbia University, United States.

SM9.2.07
Piriform Spider Silk Production Cole Peterson; Utah State University, United States.

SM9.2.08
Gelling, Spinning, and Filming: Chemical and Physical Properties of Novel Recombinant Spider Silk Materials Thomas Harris; Utah State University, United States.

SM9.2.09
Isolating a Gene for Spider Glue Kyle R. Berg; Utah State University, United States.

SM9.2.10
Structure and Mechanical Behavior of Human Hair Yang Yu; University of California, San Diego, United States.

SM9.2.11
Strength and Failure of Eggshells Andrei Pissarenko; UCSD, United States.

SM9.2.12
The Ganoid Scales of Atractosteus spatula: Potential for Bioinspired Flexible Armor Vincent Sherman; UC San Diego, United States.

SM9.2.13
Structure and Toughening Mechanisms of the Coelacanth Fish (Latimeria chalumnae) Scales Haocheng Quan; UCSD, United States.

SM9.2.14
Temperature Replica Exchange Simulations of Major Ampullate Spidroin 1 Minilibrils Arian van der Vaart; University of South Florida, United States.
SESSION SM9.3: Natural Materials II
Session Chair: Joanna McKittrick
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 229 B

8:30 AM *SM9.3.01
Architectured Materials in Engineering and in Nature François Barthelat; McGill University, Canada.

9:00 AM SM9.3.02
Structure and Mechanical Properties of Selected Protective Systems in Marine Organisms Steven E. Naleway; University of California, San Diego, United States.

9:15 AM SM9.3.03
Nano-Mechanical Experiments and Microstructure Analysis of Diatom Frustules and Diatom-Mimetic Structures Reveal Exceedingly High Specific Strength and Provide Insights into Evolutionary Design Shi Luo; California Institute of Technology, United States.

9:30 AM SM9.3.04
Mechanical Behavior of Tubular Structures in Horns and Hooves Wei Huang; University of California, San Diego, United States.

9:45 AM SM9.3.05
Catecholamine as a Reinforcing Agent in Mechanically Hard Grasshopper Mandibles Kyeun Lee; Korea Advance Institute of Science and Technology (KAIST), Korea (the Republic of).

10:00 AM BREAK

10:30 AM *SM9.3.06
Revealing the Exceptional Deformability and Toughness of Reptilian Eggshells Po-Yu Chen; National Tsing Hua University, Taiwan.

11:00 AM SM9.3.07
Nano- and Micromechanics of the Radular Teeth of the Chiton Pablo D. Zavattieri; Purdue University, United States.

11:15 AM SM9.3.08
Toughness-Enhancing Structure of the Recluse Spider Web Sean R. Koebley; The College of William & Mary, United States.

11:30 AM SM9.3.09
NanoComposite Nature of Bone Drives Its Strength and Damage Resistance Osman Turgutlu; California Institute of Technology, United States.

11:45 AM SM9.3.10
Nano-Mechanical and Deformation Properties of Shell Structures Edward K. Amanaw; African University of Science and Technology, Nigeria.

SESSION SM9.4: Bioinspired Materials I
Session Chair: Eduard Arzt
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 229 B

1:30 PM *SM9.4.01
Smart Interfacial Materials from Super-Wettability to Binary Cooperative Complementary Systems Le Ji; Chinese Academy of Sciences, China; 1Beihang University, China.

2:00 PM SM9.4.02
Bioinspired Patterned Adhesives: From Science to Product Development Eduard Arzt; INM – Leibniz Institute for New Materials, Germany.

2:15 PM SM9.4.03
Condensation on Slippery Asymmetric Bumps Kyoung-Chul Park1; 2; 1Harvard University, United States; 2Wyss Institute for Biologically Inspired Engineering, United States.

2:30 PM SM9.4.04
Dynamics Self-Cleaning of Gecko Feet and Their Bioinspired Micromanipulator Zhenhai Xia; University of North Texas, United States.

2:45 PM SM9.4.05
Nonsolvent-Induced Phase Separation Synthesis of Biomimetic PVDF Microspheres for Superhydrophobic Coatings Lance Brookway1; 2; 1University of California Berkeley, United States; 2BEARS, Singapore.

3:00 PM BREAK

3:30 PM *SM9.4.06
Biomimetic Materials and Structures for Innovative and Sustainable Bioinspired Building Construction Thomas Speck1; 2; 3; 1University of Freiburg, Germany; 2Freiburg Centre for Interactive Materials and Bioinspired Technologies, Germany; 3Freiburg Materials Research Centre, Germany.

4:00 PM SM9.4.07
3D Printed Templatting of Freeze Casting for Hierarchical Mimetic Bone Steven E. Naleway; University of California, San Diego, United States.

4:15 PM SM9.4.08
Composites Reinforced via Mechanical Interlocking of Surface-Roughened Microplatelets Rafael Libanori; ETH Zurich, Switzerland.

4:30 PM *SM9.4.09
Bioinspired Multifunctional Materials Rajesh Naik; Air Force Research Laboratory, United States.

SESSION SM9.5: Poster Session II: Bioinspired Materials
Wednesday Afternoon, March 30, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

SM9.5.01
Fabrication of Bio-Inspired Dry Adhesive Pads Using CNT/PDMS Composite Minho Seong; UNIST, Korea (the Republic of).

SM9.5.02
Tree Frog-Inspired Friction Pads for Delicate Substrate Transportation in Dry/Wet Conditions Hanil Kim; UNIST, Korea (the Republic of).

SM9.5.03
Octopus-Inspired Omni-Stick Patches Using Programmable Multiscale Architectures Sangyul Baik; Sungkyunkwan Univ., Korea (the Republic of).

SM9.5.04
Beyond the Fiber: Novel Spider Silk Coatings and Adhesives Breton A. Day and Danielle Gaztambide; Utah State University, United States.

SM9.5.05
Synthesis and Characterization of Monetite with Thin Nacre-Like Structure Song Chen; Uppsala University, Sweden.

SM9.5.06
Kidding Around: Making Spider Goats Richard E. Decker; Utah State University, United States.

SM9.5.07
Functionally Graded Adhesive Bonding of Additively Manufactured Components Edem Dugbenoo; Masdar Institute, United Arab Emirates.

SM9.5.08
Bioinspired Geometrically Interlocked Design of 3D Printed Joints Kumar Shamugam1; 2; 1Masdar Institute, United Arab Emirates; 2MIT, United States.

SM9.5.09
Large Scale Production of Spider Silk Protein in E. coli Gargi Bhattacharyya; Utah State University, United States.

SM9.5.10
Development and Evaluation of Hydrocolloid Wound Dressing Using Synthetic Rubber and Sodium Carboxymethylcellulose (CMC) Oh Hyeong Kwon; Kumoh National Institute of Technology, Korea (the Republic of).
SESSION SM9.6: Bioinspired Materials II
Session Chair: Rajesh Naik
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 229 B

8:00 AM *SM9.6.01
Understanding of Bacterial Magnetite Formation toward Designed Synthesis of Magnetic Nanocrystals
Atsushi Arakaki; Tokyo University of Agriculture & Technology, Japan.

8:00 AM BREAK

8:30 AM SM9.6.02
Bioinspired Composites by Vacuum Assisted Magnetic Alignment
Madeleine R. Grossman; ETH Zurich, Switzerland.

8:45 AM SM9.6.03
Bioinspired by Bone: Magnetized Alumina for Strengthened Porous Scaffolds by Magnetic Freeze Casting
Michael B. Frank; University of California, San Diego, United States.

9:00 AM SM9.6.04
Bio-Inspired Synthesis of Multifunctional Diatomite-Based Scaffolds by Freeze Casting and Polymerization
Chi-Wei Huang; National Tsing Hua University, Taiwan.

9:15 AM *SM9.6.05
Bioinspired 3D Printed Hybrid Grippers
Kitty Kumar; Harvard University, United States.

9:30 AM SM9.6.06
Radially Aligned and Concentric Freeze Casting Inspired by the Porcupine Fish Spine
Frances Y. Su; University of California San Diego, United States.

9:45 AM SM9.6.07
Direct Correlation of Single Molecule Properties with Bulk Mechanical Performance for Biomimetic Design of Advanced Polymers
Zhibin Guan; University of California-Irvine, United States.

10:00 AM BREAK

10:30 AM *SM9.6.08
Biominal-Inspired Composites Based on Calcium Carbonates with Organic Molecular Templates
Takashi Kato; University of Tokyo, Japan.

11:00 AM SM9.6.09
Mechanical Properties of Porcine Cortical Bone and Bioinspired Bone: Verification of the Interpenetrating Composite Structure of Bone
Frances Y. Su; University of California San Diego, United States.

11:15 AM SM9.6.10
Epitaxial Growth of Vertically Aligned Piezoelectric Diphenylalanine Peptide Microrods with Uniform Polarization
Vu D. Nguyen; University of Minnesota, United States.

11:30 AM SM9.6.11
Bio-inspired Solar Energy Materials from Structural Design Principles
Han Zhou; Shanghai Jiaotong University, China.

11:45 AM SM9.6.12
Synthesis of Nanostructured Electrocatalysts through CaCO3 Mineralization
Jong Won Ko; KAIST, Korea (the Republic of).

SESSION SM9.7: Synthesis and Characterization I
Session Chair: Po-Yu Chen
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 229 B

1:30 PM *SM9.7.01
Structure and Mechanical Properties of Bio-Related Materials
Oden L. Warreg; Hysitron, Inc., United States.

2:00 PM SM9.7.02
Multiscale Characterization of Biomimetic Materials with Structural Hierarchy
Eric R. Meshot; Lawrence Livermore National Lab, United States.

2:15 PM SM9.7.03
Characterization of Silk Fiber-Reinforced Polyesters Synthesized by Bees in the Colletidae Family
Christine Dimke; Olin College, United States.

2:30 PM SM9.7.04
An Aqueous Solution Method for Recombinant Spider Silks: More than Just Fibers
Justin A. Jones; Utah State University, United States.

2:45 PM SM9.7.05
Enhancing the Mechanical Properties of Nylon 6,6 Electrospun Yarns by Annealing and Addition of Spider Silk Proteins
Brahim Hassounah; USTAR BioInnovations Center, United States.

3:00 PM BREAK

3:30 PM SM9.7.06
Adhesion of Fibrillar Dry Adhesives on Rough Substrates
Rene Hensel; INM - Leibniz Institute for New Materials, Germany.

3:45 PM SM9.7.07
Nanoscale Chemical Composition of Biomaterials Using Nano IR Spectroscopy
Curt Marcott; Light Light Solutions, United States.

4:00 PM SM9.7.08
Engineered Elastin-Like Polypeptide Hydrogels with Enhanced Mechanical Tunability
Malav S. Desai; University of California-Berkeley, United States; Lawernce Berkeley National Laboratory, United States.

4:15 PM SM9.7.09
Observations of a Core-Shell Structure in Single Bioproduced, Biodegradable Electrospun Poly(3-hydroxybutyrate-co-(R)-3-hydroxyhexanoate) (PHBHx) Nanofibers by AFM-IR Spectroscopy and Imaging
John F. Rabolt; University of Delaware, United States.

4:30 PM SM9.7.10
Transition Metal Nanoparticles and Quantum Dots with Tunable Electronic Properties by Bacterial Precipitation
Stefan Zauscher; Duke University, United States.

4:45 PM SM9.7.11
Discovery of β-Form Crystalline Structure in Poly ((R)-3-hydroxybutyrate-co-(R)-3-hydroxyhexanoate) (PHBHx) Thermoreversible Gel Film
Liang Gong; University of Delaware, United States.

SESSION SM9.8: Poster Session III: Synthesis and Characterization—Biomaterials for Medical Applications
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

SM9.8.01
Turn-On Fluorescence/MRI Platform for Tumor Cell Bimodal Imaging via MnO2 Nanotube
Qian Lu; Washington State University, United States; 2Southeast University, China.

SM9.8.02
Engineering RGD Peptide on Silica Forming Yellow Fluorescent Protein for Imaging and Cargo Delivery
Kim Baek Yeo; Korea University, Korea (the Republic of).

SM9.8.03
Biosilicification Induced by Novel Silica Forming Peptides
Ki Baek Yeo; Korea University, Korea (the Republic of).

SM9.8.04
Structure and Morphology of Isothermally Grown Single Crystals of Poly(3-hydroxybutyrate-co-3-hydroxyhexanoate) (PHBHx) as a Function of 3-Hydroxy-hexanoate Content
Changhao Liu; University of Delaware, United States.

SM9.8.05
Degradation of Covalently Cross-Linked Arabinoxylans Gels by Bifidobacteria
Valerie Micard; SupAgro, France.
SESSION SM9.9: Synthesis and Characterization II
Session Chair: Yurong Ma
Friday Morning, April 1, 2016
PCC North, 200 Level, Room 229 B

8:30 AM SM9.9.01
Frustrated Geometry and Thermodynamics of Virus-Like Particles: A Chapter in the Quest for Aperiodic Crystals Bogdan Dragnea; Indiana University, United States.

8:45 AM SM9.9.02

9:00 AM SM9.9.03
DNA Nanotubes and Nanotapes via Self-Assembly of ssDNA-Amphiphiles Efrosini Kokkoli; University of Minnesota, United States.

9:15 AM SM9.9.04
In Situ AFM Shows Peptoid Self-Assembly Follows a Complex Hierarchical Pathway Xiang Ma; Idaho State University, United States.

9:30 AM SM9.9.05
Synthesis and Characterization of Hydrotalcite Like Compound via a Facile Solid State Method Abbas Fahami; Texas state university, United States.

9:45 AM SM9.9.06
Experimental Evidence of Molecular Relaxation Processes in Cellulose-Amine Physical Complexes Agustin Rios de Anda; CERMAV, France.

10:00 AM BREAK

10:30 AM SM9.9.07
Functional Elastin Like-Polypeptide/Bioglass Biocomposite Hydrogels Qiongyu Zeng1, 2; 1Shanghai Jiao Tong University, China; 2University of California, Berkeley, United States; 3Lawrence Berkeley National Laboratory, United States.

10:45 AM SM9.9.08
Evidences of Intermediate Tunneling-Hopping Regime in DNA Charge Transport Limin Xiang1, 2; 1Arizona State University, United States; 2Arizona State University, United States.

11:00 AM SM9.9.09
Electromechanical Coupling of the Seashell Studied by Scanning Probe Microscopy Techniques Kaivang Zeng; National University of Singapore, Singapore.

11:15 AM SM9.9.10
Structure and Properties in Synthetic MSUM and the Corresponding Biomaterial Alicia B. Brune; Arizona State University, United States.

11:30 AM SM9.9.11
Expression of Synthetic Spider Silk in Bombyx Mori (Silkworm) through Gene Editing Randolph Lewis; Utah State University, United States.

11:45 AM SM9.9.12
Artificial Sunflower: A Heliotropic Smart Material System with Gold Nanoparticles and Poly(N-Isopropylacrylamide) Hansini Gopalakrishna; Arizona State University, United States.

SESSION SM9.10: Biomaterials for Medical Applications
Session Chair: Joanna McKittrick
Friday afternoon, April 1, 2016
PCC North, 200 Level, Room 229 B

1:30 PM SM9.10.01
Electroconductive Hydroxyapatite-Titanium Disilicide Composite for the Bone Tissue Engineering Applications Alok Kumar; University of Texas at El Paso, United States.
1:45 PM SM9.10.02
From Waste to Health: Synthesis of Hydroxyapatite Scaffolds from Fish Scales for Bone Tissue Engineering and Heavy Metal Ion Removal Wen-Kuang Liu; National Tsing Hua University, Taiwan.

2:00 PM SM9.10.03
3D Printed Bionic Prostate Kaiyan Qiu; University of Minnesota, United States.

2:15 PM SM9.10.04
Investigating the Substitution of TiO₂ for Network Modifiers within Bioactive Glass Sanggu S. Chon; Alfred University, United States.

2:30 PM SM9.10.05
Materials Construction through Peptide Design and Solution Assembly Darrin J. Pochan; University of Delaware, United States.
Biofabrication-Based Biomaterials and Tissues
March 30 - March 31, 2016

Chairs
Carlos Carvalho, Envisiontec GmbH
Yan Yan Shery Huang, University of Cambridge
Lorenzo Moroni, Maastricht University
Wei Sun, Drexel University

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* Invited Paper

SESSION SM10.1: Emerging Tissues and Materials I
Session Chair: Carlos Carvalho
Wednesday Morning, March 30, 2016
PCC North, 200 Level, Room 227 B

8:45 AM *SM10.1.01
Biofabrication of Constructs for Cartilage Regeneration Jos Malda
1, 2, 3
1 UMC Utrecht, Netherlands; 2 Utrecht University, Netherlands.

9:15 AM *SM10.1.02
Thiol-ene Cross-Linked Polyglycidol - Hyaluronic Acid Hybrid Hydrogels: Preparation, Cell Loading, 3D Printing, and in vivo Evaluation Juergen Groll; University of Würzburg, Germany.

9:30 AM *SM10.1.03
Novel Strategies and Materials for Biofabrication: Towards Complex Tissue Regeneration Matthew Baker; Maastricht University, Netherlands.

10:00 AM SM10.1.04
Bio-Calcium Carbonate, an Inorganic Polymer for Bone Regeneration: From Bioseed Formation to the Synthesis of Calcium Phosphate in Bone Xiaohong Wang; Johannes Gutenberg University, Germany.

10:15 AM BREAK

10:45 AM *SM10.1.05
Polyphosphate as a Metabolic Fuel in Metazoa: A Foundational Breakthrough Invention for Biomedical Applications Werner E. Mueller; University Medical Center of the Johannes Gutenberg University Mainz, Germany.

11:15 AM SM10.1.06
Engineered Bacterial Functional Amyloids as Bionanomaterials Tucee Onur1, 2, 3; 1 Bilkent University UNAM, Turkey; 2 Institute of materials science and nanotechnology, Turkey.

11:30 AM SM10.1.07
Additive Manufacturing of Bacterial Cellulose Produced by Gluconacetobacter Xilinus Culture Using Complex Carbon Sources for Biomedical Applications Mayra Elizabeth Garcia-Sanchez1, 2, 3; 1 Instituto de Materiales de C.V., Mexico; 2 Universidad de Guadalajara, Mexico.

11:45 AM SM10.1.08
Programmable Biofilm-Based Materials from Engineered Curli Nanofibers Neel S. Joshi1, 2; 1 Harvard University, United States; 2 Wyss Institute, United States.

SESSION SM10.2: Emerging Tissues and Materials II
Session Chairs: Matthew Baker and Jos Malda
Wednesday Afternoon, March 30, 2016
PCC North, 200 Level, Room 227 B

1:30 PM *SM10.2.01
Extrusion-Based 3D Printing of Biodegradable Polymer Networks for Biomedical Applications Jason Burdick; University of Pennsylvania, United States.

2:00 PM SM10.2.02
A Microfluidic Bioreactor for Understanding Effect of Magnetic Field and Fluid Shear on Mesenchymal Stem Cells through Time Lapse Microscopy and Cell Tracking Bodhisatwa Das; IIT Kharagpur, India.

2:15 PM SM10.2.03
Fabrication of Regularly Aligned Hair Follicles Using Microfabricated PDMS Microarray Chips Tatsuto Kageyama; YOKOHAMA National University, Japan.

2:30 PM SM10.2.04
Incorporating Bio-Matrix into Organ-on-Chip Models Zhaoying Li; University of Cambridge, United Kingdom.

2:45 PM BREAK

3:15 PM *SM10.2.05
Biofabrication and Its Role in Tissue Engineering and Regenerative Medicine Stephen Badylak; University of Pittsburgh, United States.

3:45 PM SM10.2.06
Decellularized Extra Cellular Matrix Derived Tissue Papers: Creating Simple and Complex, Tissue-Specific Constructs through Integration of 2D Casting and 3D-Printing Technologies Adam E. Jakus; Northwestern University, United States.

4:00 PM *SM10.2.07
Expanding the 3D Printing Biomaterial Palette: New Approaches to Material Design and Development Ramille N. Shah; Northwestern University, United States.

4:30 PM *SM10.2.08
15 Years of 3D-Bioplotter: Setting the Standard for Commercial 3D Bioprinters Carlos Carvalho; Envisiontec GmbH, Germany.

SESSION SM10.3: New Technology I
Session Chairs: Dong Sung Kim and David Williams
Thursday Morning, March 31, 2016
PCC North, 200 Level, Room 227 B

8:15 AM *SM10.3.01
Stereolithography of Engineered Tissues Containing Interpenetrating Vascular Networks Jordan Miller; Rice University, United States.

8:45 AM *SM10.3.02
Biofabrication Using Inkjet Printing - Scaffolds, Cells, Tissue and Organs Brian Derby; University of Manchester, United Kingdom.

9:15 AM SM10.3.03
Free-Standing, Spatially Controlled Nanofiber Membrane Fabricated by Electrolyte-Assisted Electrospinning for Developing in vitro Blood Brain Barrier Model Sang Min Park; POSTECH, Korea (the Republic of).

9:30 AM *SM10.3.04
Bio-Fabrication of Hierarchical Tissues: Bio-Printing and Bio-Assembly with Pre-Cultured Tissue Components Makoto Nakamura; University of Toyama, Japan.

10:00 AM BREAK

10:30 AM SM10.3.05
Omnidirectional Bioprinting for in situ Tissue regeneration Clas Visser; University of Twente, Netherlands.
10:45 AM *SM10.3.06

11:15 AM SM10.3.07
Bioprinting of Mechanically Strong Cell-Laden Fibres Jing Yang: University of Nottingham, United Kingdom.

11:30 AM SM10.3.08
3D Printing of Gels with Living Photosynthetic Algae Paul Calvert: New Mexico Tech, United States.

11:45 AM SM10.3.09
3D-Printed Gelatin Scaffolds of Differing Pore Geometry Modulate Hepatocyte Function and Gene Expression Phillip L. Lewis1, 2; 1Northwestern University, United States; 2Northwestern University, United States.

12:00 PM SM10.3.10

SESSION SM10.4: New Technology II
Session Chair: Claas Visser
Thursday Afternoon, March 31, 2016
PCC North, 200 Level, Room 227 B

1:30 PM *SM10.4.01
Bioprinted Microengineered Hydrogels for Tissue Fabrication Ali Khademhosseini: Harvard Medical School, United States.

2:00 PM SM10.4.02
Fabrication of Cellulose Structures via Focused Electron Beam Induced Conversion: Approaching the Nanoscale Harald Plank1, 2; 1Graz University of Technology, Austria; 2Graz Centre for Electron Microscopy, Austria.

2:15 PM SM10.4.03
3D Bioprinting of Thick, Vascularized Living Tissues David Kolesky1, 2; 1Harvard University, United States; 2Wyss Institute for Biologically Inspired Engineering, United States.

2:30 PM BREAK

3:00 PM *SM10.4.04
A Regulated Manufacturing Perspective on Customised 3D Bio-Printing David J. Williams: Loughborough University, United Kingdom.

3:30 PM SM10.4.05
The Patent Landscape of Bioprinting Deborah Sterling: Sterne, Kessler, Goldstein & Fox, United States.

3:45 PM SM10.4.06
Sub- 100 V Electrospinning Writing for Bio-Interface Fabrications Xia Li: University of Cambridge, United Kingdom.

4:00 PM *SM10.4.07
Nanomanufacturing for Cell Culture Platform Promoting Cell Functions by Mimicking Physical Cell Environment Dong Sung Kim: POSTECH, Korea (the Republic of).

SESSION SM10.5: Poster Session
Thursday Afternoon, March 31, 2016
8:00 PM
Sheraton, Third Level, Phoenix Ballroom

SM10.5.01

SM10.5.02
Preparation of 3D Polybutylene Succinate Scaffold by Electrospinning Jisun Ju: Seoul National University, Korea (the Republic of).

SM10.5.03
Preparation and Characterization of Chemically Cross-Linked Silk Fibroin/Hydroxyapatite Composite Scaffolds for Bone Tissue Engineering Won ho Park: Chungnam National University, Korea (the Republic of).

SM10.5.04
3D Cell Culture Perfusion Model for Adhesion Studies of Surface Functionalized Nanoparticles Monika Majerska: University of Chemistry & Tech, Czech Republic.

SM10.5.05
Study on MG-63 Cells Proliferation with Various Mechanical Stimulation on Auxetic Hybrid Scaffold Hong Jin Choe: Inje University, Korea (the Republic of).

SM10.5.06
Arakniprint: 3D Printing of Synthetic Spider Silk to Produce Biocompatible and Resorbable Biomaterials Robert C. Spencer: Utah State University, United States.

SM10.5.07
Norbornene-Functionalized Silk Fibroin and Poly(ethylene glycol) Hybrid Hydrogel Formed by Dual Mode Gelation MunJu Shin: Seoul National University, Korea (the Republic of).

SM10.5.08
Fabrication of Poly(butylene adipate-co-terephthalate) Nanofiber by Electrospinning MunJu Shin: Seoul National University, Korea (the Republic of).
Catherine Oertel received a B.A. in chemistry from Oberlin College and a Ph.D. in inorganic chemistry from Cornell University. She was a National Science Foundation Discovery Corps Postdoctoral Fellow at the Cornell Center for Materials Research and the Chalmers University of Technology in Göteborg, Sweden. She has been a faculty member at Oberlin College since 2006. Her undergraduate-centered research program focuses on hydrothermal synthesis and crystal chemistry of complex oxides, including those that form as corrosion products on lead-rich objects. Her research is supported by an NSF CAREER award and by the Camille and Henry Dreyfus Foundation.

Annette Richards is Professor of Music and University Organist at Cornell University, and the Executive Director of the Westfield Center for Historical Keyboard Studies. She is a performer and scholar with a specialty in 18th-century music and aesthetics, and interdisciplinary research into music, literature and visual culture. She is the author of The Free Fantasia and the Musical Picturesque (Cambridge, 2001) and the editor of C. P. E Bach Studies (Cambridge, 2006), as well as the founding editor of the book Keyboard Perspectives. Her current project is a book on the musical gothic, entitled Music on the Dark Side of 1800. She has been a Mellon New Directions Fellow, and an Alexander von Humboldt fellow, and has won prizes at the Dublin and Bruges international organ competitions. In 2011 she completed a 10-year research and construction project, in collaboration with colleagues at the University of Gothenburg, to create an 18th-century-style organ at Cornell.

The organ, the “King of Instruments,” is the oldest Western musical instrument with the richest notated repertoire stretching back to the early 14th century. Likewise, it is the most interdisciplinary of instruments, a multi-media artwork that has also been a laboratory for research and experimentation. The great historical organs of the 17th and 18th centuries, with their thousands of pipes and many individual voices, are crucial sites for the exploration of the relationship between materials and music, and how those relations were understood and understood in the past. Now as the surviving antique instruments, of immense value yet in regular use, need to be restored and maintained, there is an important role for contemporary materials science in understanding the properties of historic organ pipe metal. Some of the great European baroque organs suffer from atmospheric corrosion of their pipes, which affects the generation of sound and eventually prevents the pipes from sounding altogether. Baroque organ pipes were typically made from lead-tin alloys in compositions ranging from >99% Pb to >99% Sn. Organic acids emitted from the wood of organ cases are significant corrosive agents for lead-rich pipes. Field observations of conditions in historic organ cases were used to design laboratory exposure experiments to study the role of alloy composition and humidity in the susceptibility of pipes to organic acid attack. The rates of growth, compositions, and morphologies of corrosion product phases were studied with a suite of analytical methods including gravimetry, X-ray diffraction, EDX/WDX, and SEM imaging of surfaces and cross-sections. Direct crystallization of corrosion products has allowed elucidation of their atomic-level structures and studies of the conversion of short-term to long-term corrosion products. This interdisciplinary project provides one model for considering the materiality of music, and for the interplay of scientific and humanities research in addressing materials problems in cultural heritage.

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molecular movies from light-sensitive proteins with 500 fs time resolution and near-atomic spatial resolution important for photosynthesis, using both crystals and solution scattering. I’ll also discuss work in my lab on methods for delivering a stream of hydrated samples across an XFEL or TEM beam (each destroyed, after producing a useful elastic scattering. See Google Scholar for references and the many collaborators whom I thank.

**Biography:**
John C.H. Spence FRS is Richard Snell Professor of Physics at Arizona State University, where he teaches condensed matter physics. He completed a PhD in Physics at Melbourne University in Australia, followed by postdoc at Oxford UK Materials department. His group undertakes research in diffraction physics and new microscopies for materials science and biology. See https://live-spence.ws.asu.edu. He is a Foreign Member of the Royal Society, the author of texts on electron microscopy and was recently awarded the Buerger Medal of ACA, the Cowley Medal of IFSM and the Distinguished Scientist Medal of MSA. He is currently Director of Science for the NSF’s BioXFEL Science and Technology Center, devoted to the application of X-ray lasers to structural and dynamic molecular biology. John is a Fellow the AAAS, APS, IOP and MSA, an overseas Fellow of Churchill College, and Main Editor of IUCrJ https://scholar.google.com/citations?user=UxmHb8sAAAAJ&hl=en
Ong, Shuyue Ping, MD1.11, *MD12.01
Ong, Zhen-Yong, *NT4.7.03
Onimus, Fabien, EE12.4.05
Onodera, Yuta, EP13.7.03
Onur, Tugce, SM10.1.06
Ordonez, Christopher, *EE4.2.06, *EE8.1.01
Orfelt, Noah, NT6.3.06
Orikasa, Tetsuya, SM9.1.02
Oshida, Ryo, CM3.3.02
Otsuka, Tsuneo, NT3.4.08
Oya, Masatoshi, MD6.4.01
Oyedele, Akinola, EE11.8.09
Ozay, Vazif, EP13.1.03
Oz, Goldie, MD9.3.09
Ozyav, Ekmel, EP10.5.03
Ozcan, Burak, SM4.1.08
Ozcan, Soydon, EE7.2.02
Ozdemir, Sahin, *NT8.1.02
Ozdon, Sebnem, CM3.10.10
Ozin, Geoffrey, *NT9.10.02
Ozkaya, Dogan, CM1.1.09
Ozolins, Vidvuds, *EE5.12.01
P, Sanish, MD5.6.45
Paccagnella, Alessandro, EE12.7.05
Pacco, Antonio, *NT7.1.07
Page, Giuseppina, MD9.9.09
Pacheco, Carlos, SM2.4.05
Pacheco, Robin, CM2.4.06
Pachtary, Ursula, *EP13.6.02
Paciornik, Sidnei, CM3.10.10
Pacold, Josaphat, EE13.10.07
Padilla, Carlos, MD4.10.02
Paduan, Qing, NT4.7.02, *NT4.9.05
Pae, Seung Ryol, *EE1.1.01
Page, Catherine, EP5.4.03, NT2.2.13, NT2.2.27, NT2.2.29
Page, Katharine, EE13.1.07
Pagoria, Phil, NT5.1.02
Pahlke, Patrick, EP13.1.02, EP13.1.05
Pai, Devdas, SM5.5.03
Pain, Erwan, NT3.1.06
Paisley, Elizabeth, MD3.3.13
Pajares Chamorro, Natalia, MD1.5.04, MD6.4.11
Pak, Adam, SM3.4.07, SM3.4.08
Pak, Alexander, EP6.2.03, EP12.2.05
Pak, Jinsoo, EP10.1.07
Pak, Kwangyong, EE4.3.17
Pakarinen, Janne, EE12.2.06/EE13.2.06/MD8.3.06
Pal, Banabir, MD5.7.01
Pal, Pallabi, SM10.2.02
Pal, Ramendra, SM3.3.04
Pala, Ragip, EP1.8.0.16, EP1.8.0.17, EP1.8.0.6
Palani, Balaya, *EE3.8.05
Palani, Stephen, EP3.8.05, NT6.10.12
Palazon, Francisco, NT6.11.05
Pale, Ville, NT1.6.22
Palei, Milan, EE17.7.40
Palfinger, Ursula, SM3.7.03
Palgrave, Robert, EE12.8.05
Palmer, Justinas, EP10.4.11
Palmer, Myriam, NT2.4.03
Pandey, Sudip, EE11.4.01, EE11.4.05
Pandya, Shishir, EE11.6.02, MD2.3.02
Panesar, Francesco, CM2.4.09
Pang, Changhai, SM9.5.03
Pang, Shuping, EP3.1.04, EP3.1.05
Pang, Wei Kong, EE16.11.07
Pang, Yutong, EP10.5.08
Pangdam, Apichat, NT1.7.04
Panich, Alexander, *NT5.2.06
Panigrahi, B, EE12.9.07
Pannala, Sreekanth, EE3.0.05/EE6.4.05
Pannetier-Lecoeur, Myriam, *NT2.4.03
Pan, Anupam, NT4.5.29
Panetela, Dan, EE12.4.17, SM5.1.02
Panetelides, Sokratous, CM1.1.06, MD9.8.07, NT4.2.25
Panopoulou, Dimitrios, *EE9.4.01
Papageorgioupolou, Dimitrios, *EE9.1.01
Papageorgioupolou, Dimitrios, *EE9.1.01
Papa, Melih, EE15.6.05
Pappa, Anna-Maria, SM2.2.04, SM4.5.07
Parameswaran, Lalitha, SM1.6.04
Pant, Paul, CM4.2.10
Pant, Andrew, *EE9.3.04
Pant, Beomjin, EP10.4.11
Pant, Bongyu, EE14.11.25
Pant, Byongwoo, EP14.7.07
Pant, Chan Beum, SM9.4.12
Pant, Chan Eon, EE11.12.33, MD5.6.01, EP14.1.07
Pant, Chan-Hyuck, EP7.10.02, EP7.13.01
Pant, Chang Jun, MD6.4.08
Pant, Cheol Hee, MD5.2.26
Pant, Cheol Min, NT4.2.20
Pant, Cheolho, EE8.3.05, EE4.9.16
Pant, Cheolmin, EE11.1.10
Pant, Chisoo, CM1.0.09, CM3.5.09
Pant, Hong-Kyu, EE8.3.05
Pant, Hun, NT6.7.10
Pant, Hunmin, EE2.2.02
Pant, Hwanjo, EE7.7.10
Pant, Hyo-Jung, EE7.9.31, EE9.4.16
Pant, Hyung, EP11.9.08
Pant, Hyungbae, MD2.6.04, NT6.10.20, NT6.7.05
Pant, Hyung Baek, MD5.6.17
Pant, Hyun, EKD.5.2.91
Pant, Him-Chan, EP2.2.10
Pant, Ho Bum, EP11.1.02
Pant, Ho Seok, EKD.5.9.31
Pant, Hong-Keun, EP14.5.05
Pant, Hun, NT6.7.10
Pant, Hunmin, EE2.2.02
Pant, Hwanjo, EE7.7.10
Pant, Hyeong-II, EE9.4.13, EE9.4.16
Pant, Hyou, Ju, EP10.4.11
Pant, Hyomin, EE3.5.11
Pant, Hyun, EKD.5.6.02
Pant, Hyun-Soo, SM6.4.02
Pant, Hyun-Soo, SM9.5.02
Pant, Nanit, GT3.3.02
Pant, Nanit, GT3.3.03, NT3.4.03, NT3.5.07
Pant, Hyunwoo, EE11.12.12, EE12.12.03
Pant, In-Sung, NT6.2.25, NT6.7.14
Pant, Jae Hyun, SM9.8.02
Pant, Jae Hyo, EE14.11.25
Van De Groep, Jorik, EE3.8.03/NT3.8.03, EP8.8.02
Van de Kroel, Roel, EE2.11.09, *EE2.2.01
Van de Lagemaat, Jao, NT1.5.04
Van De Sanden, Richard, EE1.4.07
Van de Walle, Chris, MD3.13.05
van den Broeck, Karl, *CM1.1.07
dvan Der Donck, Jacques, *NT1.7.05, NT1.7.03
dvan der Vaart, Arjan, SM9.2.14
Van der Ven, Anton, CM1.4.07
Van Der Voort, Pascal, EE14.4.05
van der Walle, Peter, *NT1.7.05
Van Dorp, Dennis, "NT1.7.07
Van Driessche, Isabel, EE1.4.05, EP13.6.06
Van Dun, Adri, EE15.6.18, NT6.4.26
van Esch, Jan, *SM2.7.07
van Hest, Maikel, MD1.14.02, EP4.5.05
van Huis, Marijn, SM3.4.06, NT6.7.06, NT6.0.04
van Nieuwenhuysen, Kris, *EP4.6.01
Van Nostrand, Joseph, EP11.5.08
van Rooyen, Isabella, MD8.12.03
van Rossouw, Susan, *SM2.7.07
Van Spuybroeck, Veronique, NT6.7.26
Van Tendeloo, Gustaaf, EE4.2.02, *MD3.11.01, EE13.1.02, EE13.1.05, EE13.6.06
Van Uffelen, Paul, *MD8.5.01
Van Veggel, Frank, *MD1.7.08, MD7.4
Van Voorhys, Troy, EP1.4.02, EP1.8.02
van Weeren, René, SM10.02
Vanwamme, Nicolas, *NT1.7.06
Vandervorst, Wilfried, CM2.2.09, EE4.8.02, EP1.1.05, NT1.5.06, NT8.3*, EE13.4.01
Vanderzand, Dirk, MD3.5.07
Vansderbouren, Leroy, *NT1.4.05
van Vletteren, Jan, SM3.6.10
Vangala, Shiva, EP8.8.03, NT4.7.02
Vanjari, Jignesh, EP5.6.03, EP12.5.03, NT10.10.10
Vankar, VD, MD8.13.05
Vanmaekelbergh, Daniel, *NT6.2.02, NT6.7.06
Van Stey, Anouk, *SM3.8.06
VanSaders, Bryan, EE2.3.10
Vaqueiro-Stainer, Anthony, *EE3.9.04
Varanasi, Chakrapani, *NT4.3.01
Varanasi, Kripa, EE14.8.13
Varanatsia, Andrii, SM1.2.03, SM1.4.06
Varcoo, John, *EE9.3.03
Vardey, Z., EE11.3.01, NT1.6.07
Varel, Maria, MD3.8.05, NT4.7.04
varga, Martin, MD5.2.04, MD5.6.24
Varga, Zsolt, *EE13.10.06
Vargas Requena, Claudia, EE12.7.07
Vargas, Zulema, *SM4.0.01
Vargas-Hernandez, Diana, SM4.8.07
Varghese, Sunil, EE3.2.05
Varghese, Tony, NT6.11.07
Varigoni, Giulien, MD3.8.05
Variola, Fabio, *SM5.1.04, SM5.6
Varely, Joel, EE2.4.01, EE4.8.09
Varma, Ghanshyam, EP13.2.03
Varma, Siddhartha, SM5.1.07
Varon, Miriam, MD9.4.08
Varoon Aroonawat, Kumar, *NT3.1.04
Vasan, Ramesh, NT2.2.16
Vasile, Bogdan, EE12.4.10
Vasile, Dragica, EE3.5.02, EE3.6.04, EP11.4.27
Vasilev, Krasmir, SM5.1*, SM5.3.01
Vasiliopoulos, Maria, MD5.2.01
Vassilev, Vladimir, MD1.11.03
Vasinsek, Vladimir, *EP7.3.01
Vasquez, Stephane, MD6.1.05
Vasquez Quintero, Andres, SM3.6.10
Vasudevan, Rama, *EE7.11.01, CM3.7.05, MD2.3.02, MD3.8.03, MD3.7.12
Vasudevan, Ravi, EE4.0.03
Vatan Meidanshahi, Reza, NT8.9.03
Vathone, Emmanuel, *EE13.7.01, *MD11.8.04
Vaughey, John, EE8.5.07
Vaynzof, Yana, EP10.0.09
Vayssieres, Lionel, *EE2.1.05, EE2.2
Vaziri, Ashkan, CM3.9.05
Vazquez-Garcia, Geovanni, EE1.3.06
Vazquez-Moreno, Luz, SM5.7.13
Vazquez de Aldana, Javier, EP1.7.02
Veal, Boyd, MD3.6.04
Vaccione, Theodore, NT4.2.04
Vega, Abraham, NT5.8.04
Vegelius, Johan, EE13.8.04
Veinot, Jonathan, *NT8.07.01, NT8.1, NT8.1.03
Veith, Gabriel, EE6.1.04, EE6.3.01, MD1.5.04, NT2.7.05, NT2.3.04
Velezquez, Jesus, NT2.1.01
Velin, Alexander, MD1.10.04
Veligatiga, Medha, EE12.3.09
Vella, Jarrett, MD11.11.03
Velumurugan, Jeyavel, EE6.2.03, EE6.3.05
Velmasy, Tam, NT3.8.03
Vemuri, Krishna, MD11.13.09
Vendra, Venkat, EE4.1.06
Venkatesan, Swaminathan, EE1.3.32, EP3.9.23
Venkatesan, T., EE14.7.03, EE14.7.04, MD3.13.02, MD3.4.10, MD3.7.01, NT4.8.21
Venna, Sunendar, EE10.1.07
Verbeek, Johan, *MD3.11.01
Verburg, Paul, EP4.6.05
Vercesi, Federico, MD3.7.06
Verdini, Alberto, EP1.6.14
Verduzco, Rafael, *SM1.1.01
Verdecke, Guy, *NT7.1.07
Vergelati, Caroll, SM9.9.06
Verhaverbeke, Steven, *NT7.4.01
Verheijen, Marcel, EE1.3.03, MD4.8.07
Verhoeven, Peter, EP5.7.02
Verlage, Erik, EE11.07
Verlach, Jean-Baptiste, NT1.1.07
Verma, Deepthi, NT5.4.09
Verma, Parmesh, EE11.3.06
Verma, Sankalp, SM7.1.05
Verma, Vivek, SM7.1.05
Vermaas, David, EE16.01
Vernardou, D, EE4.9.32
Vernick, Sefi, SM3.4.06, SM3.6.07
Vernon, Jonathan, SM1.4.01
Verplanck, Rik, SM3.6.10
Verrept, Bregt, EP1.8.07
Verrelli, Emanuele, NT11.11.17
Versstappen, Piet, MD3.7.05, EP15.2.04
Vezhbitskiy, Ivan, NT4.1.06
Vetter, Eric, MD9.4.05
Vezin, Herve, EE4.2.07
Viallet, Virginie, EE4.11.02
Videv, Stefan, *EP1.7.03
Vielhard, Dwight, MD3.7.09, NT2.3.07
Viere, Layane, NT4.18.17
Viere, Manuel, EP2.2.08, EP2.2.09, EP2.3.08
Viere, Manuel, EE3.5.13, EE2.2.08, EE2.2.09, EP2.3.08
Viere, Manuel, EE3.5.13, EE2.2.08, EE2.2.09, EP2.3.08
Vigano, Davide, MD6.1, MD6.5, MD6.5.07
Vigil Galan, Osvaldo, NT2.6.17, NT2.6.18
Vigil, Julian, MD7.4.06
Vigil-Fowler, Derek, EP3.8.06
Vignoles, Gerard, CM3.12.03
Vigueras Santiago, Enrique, NT7.2.02
Vijay, Y., EE5.9.06, MDS 2.3.10
Vijayakumar, Murugesan, EE4.6.07
Vij, M., EE4.7.03
Vila, Rafael, NT4.8.12
Vilches, Estefan, Alfredo, SM5.9.04
Vilchez, Laszlo, EE14.4.05
Vinblau, Rodrigo, SM5.8.03
Vinblau, Rodrigo, SM5.8.03
Zhu, Wenqi, **EP8.3.01**
Zhu, Xiaoyang, EP3.11.08, EP6.5.03
Zhu, Xiyu, **EP13.1.01**
Zhu, Yimei, EE2.8.05
Zhu, Yinlian, CM1.9.07
Zhu, Yizhou, EE6.10.02, MD1.9.04
Zhu, Yu, EE4.9.10, EE7.4.04
Zhu, Yuan, EE9.7.05
Zhu, Yuanyuan, MD3.1.03
Zhu, Yuntian, SM5.7.08
Zhuang, Houlong, *MD3.1.04*
Zhelkovskyi, Maksym, NT4.8.25
Zhuo, Junqiao, NT4.8.30
Ziehmer, Markus, *CM3.1.09*
Zielinski, Marcin, **EP2.5.02**
Ziemianek, Marta, *EP9.1.04*
Zimm, Carl, *EE11.1.03*
Zobel, Mirijam, **NT6.6.08**
Zobelli, Alberto, *MD3.8.04*
Zoellner, Marvin, MD2.8.02
Zollner, Stefan, EP11.6.16
Zornberg, Leo, EP8.1.08
Zou, Bin, MD3.3.10, NT2.10.02
Zou, Bingsuo, NT6.1.08, NT6.1.11
Zou, Bo, EE4.3.01
Zou, Jin, EP2.4.09, *EP13.4.04*
Zou, Lanfang, *EE10.4.01*
Zou, Ruqiang, EE5.12.08
Zou, Xianshao, SM9.8.20
Zou, Yongjie, **EE3.5.01**
Zschech, Ehrenfried, *CM2.1.04*
Zucolotto, Valtencir, SM4.3.16
Zuechl, Tanja, EE4.9.24, EE5.7.03
Zueva, Valeria, EE7.7.02
Zuluaga, Sebastian, **EE10.3.04**
Zumer, Slobodan, *SM1.6.05, *SM1.7.02*
Zunger, Alex, NT8.07.03
Zuo, Jian-Min, CM1.9.10
Zupancic, Blaz, SM4.3.08
Zwieback, Ilya, EP2.4.02
Zwijnenburg, Martijn, **EE1.6.05, EE14.6.05, MD1.12.05**
Zwinkels, Joanne, EP4.11.29
Zwissler, Darwin, NT6.10.12
Zysman-Colman, Eli, **EP1.2.07**