SYMPOSIUM NM7

Semiconductor Nanowires for Energy Applications
April 18 - April 21, 2017

Symposium Organizers
Esther Alarcon-Llado, AMOLF
Anna Fontcuberta i Morral, EPFL
Sudha Mokkapati, Australian National University
Carl Thompson, Massachusetts Institute of Technology

Symposium Support
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Proceedings Statement
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SESSION NM7.1: Piezoelectronic Nanowire Devices
Session Chairs: Esther Alarcon-Llado and Anna Fontcuberta i Morral
Tuesday Morning, April 18, 2017
PCC West, 100 Level, Room 105 A

10:30 AM *NM7.1.01
Metal Oxide Nanosurfaces and Hetero-Interfaces for Energy Harvesting and Sensing Applications Sanjay Mathur; University of Cologne, Germany.

11:00 AM NM7.1.02
Voltage-Current Characteristics of a Piezoelectric Semiconductor Nanowire under Dynamic Axial Tension Deformations Shuaqi Fan; Huazhong University of Science and Technology, China.

11:15 AM NM7.1.03
All Oxide VO2 Nanowire Bimorph Actuators Helmut Karl; University of Augsburg, Germany.

11:30 AM *NM7.1.04
Piezotronics and Piezo-Phototronics of Nanowires Zhong Lin, Wang; 1 Georgia Institute of Technology, United States; 2 Beijing Institute of Nanoenergy and Nanosystems, CAS, China.

SESSION NM7.2: Pushing the Frontier of Efficient Light Emitting Devices with Nanowire Structures
Session Chairs: Sudha Mokkapati and Carl Thompson
Tuesday Afternoon, April 18, 2017
PCC West, 100 Level, Room 105 A

1:45 PM *NM7.2.01
Flexible Optoelectronic Devices Based on Nitride Nanowires Embedded in Polymer Films Maria Tchernycheva; University of Paris-Sud, France.

2:15 PM NM7.2.02
Simultaneously Enhancing Light Emission and Suppressing Efficiency Drop in GaN Microwire-Based UV LED by Piezo-Phototronic Effect Xingfu Wang; Georgia Institute of Technology, United States.

2:30 PM *NM7.2.03
3D Nano-Architectures on Si Platforms for Opto-Electronic Device Concepts such as Solarcells, Light Emitting Devices and Sensors S.H. Christiansen; Helmholtz Zentrum Berlin, Germany.

3:00 PM BREAK

SESSION NM7.3: Nanowire Architectures for Light Management in Photovoltaics
Session Chairs: Sudha Mokkapati and Carl Thompson
Tuesday Afternoon, April 18, 2017
PCC West, 100 Level, Room 105 A

3:30 PM *NM7.3.01
Resonantly Excited Semiconductor Wire Motifs in Photovoltaic, Photoelectrochemical and Thermoelectric Devices Kelly W. Mauser; California Institute of Technology, United States.

4:00 PM NM7.3.02
Broadband and Omnidirectional Anti-Reflectivity of Hierarchically Structured Silicon Anna M. Hiszpanski; Lawrence Livermore National Laboratory, United States.

4:15 PM NM7.3.03
Metamaterial Absorber for Efficient Perovskite Solar Cell Omar A. Abdelraouf; The American University in Cairo, Egypt.

4:30 PM *NM7.3.04

SESSION NM7.4: Electrical Properties in Nano-Photovoltaics
Session Chairs: Sudha Mokkapati and Carl Thompson
Wednesday Morning, April 19, 2017
PCC West, 100 Level, Room 105 A

8:00 AM *NM7.4.01
Exploring Electromechanical Properties of III-V Nanowires for Energy Applications Sohini Kar-Narayan; University of Cambridge, United Kingdom.

8:30 AM NM7.4.02
Surface Passivation and Quantum Efficiency Enhancement of InP Nanowires by ALD Al2O3 with PO4 Interlayer Lachlan Black; Eindhoven University of Technology, Netherlands.

8:45 AM NM7.4.03
Hybrid Free-Standing Metal-Semiconductor Nanowire Arrays for Semi-Transparent Organic Solar Cells Yi Y. Feng; University of Konstanz, Germany.

9:00 AM *NM7.4.04
Semiconductor Nanowires for Nanostructured Photovoltaic Devices Silvia Granc cleaners; Massachusetts Institute of Technology, United States.

9:30 AM NM7.4.05
Characterization of Silicon Nanowires with Infrared Near-Field Optical Microscopy Paul T. Ritchie; University of North Carolina at Chapel Hill, United States.

9:45 AM BREAK

SESSION NM7.5: Nanowires for Next Generation Batteries
Session Chairs: Esther Alarcon-Llado and Anna Fontcuberta i Morral
Wednesday Morning, April 19, 2017
PCC West, 100 Level, Room 105 A

10:15 AM *NM7.5.01
Synthesis and In Situ Scanning Electron Microscopy Investigations of Semiconductor Nanowires for Smart Material and Energy Storage Applications Steven T. Boles; Hong Kong Polytech University, Hong Kong.
10:45 AM NM7.5.02
Silicon-Germanium Alloy Nanowires as Potential High Capacity Lithium-Ion Battery Anodes Killian Stokes; 1 Georgia Institute of Technology, United States; 2 Bernal Institute, Ireland.

11:00 AM NM7.5.03
Optimizing Performance of Ge Nanowire Based Li-Ion Full-Cells Hugh Geaney; University of Limerick, Ireland.

11:15 AM NM7.5.04
Low Temperature of Growth Silicon Nano-Structures of for Li-Ion Batteries Shashi Paul; Emerging Technologies Research Centre, De Montfort University, United Kingdom.

11:30 AM *NM7.5.05
Nanowires for Enabling Fundamental In Situ Investigations and New Materials Architectures in Electrochemical Energy Systems Matthew T. McDowell; 1 Georgia Institute of Technology, United States; 2 Georgia Institute of Technology, United States.

SESSION NM7.6: Pushing the Frontiers of Thermoelectric Energy Conversion
Session Chairs: Sudha Mokkapati and Carl Thompson
Wednesday Afternoon, April 19, 2017
PCC West, 100 Level, Room 105 A

1:45 PM *NM7.6.01
Investigating the Thermoelectric Properties of Semiconductor Nanowires Ilaria Zardo; Universitat Basel, Switzerland.

2:15 PM NM7.6.02
Enhanced Thermoelectric Properties of PEDOT Nanowires for Printed Devices Verena K. Schendel; Karlsruhe Institute of Technology, Germany.

2:30 PM BREAK

SESSION NM7.7: Thermoelectric Nanowires and Devices
Session Chairs: Sudha Mokkapati and Carl Thompson
Wednesday Afternoon, April 19, 2017
PCC West, 100 Level, Room 105 A

3:30 PM *NM7.7.01
Photothermal Energy Harvesting and Light Detection in Heterostructure Nanowires Heiner Linke; 1 Lund University, Sweden; 2 University of New South Wales, Australia.

4:00 PM NM7.7.02
Remote Doping-Based Approach to Thermoelectric Performance Enhancement in N-Type Flexible Nanocomposites Hyeunhwan An; University of Nevada, Las Vegas, United States.

4:15 PM NM7.7.03
Manipulating Electrical and Thermal Transport in Nanowire Based Nanocomposite through Doping for Thermoelectric Applications Yue Wu; Iowa State University, United States.

4:30 PM *NM7.7.04
Silicon-Based Nanowires for Fully Integrated Micro Thermo-Electric Generators Albert Tarancón; Institut de Recerca en Energia de Catalunya (IREC), Spain.

SESSION NM7.8: Poster Session
Wednesday Afternoon, April 19, 2017
8:00 PM - 10:00 PM
Sheraton, Third Level, Phoenix Ballroom

NM7.8.01
Switching from Negative to Positive Photoconductivity in the Same InAs Nanowire Field Effect Transistors Qing Chen; Peking University, China.

NM7.8.02
Surface Effects in Polytypic Gallium Arsenide Nanowires Natasia Vulic; 2 Arizona State University, United States; 3 Ecole Polytechnique Federale de Lausanne, Switzerland.

NM7.8.03
Gas Depletion Effects on Preferential Growth Directions of Aluminum-Catalyzed Silicon Nanowires Mel F. Haney; The Pennsylvania State University, United States.

NM7.8.04
Morphology Dependent Optical Properties of ZnO/SiNWs Nanocomposites Vitaly Bondarenko; Belarusian State University of Informatics and Radioelectronics, Belarus.

NM7.8.05
Synthesis and Characterization of Colloidal CsPbX$_3$ (X = Cl, Br, I) Nanowires Dandan Zhang; University of California Berkeley, United States.

NM7.8.06
On the Physical Properties of Radial ZnO-Core/ZnS-Shell Nanostuctures Deposited at Atmospheric Pressure Using DEZn, N$_2$O and DTBS Ho-Ching Ni; National Chung Hsing University, Taiwan.

NM7.8.07
Solution Synthesis of Colloidal RbPbI$_3$ Orthorhombic Perovskite Nanowires Da-Hye Lim; DGIST, Korea (the Republic of).

NM7.8.08
Indium Selenide (In$_2$Se$_3$) Nanowires Synthesis and Characterization Ya Chu Hsu; National Taiwan University of Science and Technology, Taiwan.

NM7.8.09
Vapor Phase Synthesis and Optoelectrical Properties of Structurally Tailored Organic-Inorganic Perovskites for Nanowires Transistors Dong Ruo-Xing; City University of Hong Kong, Hong Kong.

NM7.8.10
Spectroscopic Characterization by Super Resolution Transient Absorption Microscopy Eric Massaro; Montana State University, United States.

NM7.8.11
Epitaxy of GaN Nanowires on Versatile Substrates Ludovic Largeau; 1 CNRS, France; 2 University Paris Saclay, France.

NM7.8.12
New Insight into the Effect of Annealing on the Photoelectrochemical Performance of Rutile Single-Crystalline TiO$_2$ Nanorods Arrays Chao Huang; City University of Hong Kong, Hong Kong.

NM7.8.13
Three-Dimensional Cobalt Phosphide Nanowire Arrays for Flexible Solid-State Asymmetric Supercapacitors Zhi Zheng; University of New Orleans, United States.

NM7.8.14
Electron Beam at Low Acceleration Voltage does not Damage Carbon Nanotube and Graphene Jae Hong Choi; Ulsan National Institute of Science and Technology (UNIST), Korea (the Republic of).

NM7.8.15
Preferential Transport of Cations Along the Exterior of Single Walled Carbon Nanotubes Assisted by Cation-π Interaction Yun-Tae Kim; Ulsan National Institute of Science and Technology, Korea (the Republic of).
SESSION NM7.9: New Fabrication Methods of Nano-PV Devices

Session Chairs: Esther Alarcón-Llado and Anna Fontcuberta i Morral
Thursday Morning, April 20, 2017
PCC West, 100 Level, Room 105 A

8:15 AM NM7.9.01
Novel Growth of Silicon Nanowires for Photovoltaic Applications Shashi Paul; Emerging Technologies Research Centre, De Montfort University, United Kingdom.

8:30 AM *NM7.9.02
Single and Tandem Radial Junction Solar Cells Built on Silicon Nanowires Produced by Plasma-Assisted VLS Pere Roca i Cabarrocas; LPICM, CNRS, Ecole Polytechnique, France.

9:00 AM NM7.9.03
Growth of Silicon Nanowires Coated with Dielectric Layer by Simultaneous Precipitation at Low Temperatures (<300°C) Krishna Nama Manjunatha; De Montfort University, United Kingdom.

9:15 AM NM7.9.04
Templated Synthesis of Uniform Perovskite Nanowire Arrays Michael Ashley; Northwestern University, United States.

9:30 AM NM7.9.05
From Single NW to Large Scale NW Array Solar Cell Development through Conductive AFM Analysis Dmitry Mikulik; Ecole Polytechnique Fédérale de Lausanne, Switzerland.

9:45 AM NM7.9.06
Fabrication of CIGS Nanowire-Based Solar Cell by Electrodeposition Daniel Choe; Masdar Institute of Science and Technology, United Arab Emirates.

10:00 AM BREAK

SESSION NM7.10: Nanowire Strategies for Efficient Photodetection
Session Chairs: Esther Alarcón-Llado and Anna Fontcuberta i Morral
Thursday Morning, April 20, 2017
PCC West, 100 Level, Room 105 A

10:30 AM NM7.10.01
Performance Boosting of Flexible ZnO UV Sensors with Rational Designed Absorbing Antireflection Layer and Humectant Encapsulation Hong Zhang; Peking University, China.

10:45 AM *NM7.10.02
Silicon-Germanium-Tin Nanowires—Growth, Structure and Device Properties Oussama Moutanabbir; Ecole Polytechnique de Montreal, Canada.

11:15 AM NM7.10.03
Extreme IR Light Absorption in Group IV-SiGeSn Core-Shell Nanowires Anis Attiaoui; Ecole Polytechnique Montreal, Canada.

11:30 AM *NM7.10.04
Design of Nanowire Quantum-Well Infrared Photodetectors for Intersubband Absorption Dingkun Ren; University of California, Los Angeles, United States.

SESSION NM7.11: Nanowire Strategies for Efficient Solar to Fuel Conversion

Session Chairs: Sudha Mukkapati and Carl Thompson
Thursday Afternoon, April 20, 2017
PCC West, 100 Level, Room 105 A

1:30 PM *NM7.11.01
CO2 + H2O + Sunlight = Chemical Fuels + O2 Peidong Yang; University of California, Berkeley, United States.

2:00 PM NM7.11.02
Mixing Cu Nanowires with ZnO Nanowires as Highly Stable Catalysts for Methanol Synthesis and Steam Reforming Jun Xu; Arizona State University, United States.

2:15 PM NM7.11.03
Three-Dimensional Array of Highly Conductive SnO2 Nanowires Arrays as a Current Collector of CdSe/CdS/TO, Cascade Heterojunction Photoelectrochemical Cells Salim Caliskan; University of Pittsburgh, United States.

2:30 PM BREAK

3:00 PM *NM7.11.04
Nanowires, Nanoplates and Nanofilms of Two-Dimensional Layered Materials Hongtai Yuan1, 2; Stanford University, United States; 2SLAC National Accelerator Laboratory, United States.

3:30 PM NM7.11.05
Silicon Nanowires for Solar-to-Fuel Conversion Yude Su; University of California, Berkeley, United States.

3:45 PM NM7.11.06
Growth and Optical Properties of Self-Assembled Gallium Nitride Nanowires for Photocatalytic Water Splitting Bijun Zhao; Research School of Physics and Engineering, The Australian National University, Australia.

4:00 PM *NM7.11.07
Efficient Solar Cells and Water Reduction with Nanowires Erik Bakkers1, 2; Eindhoven University of Technology, Netherlands; 2Delft University of Technology, Netherlands.

4:30 PM NM7.11.08
High Efficiency and Highly Stable Photocatalytic Overall Water Splitting on III-Nitride Nanowire Arrays Mohammad F. Chowdhury; McGill University, Canada.

4:45 PM NM7.11.09
An InGaN Nanowire/Si Tandem Photoanode for High-Efficiency Photoelectrochemical Water Splitting Srinivas Vanka; McGill, Canada.
SESSION NM7.12: III-V Nanowires for Solar Energy Conversion
Session Chairs: Sudha Mokkapati and Carl Thompson
Friday Morning, April 21, 2017
PCC West, 100 Level, Room 105 A

8:30 AM NM7.12.01
Self-Guided Growth of Millimeter-Long Vanadium Dioxide Nanowires Lee Hye Jin 1, 2; 1Ulsan National Institute of Science and Technology (UNIST), Korea (the Republic of); 2Korea Institute of Science and Technology (KIST), Korea (the Republic of).

8:45 AM NM7.12.02
III-V Semiconductor Nanowires for Energy Applications Chennupati Jagadish; Australian National University, Australia.

9:15 AM NM7.12.03
Zn and Sn Doped GaAs Nanowires Grown by Aerotaxy Wondwosen Metaferia 1, 2; 1Lund University, Sweden; 2Lund University, Sweden.

9:30 AM NM7.12.04
Growth of Self-Catalyzed InGaP Alloy Nanowires via CVD Method Praneeth Ranga; Arizona State University, United States.

9:45 AM NM7.12.05
Vapor-Liquid-Solid Growth of High Quality InP Thin Film and Nano-Networks for Photovoltaic Applications Seyed Ebrahim Hashemi Amiri 1, 2; 1Arizona State University, United States; 2Arizona State University, United States.