

SYMPOSIUM ES2

High-Capacity Electrode Materials for Rechargeable Energy Storage
April 18 - April 21, 2017

Symposium Organizers

Mauro Pasta, University of Oxford
Kristin Persson, University of California, Berkeley
Yuan Yang, Columbia University
Jia Zhu, Nanjing University

Symposium Support

BICI Collaborative Innovation
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Proceedings Statement

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* Invited Paper

SESSION ES2.1: Energy Storage Overview and Solid Electrolyte
Session Chairs: Mauro Pasta and Yuan Yang
Tuesday Morning, April 18, 2017
PCC North, 200 Level, Room 224 A

10:30 AM *ES2.1.01

Rechargeable Alkali-Metal Batteries M. Helena Braga^{1,2}; ¹University of Texas at Austin, United States; ²University of Porto, Portugal.

11:00 AM *ES2.1.02

Overview and Highlights of the Advanced Battery Materials Research Program Tien Duong; U.S. Department of Energy, United States.

11:30 AM *ES2.1.03

Achieving High-Capacity Dendrite-Free Li-Metal Anodes with Solid-State Electrolytes Eric D. Wachsman; University of Maryland, United States.

SESSION ES2.2: Group IV Anodes—Si and Sn
Session Chairs: Jang Wook Choi and Yue Qi
Tuesday Afternoon, April 18, 2017
PCC North, 200 Level, Room 224 A

1:30 PM *ES2.2.01

Advanced Binder Designs in High Capacity Silicon Anodes Jang Wook Choi; Korean Institute of Science and Technology, Korea (the Republic of).

2:00 PM ES2.2.02

Scalable and Low Cost Methods for the Production and Performance Improvement of Si and Li Anode Bin Zhu; Nanjing University, China.

2:15 PM ES2.2.03

Metallurgically Lithiated SiO₂ Anode with High Capacity and Ambient Air Compatibility Jie Zhao; Stanford University, United States.

2:30 PM ES2.2.04

Stress Evolution and Volume Expansion in Lithium-Ion Batteries with Si/C Composite Anodes Jianlin Li; Oak Ridge National Laboratory, United States.

2:45 PM ES2.2.05

Overcoming Micro-Silicon Particle Fracture within Graphene Cages for Stable Battery Anodes Yuzhang Li; Stanford University, United States.

3:00 PM BREAK

3:30 PM ES2.2.06

Design of Multifunctional Copolymers for High-Performance Energy Storage Devices Soojin Park; Ulsan National Institute of Science and Technology, Korea (the Republic of).

3:45 PM *ES2.2.07

Multi-Component and Multi-Functional Protection Coating for High Capacity Anodes (Li and Si) Yue Qi; Michigan State University, United States.

4:15 PM ES2.2.08

Tin Nanoparticles as a Conductive Additive in Silicon-Based Anodes Lorenzo Mangolini; University of California, Riverside, United States.

4:30 PM ES2.2.09

Electroplating High-Performance Lithium Ion Batteries Huigang Zhang; Nanjing University, China.

SESSION ES2.3: Alkaline Metal Anodes
Session Chairs: Kristin Persson and Hailiang Wang
Wednesday Morning, April 19, 2017
PCC North, 200 Level, Room 224 A

8:30 AM *ES2.3.01

Battery 500Wh/Kg: Reviving Lithium Metal Anode through Materials Design Yi Cui; Stanford University, United States.

9:00 AM *ES2.3.02

Lithium Metal Anodes and Rechargeable Li Metal Batteries Wu Xu; Pacific Northwest National Laboratory, United States.

9:30 AM ES2.3.03

High Performance Lithium Metal Anode with a Soft and Flowable Polymer Coating Jeffrey F. Lopez; Stanford University, United States.

9:45 AM BREAK

SESSION ES2.4: Group VI Cathodes—S and Se I
Session Chairs: Kristin Persson and Hailiang Wang
Wednesday Morning, April 19, 2017
PCC North, 200 Level, Room 224 A

10:15 AM *ES2.4.01

Dynamically and Statically Stable Metal-Sulfur Batteries with High Sulfur Loading Arumugam Manthiram; University of Texas at Austin, United States.

10:45 AM ES2.4.02

Design Stable Room-Temperature Metal-Sulfur Batteries Shuya Wei; Cornell University, United States.

11:00 AM ES2.4.03

Empowering the Performance of Lithium Sulfur Batteries via Development of Integrated Polysulphide Reservoirs Sarish Rehman; Peking University, China.

11:15 AM ES2.4.04

Towards an Efficient Current Collector for Ceramic-S Composite Cathodes in Lithium Sulfur Batteries Priyanka Bhattacharya; University of Dayton Research Institute, United States.

11:30 AM ES2.4.05

A Facile Soft-Template Synthesis of Ultrahigh Surface Area Nitrogen-Doped Mesoporous Carbon Nanospheres for High Performance Lithium-Sulfur Batteries Ruowen Fu; Sun Yat Sen University, China.

11:45 AM ES2.4.06

Copolymer Sulfur Cathodes for High Capacity Lithium Ion Batteries [Jingjing Liu](#); University of California, United States.

SESSION ES2.5: Group VI Cathodes—S and Se II

Session Chairs: Hailiang Wang and Jie Xiao

Wednesday Afternoon, April 19, 2017

PCC North, 200 Level, Room 224 A

1:30 PM *ES2.5.01

Challenges in Li-S Batteries—Thick Cathode and Anode Corrosion [Jie Xiao](#); University of Arkansas, United States.

2:00 PM ES2.5.02

Ultra-High Sulfur Loading Li-S Cathodes Enabled by Trenched Wall Carbon Nanotube Scaffolds [Gang Yang](#); Texas A&M University, United States.

2:15 PM ES2.5.03

High Loading Li-S and Li-Se Batteries towards Commercialization—Material, Fabrication and Cell Design [Fang Dai](#); General Motors, United States.

2:30 PM BREAK

3:30 PM ES2.5.04

In Operando Synchrotron Multi-Modal Investigation for Structural and Chemical Evolution of Metal Sulfide Additives in Li-S Battery [Yu-Chen K. Chen-Wiegart](#)^{1,2}; ¹Stony Brook University, United States; ²Brookhaven National Laboratory, United States.

3:45 PM ES2.5.05

Molybdenum Polysulfide Chalcogels as High-Capacity, Anion-Redox-Driven Electrode Materials for Li-Ion Batteries [Vicky V. Doan-Nguyen](#); University of California, Santa Barbara, United States.

4:00 PM *ES2.5.06

Cathode Materials Design and Surface Chemistry for Stable Cycling Lithium-Sulfur Batteries [Hailiang Wang](#); Yale University, United States.

4:30 PM ES2.5.07

Exceptional Energy and New Insight with Sodium—Selenium Battery Based on Carbon Nanosheet Cathode and Pseudographite Anode [David Mitlin](#); Clarkson University, Canada.

4:45 PM ES2.5.08

Three-Dimensional Se/Bicontinuous Porous Carbon (BPC) Electrodes with High Energy Density and Stable Long Term Cycling Performances [Junjie Wang](#); University of Illinois at Urbana-Champaign, United States.

SESSION ES2.6: Poster Session I

Session Chairs: Mauro Pasta, Yuan Yang and Jia Zhu

Wednesday Afternoon, April 19, 2017

8:00 PM - 10:00 PM

Sheraton, Third Level, Phoenix Ballroom

ES2.6.01

A Mechanism of Deterioration in Cycling Performance of LiB Cells Using the SiO as Active Material [Takakazu Hirose](#)^{1,2}; ¹Shin-Etsu Chemical Co., Ltd, Japan; ²Yamagata University, Japan.

ES2.6.02

All-Nanowire Based Anodes for Ultrafast Charge-Discharge Lithium Ion Batteries [Zhenxing Yin](#); Seoul National University, Korea (the Republic of).

ES2.6.03

Study of Nanoporous Carbon Fabrics for Rechargeable Energy Storage Capacitors [Sergey M. Karabanov](#); Ryazan State Radio Engineering University, Russian Federation.

ES2.6.04

Rational Design of Ultra-Durable Silicon-Based Anodes for High-Performance Lithium-Ion Batteries [Jaegwon Ryu](#); Ulsan National Institute of Science and Technology, Korea (the Republic of).

ES2.6.05

Chip Scale Carbon Nanotube Based Electrochemical Double Layer Capacitors with Ionic Liquid Electrolyte [Tyler J. Colling](#)^{1,2}; ¹Georgia Institute of Technology, United States; ²Georgia Tech Research Institute, United States.

ES2.6.06

Structural Evolution of Si-Based Multicomponent for Li-Ion Battery Anodes [Dongki Hong](#); Ulsan National Institute of Science and Technology, Korea (the Republic of).

ES2.6.07

Aligned MWCNT Channels in Free Standing Polymer Nanocomposites for Li-Ion Battery [Balram Tripathi](#)^{1,2}; ¹University of Puerto Rico, United States; ²S S Jain Subodh PG (Autonomous) College, India.

ES2.6.08

Fabrication of Tube-in-Tube Nanostructure Carbon Materials for High-Performance Lithium-Sulfur Batteries [Ruowen Fu](#); Sun Yat Sen University, China.

ES2.6.09

Carbon Nanotube/MnO₂ Hybrid Fiber Supercapacitor with High Areal Capacitance and Energy Density for Wearable Energy Storage [Changsoo Choi](#); Hanyang University, Korea (the Republic of).

ES2.6.10

SnSb Alloys as Anode Materials for Na-Ion Batteries [Hyukjae Lee](#); Andong National University, Korea (the Republic of).

ES2.6.11

Approach to Flexible Na-Ion Batteries with Exceptional Rate Capability and Long Lifespan Using Na₂FeP₂O₇ Nanoparticles on Porous Carbon Cloth [Hee Jo Song](#)^{1,2}; ¹Seoul National University, Korea (the Republic of); ²Korea University, Korea (the Republic of).

ES2.6.12

Synthesis and Characterization of High-Performance Energy Storage Materials for Supercapacitors [Limin Huang](#); South University of Science and Technology of China, China.

ES2.6.13

Ultrathin Porous Co₃O₄ Nanosheets with Exposed {112} Facets as Anodes for Extraordinarily High Capacity Lithium-Ion Batteries [Renjie Wei](#)^{1,2}; ¹City University of Hong Kong, Hong Kong; ²South-Central University for Nationalities, China.

ES2.6.14

Phase Field Model of the Structural Evolution of Silicon Thin Films [Thanh P. Tran](#); Michigan State University, United States.

ES2.6.15

The Effect of Calendering Temperature for Sulfur Electrodes Used for Large-Scale Lithium-Ion Batteries [Rachel Ye](#); University of California, Riverside, United States.

ES2.6.16

Simple Synthesis of Carbon-Ni Nanowire Foam for Applications in Li-Ion Battery Anode [Chueh Liu](#); University of California, Riverside, United States.

ES2.6.17

Nickel Oxide Nanowire Foam—The Effect of Various Nanowire Morphologies on Li-Ion Battery Performance [Yiran Yan](#); University of California, Riverside, United States.

ES2.6.18

In Situ Synthesis Graphene/CuO Composite for Anode of Li-Ion Battery [Jeeyoung Yoo](#); Seoul National University, Korea (the Republic of).

ES2.6.19

Nanostructured MoO₃ as an Anode Material for Lithium Ion Storage Site in Lithium-Ion Batteries [Hojae Jung](#); Hanyang University, Korea (the Republic of).

ES2.6.20

Three-Dimensional Pore-Patterned Carbon Structures for Their Energy Storage Application [Cheolho Kim](#); Sogang University, Korea (the Republic of).

ES2.6.21

Anodized Porous Oxide Thin Films for Energy Application [Hua Cheng](#); South University of Science and Technology of China, China.

ES2.6.22

Titanium Dioxide Coated Graphite Anode Material for Enhancement of High Rate Capability Lithium-Ion Battery [Dong Jae Chung](#); Hanyang University, Korea (the Republic of).

ES2.6.23

Fe₂O₃ Anode Material for Na-Ion Rechargeable Batteries [Saveria Santangelo](#); Mediterranea University, DICEAM, Italy.

ES2.6.24

Hydrothermal Synthesis of LiFePO₄ Cathode-Active Material Using Iron Metal [Satish Bolloju](#); National Sun Yat-Sen University, Taiwan.

ES2.6.25

N-Doped Hierarchical Mesoporous Carbon Tubes for High Performance Supercapacitors [Wen Zhang](#); Arizona State University, United States.

ES2.6.26

Development of Tin Based ALD Anodes for 3D Thin Film Lithium Ion Batteries [Thomas Schmitt](#); University of Maryland College Park, United States.

ES2.6.27

Silicon-Tin-Carbon Nanocomposites—Rational Exploration of Processing Parameters [Nicole Wagner](#); California State Polytechnic University, Pomona, United States.

ES2.6.28

Niobium Pentoxide Nanowire Electrochemical Fabrication for Energy Storage Applications [Gaurav Jha](#); University of California, Irvine, United States.

ES2.6.29

Electrochemical Performance of TMD/KMnO₄ Hybrids as Supercapacitor Electrode Materials [Monsuru A. Abass](#); Kansas State University, United States.

ES2.6.30

Spontaneous Exfoliation of Transition Metal Dichalcogenide Crystals and Performance as Electrodes for Rechargeable Batteries and Supercapacitors [Monsuru A. Abass](#); Kansas State University, United States.

ES2.6.31

Synthesis of MnO₂ Nanoflakes-Coated CNT Particle for Energy Storage Application [Donghee Gueon](#); Sogang University, Korea (the Republic of).

ES2.6.32

Anion Redox Driven Electroreduction Synthesis of Silicon Nanowire in Molten Salts at Low Temperature as High Capacity Lithium-Ion Battery Anode [Yifan Dong](#)^{1,2}; ¹University of Wisconsin-Madison, United States; ²Wuhan University of Technology, China.

ES2.6.33

Effects of Doping with Transition Metal (Fe or Cu) on Electrochemical Performance for Li-Rich Cathode Material [Sung Nam Lim](#); Korea Institute of Industrial Technology, Korea (the Republic of).

ES2.6.34

Electrochemical Properties of Si/SiO_x-Conductive Polymer Core-Shell Nanospheres as a High Capacity Anode Material for Lithium-Ion Battery [Eunjun Park](#); Hanyang University, Korea (the Republic of).

ES2.6.35

Characterizations of Al₂O₃ Coatings on Lithium-Ion Cathodes—Effects of Cathode Compositions and Annealing Temperatures [Binghong Han](#); Argonne National Laboratory, United States.

ES2.6.36

Metal Oxide Protected Lithium Anode Enabled by Atomic Layer Deposition towards Practical Applications [Lin Chen](#)^{1,2,3}; ¹Illinois Institute of Technology, United States; ²Argonne National Laboratory, United States; ³Joint Center for Energy Storage Research, United States.

ES2.6.37

Passivated Lithium Metal as Anode Materials for Advanced Battery Applications [Eunho Cha](#); University of North Texas, United States.

ES2.6.38

Enhanced Lithium and Sodium Storage of Red Phosphorus-Based P-TiP₂-C Nanocomposite Anode [Sang-Ok Kim](#)^{2,1}; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²University of Texas at Austin, United States.

ES2.6.39

Self-Templating Scheme for the Synthesis of Nanostructured Transition-Metal Chalcogenide Electrodes for Capacitive Energy Storage [Chuan Xia](#); King Abdullah University of Science and Technology (KAUST), Saudi Arabia.

ES2.6.40

Transparent, Flexible and Stretchable Supercapacitors Using Ag-Au-Polypyrrole Core Shell Nanowire Mesh Films [Habeom Lee](#); Seoul National University, Korea (the Republic of).

ES2.6.41

Electrochemical Properties of Type I Germanium Clathrates Ba₈Al_dGe_{46-d} (0 < d < 16) [Ran Zhao](#); Arizona State University, United States.

ES2.6.42

Solvation Effect on Lithium-Sulfur Electrochemical Reaction in Sub-Nano Confinement [Chengyin Fu](#); University of California, Riverside, United States.

SESSION ES2.7: Group VI Cathodes—Oxygen-Based Redox

Session Chairs: Mauro Pasta and Daniel Steingart

Thursday Morning, April 20, 2017

PCC North, 200 Level, Room 224 A

8:15 AM *ES2.7.01

Oxygen Redox in 3D Transition Metal Oxide Cathodes [Peter Bruce](#); University of Oxford, United Kingdom.

8:45 AM *ES2.7.02

Anion-Redox Batteries and Lithium Metal Protection [Ju Li](#); Massachusetts Institute of Technology, United States.

9:15 AM ES2.7.03

High Areal Loading Holey Graphene Air Cathodes for Lithium-Oxygen Batteries [Yi Lin](#); National Institute of Aerospace, United States.

9:30 AM ES2.7.04

Novel High Power Solid State Sodium-Air Batteries [Ramin Rojace](#); University of Illinois at Chicago, United States.

9:45 AM BREAK

SESSION ES2.8: Aqueous and Organic Systems

Session Chairs: Mauro Pasta and Daniel Steingart

Thursday Morning, April 20, 2017

PCC North, 200 Level, Room 224 A

10:15 AM *ES2.8.01

Safe Electrolytes for Li-Ion Batteries [Chunsheng Wang](#); University of Maryland, United States.

10:45 AM *ES2.8.02

Exploiting Rough Metallic Growth for Secondary Battery Anodes [Daniel Steingart](#); Princeton University, United States.

11:15 AM ES2.8.03

Hexacyanochromates—Open-Framework Crystal Structure Anode Materials for Sodium-Ion Batteries [Mauro Pasta](#); University of Oxford, United Kingdom.

11:30 AM ES2.8.04

Light-Weight and Corrosion-Resistant Current Collector for Aqueous Li-Ion Batteries [Saman Gheyfani](#); University of Houston, United States.

11:45 AM ES2.8.05

Voltage and Capacity Control of Polyaniline Based Organic Cathodes—An Ab Initio Study [Sergei Manzhos](#); National University of Singapore, Singapore.

SESSION ES2.9: 3D Oxide Cathodes

Session Chairs: Matthew McDowell and Chunsheng Wang

Thursday Afternoon, April 20, 2017

PCC North, 200 Level, Room 224 A

1:30 PM *ES2.9.01

Combining Li-Excess and Reversible Oxygen Charge Transfer to Achieve High Capacity Cathodes [Gerbrand Ceder](#); University of California, Berkeley, United States.

2:00 PM ES2.9.02

Considering Factors of Lithium-Rich Oxide Layered Cathodes for Practical Application in Li-Ion Batteries [Jaephil Cho](#); UNIST, Korea (the Republic of).

2:30 PM ES2.9.03

Where is the Capacity Limit—A Perspective of Polyhedral Structure [Zhenlian Chen](#); Chinese Academy of Sciences, China.

2:45 PM ES2.9.04

The Effect of Magnetic Interactions on Structural Stability of LiNi_{1-y}CoyO₂ [Eunseok Lee](#); University of Alabama, Huntsville, United States.

3:00 PM BREAK

3:30 PM ES2.9.05

Nanoscale Surface Disorder in Li-Substituted P3/O3 Layered Cathodes for Sodium-Ion Batteries [Qun Huang](#); Central South University, China.

3:45 PM *ES2.9.06

A Comparison between Classical Layered Oxides and Lithium-Excess Layered Oxides—Pushing the Limit of Intercalation Compounds [Y. Shirley Meng](#); University of California, San Diego, United States.

4:15 PM ES2.9.07

Morphological and Structural Changes during Electrochemical Cycling in Li-Rich Layered Oxides for Next Generation Li-Ion Batteries [Minghao Zhang](#); University of California, San Diego, United States.

4:30 PM ES2.9.08

A New Degradation Mechanism in High Voltage NMC Cathodes [Soroosh Sharifi-Asl](#); University of Illinois at Chicago, United States.

SESSION ES2.10: Poster Session II

Session Chairs: Kristin Persson, Yuan Yang and Jia Zhu

Thursday Afternoon, April 20, 2017

8:00 PM - 10:00 PM

Sheraton, Third Level, Phoenix Ballroom

ES2.10.01

Electrodeposition of Si and Sn-Based Amorphous Films for High Energy Novel Electrode Materials [Serena Gallanti](#); University of Warwick, United Kingdom.

ES2.10.02

Silicon Electrode Degradation Analysis Using Laboratory Based X-Ray Tomography [Serena Gallanti](#); University of Warwick, United Kingdom.

ES2.10.03

Rational Doping Design of Ni-Rich Layered Oxide Cathode Materials for Li-Ion Battery [Fantai Kong](#); University of Texas at Dallas, United States.

ES2.10.04

Unravelling the Origin of Irreversible Capacity Loss in NaNiO₂ for High Voltage Sodium Ion Batteries [Liguang Wang](#)^{1,2}; ¹Harbin Institute of Technology, China; ²Brookhaven National Laboratory, United States.

ES2.10.05

Nickel–Cobalt Layered Double Hydroxide Based Nanoflakes Electrode Materials for High-Performance Electrochemical Energy Storage Devices [Imran Shakir](#); King Saud University, Saudi Arabia.

ES2.10.06

Room-Temperature Synthesized Amorphous Nano-Aggregates of Antimony Sulfide and Their Na-Ion Storage Performance for Seawater Flow Batteries [Soo Min Hwang](#); Ulsan National Institute of Science and Technology, Korea (the Republic of).

ES2.10.07

Electrochemical Characterization of Silicon-Coated Vertically Aligned Carbon Nanofibers Anode in Gel Polymer Electrolyte for All-Solid-State Lithium-Ion Batteries [Gaiind P. Pandey](#); Xavier University of Louisiana, United States.

ES2.10.08

Vertically Oriented MoS₂-3D Carbon Nanotubes Hybrid Composite as an Anode Material for Next Generation Li-Ion Batteries [Mumukshu D. Patel](#); University of North Texas, United States.

ES2.10.09

Semiconductor Based Supercapacitor with High Capacitance and Intrinsic Smart Functions [Minshen Zhu](#); City University of Hong Kong, Hong Kong.

ES2.10.10

Study of Initial Cell Conditioning Effects on Lithium-Sulfur Cells Undergoing Simulated EV Driving [Jeffrey M. Bell](#); University of California, Riverside, United States.

ES2.10.11

Protecting Silicon-Film Anodes in Lithium-Ion Batteries Using an Atomically-Thin Graphene Drape [Shravan Suresh](#); Rensselaer Polytechnic Institute, United States.

ES2.10.12

3 in 1—Multifunctional 3D Graphene for Integrated Graphene-Sulfur Cathode, Separator and Current Collector of Li-S Battery [Yu-Yun Hsieh](#); University of Cincinnati, United States.

ES2.10.13

Carbon Coated Wrinkled Silicon Nanoparticles as a High-Rate Anode for Li-Ion Batteries [Bokyung Kim](#); Yonsei University, Korea (the Republic of).

ES2.10.14

Trash to Treasure—Bio-Inspired Synthesis of Nanostructured Materials via Controllable Diffusion System for Energy Storage [Xinghua Meng](#); Wayne State University, United States.

ES2.10.15

Boron-Modified Silicon Oxycarbide/Graphene Composite Paper Electrode for Electrochemical Energy Storage [Monsuru A. Abass](#); Kansas State University, United States.

ES2.10.16

Fabrication of Aligned Carbon Nanotubes and Magnetic Nanowires Using Porous Polymer Template [Dmitri L. Zagorskiy](#)^{1,3}; ¹Center for Crystallography and Photonics of RAS, Russian Federation; ³Institute for Problems in Mechanics RAS, Russian Federation.

ES2.10.17

Activated Edge Oriented Graphene on Carbon Nanofibers for Kilo-Hertz Ultrafast Electric Double Layer Supercapacitors [Guofeng Ren](#); Texas Tech University, United States.

ES2.10.18

Nano-Confined Metal Oxide in Carbon Nanotube Composite Electrodes for Lithium Ion Batteries [Chunlei Wang](#); Florida International University, United States.

ES2.10.19

Study on Chemical Vapor-Deposited Carbon Nanotubes as Electrode Material for Supercapacitor Applications [Ganesh Sainadh Gudavalli](#); Binghamton University, United States.

ES2.10.20

Hierarchical Carbon Nanotube Microstructures for Ultra-Flexible Li-Ion Batteries [Shahab Ahmad](#); University of Cambridge, United Kingdom.

ES2.10.21

Influence of Lithiation on Metal Ion Doped (C, Cu, In) Sb₂S₃ for Energy Storage Application [Sharvanti Pinglay](#); Anna University, India.

ES2.10.22

Nanostructured Cathode Materials of Lithium-Sulfur Batteries—Progress, Challenges and Perspectives [Kishwar Khan](#); Hong Kong University, Hong Kong.

ES2.10.23

Quantifying Electrochemical Reactions and Properties of Amorphous Silicon in a Realistic Lithium-Ion Battery Configuration [Hanqing Jiang](#); Arizona State University, United States.

ES2.10.24

Self-Healing Polymer for High Capacity Anodes [Chao Wang](#); University of California-Riverside, United States.

ES2.10.25

Layered MoS₂/RuO₂ Electrode Material for Enhanced Performance Supercapacitors [Wang Wei](#); University of Electronic Science and Technology of China, China.

ES2.10.26

High Performance All Solid-State Paper Supercapacitor Based on Nanofibrillar Cellulose (NFC) Composites [Fei Jiao](#); Linköping University, Sweden.

ES2.10.27

A Cost Effect Route to Synthesis LiFePO₄ in a Limited O₂ Environment [Fei Gu](#)^{1,2,3}; ¹University of California, Riverside, United States; ²Winston Chung Global Energy Center, University of California, Riverside, United States; ³University of California, Riverside, United States.

ES2.10.28

Novel Tire-Derived Carbon Electrodes for Lithium and Sodium Ion Batteries [Mariappan P. Paranthaman](#); Oak Ridge National Laboratory, United States.

ES2.10.29

Development of Chemically Immobilized Sulfur Cathodes for Next-Generation Lithium Sulfur Batteries [Lu Li](#); Rensselaer Polytechnic Institute, United States.

ES2.10.30

Universally Applicable Antimony-Doped Tin Oxide Decoration on Electrodes for High-Energy Density Energy Storage [Gyujin Song](#); Ulsan National Institute of Science and Technology, Korea (the Republic of).

ES2.10.31

Freestanding Solid-State Micro-Supercapacitor Based on Laser-Patterned Nanofibers [Yu Song](#); Institute of Microelectronics, Peking University, China.

SESSION ES2.11: Characterizations

Session Chairs: Matthew McDowell and Mauro Pasta

Friday Morning, April 21, 2017

PCC North, 200 Level, Room 224 A

8:15 AM *ES2.11.01

Five-Dimensional Visualization of Phase Dynamics in Battery Electrodes with Synchrotron Hard X-Ray Nanotomography [Jiajun Wang](#); Brookhaven National Laboratory, United States.

8:45 AM ES2.11.02

In Situ Tracking of the Structural Chemistry during Synthesis of Ni-Rich Layered Oxides as High-Energy Cathodes for Li-Ion Batteries [Jianming Bai](#); Brookhaven National Laboratory, United States.

9:00 AM ES2.11.03

Elucidating the Mechanism of High-Rate and High-Capacity Lithium-Ion Intercalation in Bulk Complex Oxides [Kent Griffith](#); University of Cambridge, United Kingdom.

9:15 AM ES2.11.04

In Situ Investigation of Distinct Nanoscale Reaction Pathways in a Sulfide Material for Sodium and Lithium Batteries [Matthew T. McDowell](#); Georgia Institute of Technology, United States.

9:30 AM ES2.11.05

Investigating the Mechanism and Extent of Surface Degradation in Ni-Based Cathode Materials Induced by Electrochemical Cycling [Sooyeon Hwang](#)^{1,2}; ¹Korea Institute of Science and Technology, Korea (the Republic of); ²Brookhaven National Laboratory, United States.

9:45 AM ES2.11.06

Non-Invasive in Operando Imaging of Lithium-Sulfur Battery Using Light Microscopy [Nian Liu](#); Georgia Institute of Technology, United States.

10:00 AM BREAK

SESSION ES2.12: Supercapacitors

Session Chairs: Matthew McDowell and Mauro Pasta

Friday Morning, April 21, 2017

PCC North, 200 Level, Room 224 A

10:30 AM ES2.12.01

High Energy Hybrid Supercapacitor with Asymmetrical Configuration [Fang Dai](#); General Motors, United States.

10:45 AM ES2.12.02

Facile Template Synthesis of Microporous Conductive Polymer for High Performance Supercapacitors [Chenchen Hu](#)^{1,2}; ¹Georgia Institute of Technology, United States; ²Huazhong University of Science and Technology, China.

11:00 AM ES2.12.03

Ultralight, Binder Free, Freestanding and Multi-Level Porous Graphite/Mn₃O₄ Electrodes for High Performance Flexible Supercapacitors [Weigu Li](#); The University of Texas at Austin, United States.

11:15 AM ES2.12.04

Laser Processed 2D Transition Metal Carbides (MXenes) for Flexible Pseudo Supercapacitors [Xining Zang](#)^{1,2}; ¹Berkeley Sensor and Actuator Center, United States; ²University of California Berkeley, United States.

11:30 AM ES2.12.05

Facile Synthesis of N-Doped Porous Carbons by ZnCl₂ Activation of Inexpensive Organic Building Blocks and Their Performance as Supercapacitor [Babak Ashourirad](#); Virginia Commonwealth University, United States.

11:45 AM ES2.12.06

Synthesis of Nitrogen-Rich Nanotubes and Utilization to Lithium and Sodium Ion Hybrid Full-Cell Capacitors Enabling High Energy and Power Densities over Robust Cycle Life [Jong Ho Won](#); KAIST, Korea (the Republic of).

SESSION ES2.13: Other Battery Materials and Systems

Session Chairs: Yuan Yang and Yu Zhang

Friday Afternoon, April 21, 2017

PCC North, 200 Level, Room 224 A

1:30 PM *ES2.13.01

Inorganic Energy Storage Materials Yu Zhang; Beihang University, China.

2:00 PM ES2.13.02

Low-Cost and High Energy Density Cathode Materials for Sodium Metal Halide Battery Applications Guosheng Li; Pacific Northwest National Laboratory, United States.

2:15 PM ES2.13.03

Atomic Layer Deposition Solid Electrolyte Enables Highly Reversible Advanced Composite FeOF Electrodes—The Mechanism for Superior Reversibility Chuan-Fu Lin; University of Maryland, United States.

2:30 PM ES2.13.04

Are Electrospun Carbon/Metal Oxide Composite Fibers Relevant Electrode Materials for Li-Ion Batteries? Saveria Santangelo; Mediterranean University, DICEAM, Italy.

2:45 PM ES2.13.05

Ultra-Fast Energy Storage Properties of Conjugated Redox Polymers—A Mechanism Study Fang Hao; University of Houston, United States.

3:00 PM BREAK

3:30 PM ES2.13.06

Arylene Diimide Frameworks for Energy Storage Tyler B. Schon; University of Toronto, Canada.

3:45 PM ES2.13.07

Polyol Synthesis of Na₂FePO₄F Nanoparticles for High Rate Na-Ion Cathodes Jesse S. Ko^{1,3}; ¹Naval Research Laboratory, United States; ³University of California, Los Angeles, United States.

4:00 PM ES2.13.08

The Influence of Large Cations on the Electrochemical Properties of Tunnel-Structured Metal Oxides Yifei Yuan^{1,2}; ¹University of Illinois at Chicago, United States; ²Argonne National Laboratory, United States.

4:15 PM ES2.13.09

Li₃V₂(PO₄)₃—For High Power LIBs with Extended Operating Temperature Farheen Sayed; Rice University, United States.