

Lithium Battery Power 2016

Advances in Chemistry, Materials &
Modeling

Bethesda, Maryland, USA
1 - 2 November 2016

ISBN: 978-1-5108-3796-6

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2016) by Knowledge Foundation
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Knowledge Foundation
at the address below.

Knowledge Foundation
250 First Avenue, Suite 300
Needham, MA 02494
USA

Phone: 781.972.5400
Fax: 781.972.5425

custserv@knowledgefoundation.com

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

Lithium Battery Power

Advances in Chemistry, Materials & Modeling

November 1 - 2, 2016 | Hyatt Regency Bethesda | Bethesda, MD

TUESDAY, NOVEMBER 1

7:30 am **Registration and Morning Coffee**

8:30 **Organizer's Welcome**

Craig Wohlers, Executive Director, Conferences, Knowledge Foundation, a Part of Cambridge EnerTech

8:35 **Chairperson's Opening Remarks**

Daniel Abraham, Ph.D., Engineer, Chemical Sciences and Engineering, Argonne National Laboratory

8:45 **KEYNOTE PRESENTATION: Lithium-Ion Batteries for Automotive Industry – From Materials to Vehicle ElectrificationN/A**

K. Raghunathan, Ph.D., Battery Systems Engineer, General Motors

APPLICATIONS & MARKET

9:30 **U.S. Department of Energy - ARPA-E: Investing in High-Risk/High-Reward Approaches to Solve Our Energy Storage Needs1**

Susan Babinec, Senior Commercialization Advisor, ARPA-E, U.S. Department of Energy

10:00 **Storage at the Threshold: Li-Ion Batteries and Beyond19**

George Crabtree, Ph.D., Director, Joint Center for Energy Storage Research (JCESR), Argonne National Laboratory & Distinguished Professor of Physics, Electrical and Mechanical Engineering, University of Illinois at Chicago

10:30 **Coffee Break**

11:00 **Pushing the Limits of Li-Ion Batteries33**

M. Stanley Whittingham, D.Phil., Director & Distinguished Professor, Chemistry and Materials, Binghamton University

11:30 **Evolving EV Battery Performance and Safety Based on Real-World Feedback44**

Rick Chamberlain, Ph.D., CTO, Boston-Power

12:00 pm **Enjoy Lunch on Your Own**

Lithium Battery Power

Advances in Chemistry, Materials & Modeling

November 1 - 2, 2016 | Hyatt Regency Bethesda | Bethesda, MD

DIAGNOSTICS, MODELING & SIMULATION

- 2:00** **Chairperson's Remarks**
George Crabtree, Ph.D., Director, Joint Center for Energy Storage Research (JCESR), Argonne National Laboratory & Distinguished Professor of Physics, Electrical and Mechanical Engineering, University of Illinois at Chicago
- 2:05** **Electrode Cross-Talk during Lithium-Ion Battery AgingN/A**
Daniel Abraham, Ph.D., Engineer, Chemical Sciences and Engineering, Argonne National Laboratory
- 2:35** **Battery Metrology: Revealing Corrosion Chemistry in Lithium-Ion Battery and Beyond by Transmission Electron Microscopy56**
Huolin Xin, Ph.D., Staff Scientist, Electron Microscopy, Center for Functional Nanomaterials, Brookhaven National Laboratory
- 3:05** **Refreshment Break with Exhibit and Poster Viewing**

MATERIALS FABRICATION & DESIGN

- 3:50** **Development of Low-Cost, High-Energy Density Alloy Negative Electrodes for Li-Ion Batteries72**
Timothy Hatchard, Ph.D., Research Associate, Department of Chemistry, Dalhousie University
- 4:20** **A123's Advanced Material Development for Vehicle Electrification: Low- and High-Voltage Application Approaches92**
Derek C. Johnson, Ph.D., Executive Director R&D, A123 Systems, LLC

LOW TEMPERATURE RECHARGING

- 4:50** **Opportunities for Safe Low Temperature Recharging105**
Corey T. Love, Ph.D., Materials Research Engineer, U.S. Naval Research Laboratory
- 5:20** **Close of Day and Dinner Workshop Registration**

5:30-8:30 Dinner Workshops*

W1: Energy Storage Innovation: Technologies and Markets for the Future of Power

Instructor: Chris Robinson, Research Analyst, Lux Research

W2: Battery Safety Training

Instructor: Shmuel De-Leon, CEO, Shmuel De-Leon Energy, Ltd.

** Separate registration required.*

Lithium Battery Power

Advances in Chemistry, Materials & Modeling

November 1 - 2, 2016 | Hyatt Regency Bethesda | Bethesda, MD

WEDNESDAY, NOVEMBER 2

8:00 am Battery Breakfast Breakout Discussion Groups

Battery Safety Testing and Simulation

Moderator: Brian Barnett, Ph.D., Vice President, CAMX Power

Silicon Anodes

Moderator: Dee Strand, Ph.D., CSO, Wildcat Discovery Technologies

New Paradigm Materials Needed for Li-Ion Batteries Components

Moderator: Orlando Auciello, Ph.D., Endowed Chair Professor, Materials Science, Engineering and Bioengineering, University of Texas at Dallas

Transportation of Batteries

Moderator: Corey T. Love, Ph.D., Materials Research Engineer, U.S. Naval Research Laboratory

Current Market Trends and Future Advancements for Energy Storage

Moderator: Daniel Abraham, Ph.D., Engineer, Chemical Sciences and Engineering, Argonne National Laboratory

ARPA-E Trends and Opportunities for Funding, Technical Assistance & Market Readiness

Moderator: Susan Babinec, Senior Commercialization Advisor, ARPA-E, U.S. Department of Energy

9:00 Chairperson's Remarks

Corey T. Love, Ph.D., Materials Research Engineer, U.S. Naval Research Laboratory

9:05 KEYNOTE PRESENTATION: How the Emergence of AR/VR Could Change Future Battery Requirements for PC Devices113

Jeremy Carlson, Battery Technology Engineer, Lenovo

HIGH-CAPACITY CATHODES

9:35 High-Capacity Cathodes for Advanced Lithium-Ion: Challenges and Opportunities.....119

Jagjit Nanda, Ph.D., Senior Staff Scientist, Materials Science & Technology Division, Oak Ridge National Laboratory

10:05 Manufacturing Technology of All-Solid-State Thin-Film Lithium Secondary Battery for IoT Applications.....N/A

Koukou Suu, Ph.D., ULVAC Fellow, General Manager, Global Marketing and Technology Strategy, ULVAC, Inc.

Sponsored by
ULVAC

10:20 Coffee Break with Exhibit and Poster Viewing

11:00 High-Energy Density Li-Ion Cells Based on CAM-7 High-Capacity Cathode MaterialN/A

Brian Barnett, Ph.D., Vice President, CAMX Power

Suresh Sriramulu, Ph.D., CTO, CAMX Power

The Knowledge Foundation, a part of Cambridge Innovation Institute | 250 First Avenue, Suite 300, Needham, MA 02494 | T: 781-972-5400

Please note: Video and/or audio recording of any kind is prohibited onsite at all CII events

Lithium Battery Power

Advances in Chemistry, Materials & Modeling

November 1 - 2, 2016 | Hyatt Regency Bethesda | Bethesda, MD

11:30 High-Capacity Ni-Based Layered Oxide Cathode for Li-Ion Batteries134
Wei Tong, Ph.D., Scientist/Principal Investigator, Lawrence Berkeley National Laboratory

12:00 pm Mesoscale Implications in the Lithium-Sulfur Battery CathodeN/A
Aashutosh Mistry, Graduate Student, Mechanical Engineering, Texas A&M University

12:30 Enjoy Lunch on Your Own

ANODE STRUCTURES

2:00 Chairperson's Remarks
Brian Barnett, Ph.D., Vice President, CAMX Power

2:05 Development of Solid Polymer Nanocomposite Electrolyte for Lithium-Metal Anode for High Energy Battery Application.....N/A
James Wu, Ph.D., Research Scientist/Engineer, NASA Glenn Research Center

2:35 New Long-Life Lithium-Ion Battery with Corrosion-Resistant Ultrananocrystalline Diamond-Coated Components145
Orlando Auciello, Ph.D., Endowed Chair Professor, Materials Science, Engineering and Bioengineering, University of Texas at Dallas

3:05 Refreshment Break in the Exhibit Hall with Poster Viewing

4:00 Criterion for Mechanical Suppression for Dendrites at the Li-Electrolyte Interface: Insights from First-Principles SimulationsN/A
Venkat Viswanathan, Ph.D., Assistant Professor, Mechanical Engineering, Carnegie Mellon University

4:20 Low Temperature Limitations of Lithium Ion Batteries.....159
Dee Strand, Ph.D., CSO, Wildcat Discovery Technologies

4:40 Meeting Anode Material Cost Goals for Today and Tomorrow through Understanding Performance Drivers and Production Processing CostsN/A
Bridget Deveney, Senior Research Associate, GraftTech International

IP STRATEGY AND IMPLEMENTATION

5:00 Intellectual Property Strategies for the Burgeoning Advanced Battery Industry173
Dan Abraham, Ph.D., Vice President, Science and Business Strategy, MPEG LA

5:30 Welcome Reception with Exhibit and Poster Viewing

6:30 Close of Lithium Battery Power Conference