Battery Safety 2016

Integrating Lithium Battery Safety Designs for Increasing Energy Demands

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Battery Safety

Integrating Lithium Battery Safety Designs for Increasing Energy Demands
November 3 - 4, 2016 | Hyatt Regency Bethesda | Bethesda, MD

WEDNESDAY, NOVEMBER 2

5:00 pm **Conference Registration**

5:30 **Welcome Reception with Exhibit and Poster Viewing**

THURSDAY, NOVEMBER 3

8:00 am **Morning Coffee**

8:30 **Organizer's Welcome**
Mary Ann Brown, Executive Director, Conferences, Knowledge Foundation, a Part of Cambridge EnerTech

8:35 **Chairperson's Opening Remarks**
Brian Barnett, Ph.D., Vice President, CAMX Power

8:45 **KEYNOTE PRESENTATION: Solid-State Batteries, the Ultimate Solution to Battery Safety .....N/A**
Eric D. Wachsman, Ph.D., Professor & Director, University of Maryland Energy Research Center; William L. Crentz Centennial Chair, Energy Research, University of Maryland

ENGINEERING SAFETY FOR DIVERSE APPLICATIONS

9:30 **Examining Chronic vs. Acute Safety Concerns for Wearable Batteries .....N/A**
Daniel Steingart, Ph.D., Assistant Professor, Mechanical and Aerospace Engineering, Andlinger Center for Energy and the Environment, Princeton University

10:00 **New Understanding of Energy Distributions Exhibited during Thermal Runaway of Commercial Lithium-Ion Batteries Used for Human Spaceflight Applications .....N/A**
William Walker, Heat Transfer Analyst, Thermal Design Branch, NASA Johnson Space Center

10:30 **Coffee Break with Exhibit and Poster Viewing**

11:00 **Battery Safety and Mobile Power Grid 1**
Khosrow (Nema) Nematollahi, Ph.D., Chairman and CTO, Renewable Energy, Advanced Renewable Power LLC

11:30 **Effect of Impact and Mechanical Deformation on Lithium Battery Technology .....N/A**
Nasrin Shahed Khah, Research Scientist, Electrochemical Engineering Group, Warwick Manufacturing Group, University of Warwick

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

FAILURE ANALYSIS

2:00 **Chairperson's Remarks**
John A. Turner, Ph.D., Group Leader, Computational Engineering and Energy Sciences, UT-Battelle / Oak Ridge National Laboratory (ORNL)

2:05 **FEATURED PRESENTATION: Examples of Implementation of Short Detection for Battery Safety .....N/A**
Brian Barnett, Ph.D., Vice President, CAMX Power

2:35 **Three Electrode-Based Battery Failure Analysis 10**
Yinjiao (Laura) Xing, Ph.D., Research Associate, CALCE, University of Maryland

3:05 **Selected Oral Poster Presentation: Thermal Runaway Cell-to-Cell Propagation in Lithium-Ion Batteries 20**
Bengt-Erik Mellander, Ph.D., Professor, Department of Physics, Chalmers University of Technology, Gothenburg, Sweden

3:20 **Selected Oral Poster Presentation: Mechanism of the Entire Overdischarge Process and Overdischarge-Induced Internal Short Circuit in Lithium-Ion Batteries .....N/A**
Rui Guo, Research Scientist, Powertrain Control Group, Department of Automotive Engineering, Tsinghua University

3:35 **Refreshment Break with Exhibit and Poster Viewing**

MODELS, SENSORS & SAFETY

4:15 **FEATURED PRESENTATION: Balancing Accuracy and Computational Cost in Battery Simulation 26**
John A. Turner, Ph.D., Group Leader, Computational Engineering and Energy Sciences, UT-Battelle / Oak Ridge National Laboratory (ORNL)

4:45 **FEATURED PRESENTATION: Polymer Foil-Embedded Photonic Sensor for Battery Safety .....N/A**
Wolfgang Schade, Ph.D., Professor & Department Head, Fiber Optical Sensor Systems, Fraunhofer Heinrich Hertz Institute; Department Head, Applied Photonics, IEPT, Clausthal University of Technology

5:15 **FEATURED PRESENTATION: *Operando* Diagnostics of Li-Ion Batteries 44**
Michael F. Toney, Ph.D., Synchrotron Materials Sciences Division Head & Professor, Photon Sciences, Stanford Synchrotron Radiation Lightsource, SLAC National Accelerator Center, Stanford University

5:45 **Close of Day and Dinner Workshop Registration**

6:00-9:00 Dinner Workshop*
W3: Lithium Battery Transportation Regulations – Eliminating the Complexity and Improving Safety Based on Sound Science
Panel of Facilitators: Daphne A. Fuentevilla, Ph.D., Engineer, Advanced Power and Energy Group, NSWC Carderock, U.S. Navy
Steve Hwang, Ph.D., Chemist, U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (U.S. DOT – PHMSA)
George A. Kerchner, Executive Director, PRBA – The Rechargeable Battery Association

** Separate registration required.*

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FRIDAY, NOVEMBER 4

8:00 am **Battery Breakfast Breakout Discussion Groups**

Standards in Safety Evaluation of LIBs
Moderator: Stephan Hildebrand, MSc, Research Associate, MEET Battery Research Center, University of Münster

BMS for Lithium-Ion Batteries
Moderator: Thomas Hoeger, Senior Electrical Power Systems Engineer; Contractor, Advanced Power and Energy Branch, U.S. Naval Surface Warfare Center, Carderock

Can Thermal Runaway in Lithium-Ion Cells and Batteries Be Predicted?
Moderator: Judith Jeevarajan, Ph.D., Research Director, Electrochemical Safety, Underwriters Laboratories, Inc.

Battery Modeling and Simulation
Moderator: Khosrow (Nema) Nematollahi, Ph.D., Chairman and CTO, Renewable Energy, Advanced Renewable Power LLC

Safety-Driven Battery Pack Design
Moderator: Martin Petit, Ph.D., Electrochemical Engineer, Electrochemistry and Materials Department, IFP Energies Nouvelles, IFPEN

Battery Management and Thermal Safety
Moderator: Rengaswamy (Srini) Srinivasan, Ph.D., Principal Professional Staff Scientist, Research and Exploratory Development, Applied Physics Laboratory, Johns Hopkins University

DESIGNING SAFETY WITH BATTERY MANAGEMENT SYSTEMS

9:15 **Chairperson's Remarks**
Rengaswamy (Srini) Srinivasan, Ph.D., Principal Professional Staff Scientist, Research and Exploratory Development, Applied Physics Laboratory, Johns Hopkins University

9:20 **Ensuring Thermal Safety with an Internal Temperature-Enabled Battery Management System 62**
Rengaswamy (Srini) Srinivasan, Ph.D., Principal Professional Staff Scientist, Research and Exploratory Development, Applied Physics Laboratory, Johns Hopkins University

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Akos Kriston, Ph.D., Research Fellow, European Commission, Joint Research Centre, Directorate for Energy Transport and Climate

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Asmae El Mejdoubi, Ph.D., Research Fellow, LUSAC Laboratory, Université de Caen Normandie and ENSAM, Université Moulay Ismail

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Fredrik Larsson, MSc, Researcher, Electronics, SP Technical Research Institute of Sweden; Department of Physics, Chalmers University of Technology

11:30 **Gas Analysis in Lithium-Ion Cell Tested by Very High Temperature .....N/A**
Jian Dong, Ph.D., Senior Cell Development Engineer, SAFT SDD, SAFT America, Inc.

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

1:15 **Refreshment Break**

THERMAL CONSIDERATIONS – MODELING & MANAGING RUNAWAY

1:30 **Chairperson's Remarks**
Judith Jeevarajan, Ph.D., Research Director, Electrochemical Safety, Underwriters Laboratories, Inc.

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Martin Petit, Ph.D., Electrochemical Engineer, Electrochemistry and Materials Department, IFP Energies Nouvelles, IFPEN

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John McHardy, Ph.D., President, J McHardy LLC

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Torleif Lian, Chief Engineer, Maritime Department, Norwegian Defense Research Establishment (FFI)

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Stephan Hildebrand, MSc, Research Associate, MEET Battery Research Center, University of Münster

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Barrie E. Homan, Ph.D., Research Physicist, Explosive Effect Branch, U.S. Army Research Laboratory

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Judith Jeevarajan, Ph.D., Research Director, Electrochemical Safety, Underwriters Laboratories, Inc.

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3 V. Ruiz; A. Pfrang; L. Boon-Brett; M. Destro; D. Fontana; and Akos Kriston : *Effect of Varying Ambient Temperature on Battery Degradation at Low Temperatures.....184*

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5 James Trevey; Paul Lichty; David King; and Bill Flecky : *A Drop-In, Scalable Process for Improving Cell and Pack Safety.....186*

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9 Scott Swartz; Steve Cummings; William Dawson; and Nick Frank : *Li-Ion Tamer™ AWARE: A Battery Off Gas Monitor for Improving the Safety and Health of Lithium Ion Batteries.....191*

Sandia National Laboratory

10 Armando Fresquez; Josh Lamb; Sergei Ivanov; Babu Chalamala; Summer Ferreira; and Heather Barkholtz : *Addressing Lithium-Ion Battery Safety and Failure Containment for Modern Grid Energy Storage.....192*

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11 Martin Strube : *Battery Safety: Fail-Safe Solutions.....194*

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Université de Caen Normandie

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