



2nd Annual
10X Battery R&D Showcase

January 23-24, 2012, Santa Clara, CA

Agenda

Monday, January 23, 1-5PM

10X Showcase - Day One

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| 12:00-1:00 | Registration |
| 1:00-1:15 | <i>Welcome & Opening Remarks</i>
<i>Showcase Chairman</i> |
| 1:15-1:45 | Keynote I: R&D Horizon from a Global Auto Manufacturer
John Muldoon, Ph.D., Principal Scientist, MATERIALS
RESEARCH DEPARTMENT – BATTERY, TOYOTA
RESEARCH INSTITUTE OF NORTH AMERICA |
| 1:45-2:15 | Keynote II: Finding Factor of 10 Improvements in Battery
Performance – A Venture Investor’s Perspective
David Wells, Partner, KLEINER, PERKINS, CAUFIELD &
BYERS |
| 2:15-2:45 | Keynote III: Start-Up Storage Breakthrough
Ann Marie Sastry, Ph.D., Chief Executive Officer and Co-
<i>Founder, SAKTI3</i> |
| 2:45-3:15 | <i>Networking Break</i> |

- 3:15-5:15 **NEXT GENERATION LITHIUM ION COMPONENTS**
Facing the theoretical limits of the underlying electro-chemistry of Lithium-X (magnesium, phosphate, etc.) electrolytes, R&D activity is shifting to the anode, cathode and separator components. Presenters from a leading corporate lab, and major university research groups, will offer an illuminating cross-section of the different creative workarounds to further push the life-cycle, stability, discharge rates of Li-ion.
- 3:15-3:45 **The Role of Nanomaterials: Are They the Answer to Reversibility, Lifetime and Rate?**
M. Stanley Whittingham, *Director, DOE-EFRC-NECCES, STONY BROOK UNIVERSITY, Professor of Chemistry and Materials Science, Director, Institute for Materials Research, BINGHAMTON UNIVERSITY, NEW YORK*
- 3:45-4:15 **Catalytic Nanofabrication of High-Power Anodes and Cathodes and Internal PTCR Protectants for Next-Generation Li-ion Batteries**
Daniel E. Morse, *Emeritus Founding Director, UCSB-MIT-CALTECH INSTITUTE FOR COLLABORATIVE BIOTECHNOLOGIES, Wilcox Professor of Biomolecular Science and Engineering, UNIVERSITY OF CALIFORNIA, SANTA BARBARA, CA*
- 4:15-4:45 **Three-dimensional Battery Architectures for High Power Applications**
Amy Prieto, Ph.D., *Chemistry Professor, Founder of Prieto Battery, COLORADO STATE UNIVERSITY*
- 4:45-5:15 **High Energy Nanostructured Batteries**
Yi Cui, Ph.D., *Associate Professor, David Filo and Jerry Yang Faculty Scholar, Department of Materials Science and Engineering, STANFORD UNIVERSITY*

Tuesday, January 24

10X Showcase, Day Two

- 7:30-8:30 *Networking Breakfast*
- 8:30-10:00 **NEXT GENERATION LITHIUM ION COMPONENTS**
(Continued)
- 8:30-9:00 **A Solvent Processable Conductive Polymer Binder for Si Anode Electrode**

Gao Liu, *Staff Scientist*, LAWRENCE BERKELEY NATIONAL LABORATORY

- 9:00-9:30 **Improving Electrochemical Performance of Li-ion Electrodes via Advanced Surface Modification**
Chunmei Ban, *Scientist*, NATIONAL RENEWABLE ENERGY LABORATORY
- 9:30-10:00 **High Capacity Hard Carbon Lithium Ion Anode Materials: A Platform-Based Approach**
Aaron Feaver, Ph.D., *Chief Technology Officer*, ENERG2
- 10:00-10:30 *Networking Break*
- 10:30-12:30 **ALTERNATIVE ELECTRO-CHEMISTRIES – or – OUT-OF-THE-BOX APPROACHES TO HIGH-DENSITY, RECHARGEABLE ENERGY STORAGE**
As the automotive and grid markets for energy storage becomes more of a market pull than technology push, researchers are dreaming up a huge array of alternative ideas about how to achieve rechargeable energy storage. The number of niches between the automotive and grid sectors is so large that any number of variant approaches, each with their own strengths and weaknesses, could find commercial success in the long run. This session will include new developments in flow batteries, solid state storage architectures, ionic liquids and other emerging avenues of innovation.
- 10:30-11:00 **Presentation**
Gerbrand Ceder, Ph.D., *The Richard P. Simmons Professor of Materials Science and Engineering*, MASSACHUSETTS INSTITUTE OF TECHNOLOGY
- 11:00-11:30 **Rechargeable Magnesium Batteries: Defining 21st Century Energy Storage**
Robert E. Doe, Ph.D., *Founder & Chief Scientist*, PELLION TECHNOLOGIES
- 11:30-12:00 **Manufacturing Innovations Enabling Large Format Solid State Batteries**
Scott Farris, *Chief Executive Officer*, PLANAR ENERGY
- 12:00-12:30 **Tom Beyersdorff**, *President*, IOLITECH INC., USA
- 12:30-2:00 *Networking Luncheon*

- 2:00-2:30 **Presentation**
Market Update
Kevin See, Analyst, LUX RESEARCH INC.
- 2:30-3:00 **Presentation**
Ryan Wartena, Ph.D., Chief Executive Officer & President,
GROWING ENERGY LABS, INC. (GELI)
- 3:00-3:30 **METAL AIR ELECTRO-CHEMISTRIES**
The “theoretical limits” of Lithium Ion are well within view. Yet even with the pricing discounts underway for Li-ion cells, revolutionary new business models and applications could open at the \$100/KwHr horizon, a threshold Li-ion seems unlikely to attain anytime soon. “Metal-air” batteries are one promising approach on the horizon due to their phenomenal energy densities – anywhere from 2-4X that of Lithium Ion. Yet both families have their own challenges to attain commercial status. These presentations will provide a cross-section of developments that are generating very high interest in the rechargeable battery community.
Solid State, Rechargeable Lithium-oxygen Battery
Binod Kumar, Ph.D., Group Leader, Electrochemical Power,
Distinguished Research Engineer, UNIVERSITY OF DAYTON,
OHIO
- 3:30-4:00 *Networking Break*
- 4:00-4:30 **ULTRACAPACITORS INNOVATION**
Furious innovation is underway on capacitor materials all around the world; much higher performance capabilities are believed to be attainable in the near future. The demand for regenerative braking from hybrids and full EVs, and the need for ultracapacitors to add power density and speed of discharge to battery packs is driving this innovation, beyond the permanent demand for microcapacitors for small electronics and computing.
Graphene-Enabled Supercapacitors and Surface-Mediated Cells
Bor Z. Jang, Ph.D., Co-Founder, NANOTEK INSTRUMENTS AND ANGSTROM MATERIALS
- 4:30-5:30 **Panel:**
COMMERCIALIZING FUTURE STORAGE PLATFORMS

Moderator:
John Gartner, Research Director, PIKE RESEARCH

Panelists:

Keith Gillard, *General Partner*, PANGAEA VENTURES LTD
Matthew M. Nordan, *Vice President*, VENROCK