



Co-located with *CALIFORNIA EV MARKET FORUM*, November 7-8, 2012

Agenda

- 7:00-8:00 Registration & Breakfast
- 8:00-8:15 **Chair's Opening Remarks**
- 8:15-8:45 **Keynote Address: Breakthrough in Storage Performance for Electric Mobility**
Dr. Mark W. Verbrugge, *Director Materials and Process Lab, GM RESEARCH AND DEVELOPMENT CENTER*
- 8:45-9:15 **Lay of the Land: Advanced Battery Technology Paths and Investments, both Private and Government**
- 9:15-10:15 **Developing a Solid State 3D Li-ion Battery**
Prieto Battery is committed to dramatically improving battery performance and providing our customers with breakthrough technology to enable a shift in how lithium ion batteries are produced and used. Our goal is to make lithium ion batteries significantly more powerful, safer to use, less toxic to produce, and cost effective.
Dr. Amy Prieto, *CEO/Chief Scientific Officer, PRIETO BATTERY, INC.*
- 10:15-10:45 "Structural" Storage**
With the new CAFÉ standards, auto makers are putting ever more focus on light weighting strategies. One novel approach with a strong “wow factor” that has seen a few announcements over the last year is the idea of energy storage devices integrated directly into the structural materials of automobiles. In this way OEMs might remove the independent weight factor of heavy NiMH or Lithium Ion batteries, and boost the overall energy efficiency of the vehicle. The methods announced so far appear to use different electro-chemistries. These

presentations will provide an early glimpse into this exciting alternative route for vehicle electrification.

Shreefal Mehta, *Chief Executive Officer*, PAPER BATTERY COMPANY

9:15-9:45

Potential of rechargeable Magnesium batteries for energy storage:

Comparison of MG with Li-ion; specific energy and energy density; costs and availability of Li vs. Mg salts

- *Anode issues*
- *Cathode issues*
- *Electrolyte issues*
- *Possible pathways forward for rechargeable MG batteries*

Subramanian Iyer, *President & Chief Executive Officer*, NRGTEK INC.

9:45-10:15

Graphene/UltraCapacitors

Judging from the deluge of news stories and breakthroughs over the past year or two, carbon is the new wonder stuff. One of its primary applications, needless to say, is in energy storage. However whereas much of the R&D focus had previously been on nanotubes, now researchers are looking at the single layer sheets specifically dubbed 'Graphene.' So far Graphene is primarily being explored for capacitance and electrodes. The following presentations will focus on the capacitor applications.

Dr. Bor Zeng B Jang, *Dean, College of Engineering & Computer Science*, WRIGHT STATE UNIVERSITY

10:15-10:45 Networking Break

NEW APPROACHES TO METAL-AIR CHEMISTRIES

10:45-11:15

Dual-Functioning Electrodes/Electrocatalysts for Lithium-Oxygen Batteries

- *Electrocatalysis, whether it's happening or even possible, is up for debate in the Lithium-Air community.*
- *Materials that have the advantage of storing Lithium-Air discharge products within their structures are being explored. Progress and prospects will be presented.*

Dr. Lynn Trahey, *Assistant Materials Scientist*, ARGONNE NATIONAL LABORATORY

11:15-11:45

Progresses in Lithium-Air Batteries and Lithium Dendrite Prevention at PNNL

This talk will cover two aspects of research progresses in lithium-based batteries conducted recently at PNNL. The non-aqueous electrolytes and other components used in rechargeable lithium-air batteries have been investigated systematically. The reaction products of oxygen reduced species with various

kinds of organic solvents and lithium salts with different anions have been studied. In the work on lithium dendrite suppression, novel self-healing electrostatic shield mechanism will be discussed and the effect of the additives on the morphologies of lithium deposition and cycling will be reported.

Dr. Wu Xu, Senior Research Scientist, Energy and Environment Directorate,
PACIFIC NORTHWEST NATIONAL LABORATORY

11:45-12:15 **Metal-Air Battery Presentation #3**
Presenter TBA

12:15-1:45 Group Luncheon

NEXT GENERATION LITHIUM ION COMPONENTS

1:45 – 2:15 **Evaluating NextGeneration Lithium-Ion Chemistries**
Techno-economic models are the key to quantitatively comparing the benefits of advanced Li-ion chemistries. The public-domain Battery Performance and Cost model (BatPaC) from Argonne will be introduced. Contemporary Li-ion chemistries will be directly compared to next-generation materials and conclude with the most promising path forward.

Dr. Kevin G. Gallagher, Electrochemical Engineer, ARGONNE NATIONAL
LABORATORY

2:15-2:45 **Advanced Silicon Graphene Composite Anode Material for Next Generation Lithium Batteries**
Why Silicon Graphene Anode? While silicon alone absorbs lithium 10X better (4,200mAh/g) than any battery anode material known, it breaks down after only a few cycles by itself. The CalBattery Solution: use functionalized graphene nano-platelets to protect and stabilize the silicon. Graphene's strength and elasticity allows it to absorb the expansion/ contraction of nano-silicon when embedded into and throughout graphene platelets during battery cycling. The result is a vastly superior battery anode material with significant performance advantages over conventional graphite based anodes.

Phil Roberts, Chief Executive Officer, CALIFORNIA LITHIUM BATTERY, INC.

2:45-3:15 Networking Break

3:15-3:45 **Advanced Manufacturing Platform for Energy Storage**
Presenter TBA

3:45-4:15 **Out-of-the-Box Storage Approach**
Presenter TBA

4:15-5:15 *Panel Discussion:*

Next Generation EV and Hybrid Batteries: Charting the Future

This panel will convene R&D Directors from advanced material, chemical companies alongside venture investors and leaders of prominent R&D labs to review the presentations heard earlier in the day, explore which technology paths seem most promising for which types of applications, and the overall funding and commercialization scenarios for start-ups in this space.