U.S. DEPARTMENT OF ENERGY

High-Throughput/Combinatorial Techniques in Hydrogen Storage Materials R&D

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Welcome and Thank You!!!

- This is a one-day meeting hosted by the DOE Hydrogen Program to identify how to better implement High-Throughput/Combinatorial Techniques in its challenging research on advanced Hydrogen Storage Materials
- Workshop Invitees include:
  - Experts on High-Throughput/Combinatorial Methods
  - Experts on Hydrogen Storage Materials
  - Researchers from National Laboratories
  - Researchers from Universities
  - Researchers from Industry
- Introductions: Who you are, where you are from and a brief summary of your pertinent background.

Workshop Objectives

- Assess the potential for High-Throughput/Combinatorial methods to benefit and accelerate Hydrogen Storage Materials R&D
- Identify the advantages and disadvantages of the application of High-Throughput/Combinatorial techniques to Hydrogen Storage Materials R&D
- Match High-Throughput/Combinatorial techniques with specific types of Hydrogen Storage Materials
- Identify the technical challenges and limitations associated with applying these techniques to Hydrogen Storage Materials R&D
- Recommend appropriate “Next Steps,” if any, to advance the application of these techniques to hydrogen storage materials.

How it is going to work:

- An overview of the current status of Hydrogen Storage Materials R&D – a DOE perspective – Sunita Satyapal
- Several invited summaries of current High-Throughput/ Combinatorial R&D activities:
  - Activities that are part of the DOE H_2 Program
  - Activities that are not part of the DOE H_2 Program
- Time for other attendees to briefly describe their related activities (working lunch)
- Breakout sessions to address objectives
- Wrap-up
  - Summaries of breakout sessions
  - Identification of action items
  - Open discussion
  - Next steps

Breakout Sessions

- Three groups – based on material “types”:
  - Adsorbents – led by Carole Read
  - Chemical Hydrogen Storage – led by Grace Ordaz
  - Metal Hydrides – led by Ned Stetson

- Initial cut on division of attendees by group
  - If you strongly prefer a different group – you may ask to be switched
  - However please keep groups similar in size!

Initial Breakout Group Assignments

Chemical Hydrides

- Grace Ordaz
- Alan Cooper
- Michael Fasolka
- Jonathan Ott
- Tom Boussie
- Frank Gayle
- Mark Bailey
- Xiongfel Shen

Metal Hydrides

- Ned Stetson
- Leo Bendersky
- Menas Vratsanos
- Bob Bowman
- Tony McDaniel
- Adriaan Sachtler
- Ashraf Imam
- Ewa Ronnebro
- Grigorli Soloveichik
- Theodore Bessmann

- Teleconference

Hydrogen Sorption

- Carole Read
- Pete DeSanto
- Jeff Long
- Dao Zhao
- Lawrence Cook
- Greg Downing
- Phil Parilla
- Carter Kittrell
- Rick Fischer
- Ali Raissi
- Sam Mao

Breakout Session Objectives

- **Outcome**:
  - List of potential classes of materials
  - List of High-Throughput/Combinatorial method(s) appropriate for the specific material type
  - Availability of capabilities (& state of technology)
  - List of Advantages/Disadvantages of the method and Technical Challenges/Gaps that must be overcome
  - Next steps on how to implement the method(s)

Agenda for DOE High Throughput/ Combinatorial Meeting

June 26, 2007

- 8:30 Welcome/Introductions/Objectives — Ned Stetson
- 8:45 Status of Hydrogen Storage Materials R&D — Sunita Satyapal
- 9:00 Summaries of Present HT/C Activities (Part 1) — Larry Blair
  - 9:00 Intematix — Xiongfel Shen
  - 9:20 UOP — Adriaan Sachtler
  - 9:40 GE Global Research Center — Grigorli Soloveichik
- 10:00 Break
- 10:20 Summaries of Present HT/C Activities (Part 2) — Larry Blair
  - 10:20 NIST — Leo Bendersky
  - 10:40 Univ. Central Florida (DoD/DLA new project) — Ali Raissi
  - 11:00 Berkeley/Symyx (DoD/DLA new project) — Jeffrey Long/Tom Boussie
  - 11:20 U. Miami of Ohio/NREL (DoD/DLA new project) — Philip Parilla
- 11:40 Lunch (pickup and return to meeting room)
- 12:00 Summaries of Present HT/C Activities (Part 3) — Larry Blair
  - Working lunch - Time for other attendees to present on their activities (5-10 min each)
- 1:15 Breakout Group Discussions — Carole, Grace and Ned
- 2:45 Break
- 3:00 Wrap-up — Ned & Larry
  - Breakout Group Summaries — Carole, Grace and Ned
  - Open Discussions
  - Next Steps
- 4:00 Adjourn

For More Information

Hydrogen Storage Team

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