

Conference Program

**IPHE International
Hydrogen Storage Technology Conference**

**19-22 June 2005
Lucca, Italy**

Conference Co-Chairs

Pierpaolo Garibaldi

Ministry of Environment and Territory, Italy/IPHE

Sunita Satyapal

US Department of Energy, USA/IPHE

Stanislav Malysenko

Russian Academy of Sciences, Russia/IPHE

Marc Steen

Joint Research Center, European Commission/IPHE

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Ukrainian Academy of Sciences,
Ukraine

Ranganathan Sundaresan

ARCI, India

Sunday, 19 June 2005

15:00 - 19:00 Registration at conference center

19:00 - 21:00 Welcome Reception – Cocktails and Hors D'oeuvres
Poster Session

Monday, 20 June 2005

07:30 - 08:15 Breakfast at hotel
Shuttle to conference center

08:30 - 08:50 **Welcoming Remarks from Italy**
Pierpaolo Garibaldi
Ministry of Environment and Territory, Italy

Introduction: Conference Scope, Objectives, and Expectations

08:50 - 10:00 **International Overview of Key Hydrogen Storage
R&D Activities and Plans**
Co-Chairs:
*Pierpaolo Garibaldi, Ministry of Environment and Territory,
Italy*
Mario Conte, ENEA, Italy

09:00-09:10 Overview of Hydrogen Storage R&D in the EU
Marc Steen, Joint Research Center, European Commission

09:10-09:20 U.S. National Hydrogen Storage Project
Sunita Satyapal, Department of Energy, USA

09:20-09:30 Hydrogen Storage R&D in Russia
*Stanislav Malysenko, Russian Academy of Sciences,
Russia*

09:30-09:40 Hydrogen Storage Activities in Japan
Nobuhiro Kuriyama, NEDO, Japan

09:40-09:50 Current R&D Status of Hydrogen Storage in China
Jun Chen, Institute of New Energy, Nankai University, China

09:50-10:00 International Energy Agency Hydrogen Implementing
Agreement Annex 17 Activities
Gary Sandrock, IEA HIA

10:00 - 10:30 Coffee Break

- 10:30 - 11:00 **Technical Overview: Status and System Perspectives**

(Co-Chairs: Sunita Satyapal, DOE, USA and Stanislav Malysenko, RAS, Russia)

Overview and State of the Art
Andreas Züttel, University of Fribourg, Switzerland;
George Thomas, Sandia National Labs, USA
- 11:00 - 12:00 Application and System Perspectives: Customer requirements - driving the requirements for hydrogen storage materials
Automotive Perspectives: FreedomCAR and Fuel Partnership
Scott Jorgensen, General Motors, USA

Perspectives From Japan
Nobuhiro Kuriyama, NEDO-JARI, Japan

Perspectives From EU
Katia Barral and Jerome Perrin, Air Liquide, France
- 12:00 – 13:15 Lunch
- 13:15 - 17:45 **Focused Technical Session: Reversible on-board storage: Metal Hydride R&D**
Heat and Mass Transfer in Hydrogen Storage Systems.
(Chairs: *Andreas Züttel, Craig Jensen, Rosario Cantelli*)
- 13:15 – 13:45 Overview of State-of-the-art in Metal Hydrides
Andreas Züttel, University of Fribourg, Switzerland, Craig Jensen, University of Hawaii, USA
- 13:45 – 14:05 Alanates as potential hydrogen storage materials-state-of-the-art and perspectives
Ferdi Schuth, MPI für Kohlenforschung, Germany
- 14:05 – 14:30 Development of Metal-N-H systems for Hydrogen Storage
Ping Chen, National University of Singapore, Singapore
- 14:30 – 14:50 Advanced hydrogen storage functions of destabilized and mixed-complex hydrides
Shin-ichi Orimo, Tohoku University, Japan

- 14:50 – 15:15 Experimental investigations of Heat and Mass Transfer Processes in Metal Hydride Porous Bed of Hydrogen Storage and Purification Unit
Vasily I. Borzenko, Russian Academy of Sciences, Russia
- 15:15 – 15:45 Coffee break
- 15:45 – 16:05 High-pressure Metal Hydride Tank for Fuel Cell Vehicles
Daigoro Mori, Toyota Motor Corporation, Japan
- 16:05 – 16:25 Metal Hydride Hydrogen Storage in China
Qi-dong Wang, Zhejiang University, China
- 16:25 – 16:45 Diagnostics for Hydrogen Storage: Optical hydrogenography on compositional gradient thin films
Ronald Griessen, Vrije Universiteit, Netherlands
- 16:45 – 17:05 Monitoring of Chemical Reactions and Point Defect Dynamics in Alanates
Rosario Cantelli, Università di Roma "La Sapienza", Italy
- 17:05 – 17:45 **Panel Discussion**
Chairs: Andreas Züttel, Craig Jensen, Rosario Cantelli

Alberto Albinati, University of Milan
Donald Anton, United Technologies
Hironobu Fujii, Hiroshima University
Ranganathan Sundaresan, ARCI
- 17:45 - 19:00 **Poster Session** (coffee/tea/soft drinks)
- 19:00 - 21:00 Break
Shuttle available to hotels and dinner
- 21:00- 23:00 Dinner at the Royal Palace (Piazza Grande)
Sponsor: The Ministry for Environment and Territory, Italy
- 23:00 Shuttle buses back to hotels

Tuesday, June 21, 2005

- 07:30 - 08:15 Breakfast at hotel
Shuttle available to conference center
- 08:30 - 12:00 **Focused Technical Session: Reversible On-Board Storage, Carbon-Based Materials, High Surface Area Adsorbents and Novel Concepts**
(Chairs: Richard Chahine, Michael Heben, Gavin Walker)
- 08:30 – 09:00 Overview of status of carbon-based sorbents
Guido Pez, Air Products and Chemicals, Inc., USA
- 09:00 – 09:25 Physisorption of hydrogen in microporous materials
Michael Hirscher, Max-Planck-Institute fur Metallforschung, Germany
- 09:25 – 09:50 Theory of H₂ in carbon nanotubes and nanoscrolls
George E. Froudakis, University of Crete, Greece
- 09:50 – 10:15 Coffee Break
- 10:15 – 10:40 Towards high wt%, room temperature reversible, carbon-based hydrogen adsorbents
Shengbai Zhang, National Renewable Energy Laboratory, USA
- 10:40 – 11:05 Hydrogen uptake of carbon nanotube and a carbon nanotube-magnesium hydride system
Hui-Ming Cheng, Institute of Metal Research, China
- 11:05 - 11:30 Metal Atoms
Laura Gagliardi, University of Palermo Viale delle Scienze, Italy
- 11:30 **Panel Discussion**
Chairs: Richard Chahine, Michael Heben, Gavin Walker

Alan MacDiarmid, Nobel Laureate and featured panelist

Laura Gagliardi, University of Palermo Viale delle Scienze, Hui-Ming Cheng, Institute of Metal Research Shengbai Zhang, National Renewable Energy Laboratory,

George E. Froudakis, *University of Crete*
Michael Hirscher, *Max-Planck-Institute fur Metallforschung*
Guido Pez, *Air Products and Chemicals, Inc.*

- 12:15 **Welcome**
Mr. Altero Matteoli, Italian Minister for Environment and Territory
- 12:30 - 14:00 Lunch
- 14:00 - 16:00 **Focused Technical Session: Off-board storage, stationary applications and hydrogen transport**
(Chairs: Bjørn Hauback, Jerome Perrin, Anatoly Yermakov)
- 14:00 – 14:20 Three classes of metal hydrides: the HYSTORY-EU consortium
Daniel Fruchart, CNRS Grenoble, France
- 14:20 – 14:40 Hydrogen Storage using hydrogen absorbing alloys
Etsuo Akiba, NIAIST, Japan
- 14:40 – 15:00 Stationary Storage of Hydrogen: Modified Titanium based alloys
Sergei Mitrokhin, Moscow State University, Russia
- 15:00 **Panel Discussion**
Chairs: Bjørn Hauback, Jerome Perrin, A. Ye . Yermakov

Athanassios Stubos, NCSR
Gary Sandrock, IEA HIA
Qi-dong Wang, Zhejiang University
- 17:00 -19:00 Reception/light dinner and [Poster session](#)
- 19:00 Shuttle available to hotels for dinner

Wednesday, June 22, 2005

- 07:30 - 08:15 Breakfast at hotel
Shuttle available to conference center
- 08:30 - 12:30 **Focused Technical Session: Chemical Hydrogen Storage- Regenerable off-board**
(Chairs: Seijirau Suda, William Tumas, Alberto Albinati)
- 08:30 – 09:00 Overview an Regenerative Production of Sodium Borohydride as a Hydrogen Storage Material
Seijirau Suda, Kogakuin University, Japan
- 09:00 – 09:20 Organic Hydrides for Carrying Hydrogen
Yasukazu Saito, Tokyo University of Science, Japan
- 09:20 – 09:40 Integrated Hydrogen Storage and Delivery using Organic Liquid Carriers
Alan Cooper, Air Products, USA
- 09:40 – 10:00 Breakthrough in cost reduction of NaBH₄
Hjalti Pall Ingolfsson, Icelandic New Energy, Iceland
Ying Wu, Millennium Cell, USA
- 10:00 – 10:25 Coffee Break
- 10:25 – 10:45 Technical-economical Assessment of Sodium Borohydride as Hydrogen Carrier
Katia Barral, Air Liquide, France
- 10:45 – 11:05 Novel approaches for on-board chemical hydrogen storage with a focus on ammonia borane
Tom Autrey, PNNL, USA
- 11:05 – 11:30 Approaching DOE Hydrogen Storage Long-term Goals
Pier Paolo Prosini, ENEA-IDROCOMB, Italy

- 11:30 – 12:30 **Panel Discussion**
Chairs: Alberto Albinati , Seijirau Suda and William Tumas
- Yasukazu Saito, *Tokyo University of Science*
Alan Cooper, *Air Products*
HjalTI Pall Ingolfsson, *Icelandic New Energy*
Tom Autrey, *PNNL*
Ying Wu, *Millennium Cell*
- 12:30 - 13:30 Lunch
- 13:30 - 15:30 **Closure & Next Steps:**
Identification of potential collaborative R&D
- 13:30 **Summary reports by rapporteur of each session**
- 14:00 *Stanislav Malysenko*, Russian Academy of Sciences,
Russia
Marc Steen and Constantina Filiou, Joint Research Center,
European Commission
Pierpaolo Garibaldi, Ministry of Environment and Territory,
Italy
Mario Conte, ENEA, Italy
Sunita Satyapal, Department of Energy, USA
- 16:00 **Departures:** Shuttles provided to Pisa

Thursday June 23, 2005

Departures: Shuttles provided to Pisa