

Hydrogen Production for a Hydrogen Economy

Topical Conference at the 2009 AIChE Annual Meeting

**Nashville, Tennessee, USA
8-13 November 2009**

ISBN: 978-1-61567-917-1

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

Some format issues inherent in the e-media version may also appear in this print version.

Copyright© (2009) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2010)

For permission requests, please contact AIChE
at the address below.

AIChE
3 Park Avenue
New York, NY 10016-5991

Phone: (203) 702-7660
Fax: (203) 775-5177

www.aiche.org

TABLE OF CONTENTS

Shaping Our Energy Future: Advanced Research at the U.S. Department of Energy	1
<i>Jacques Beaudry-Losique</i>	
The Challenges of Scale and Sustainability in U.S. Energy Policy	2
<i>Marilyn Brown</i>	
The Nation's Renaissance in Energy Technology.....	3
<i>Dana C. Christensen</i>	
Clean Coal Technology and CO₂ Capture: A Perspective.....	4
<i>L.-S. Fan</i>	
Advanced Biofuels - The Path Forward.....	5
<i>W. Densmore Hunter</i>	
Wind to Hydrogen Demonstration Project: Results and Lessons Learned	6
<i>Kevin W. Harrison, Gregory D. Martin</i>	
High Temperature Solid-Oxide Electrolyzer 2500 Hour Test Results at the Idaho National Laboratory	12
<i>Carl M. Stoots, James E. Obrien, Stephen Herring, Keith Condie, Lisa Moore-McAtee, Joseph J. Hartvigsen, Dennis Larsen</i>	
The RelHy Project: Durability and Efficiency of High Temperature Steam Electrolysis	19
<i>Florence Lefebvre-Joud, Annabelle Brisse, Jacob Bowen, Bert Rietveld, Nigel P. Brandon</i>	
High Temperature Steam Electrolysis for Hydrogen Production: From Materials Development to Stack Operation	20
<i>Julie Mougin, Georges Gousseau, Bertrand Morel, François Le Naour, Florent Chauveau, Jean-Claude Grenier, Jean-Marc Bassat, Fabrice Mauvy</i>	
Liquid Fuel Production From Biomass Via High Temperature Steam Electrolysis	21
<i>Grant L. Hawkes, Michael G. McKellar</i>	
Comparison Between Hydrogen Production Alternatives From Nuclear Energy	37
<i>Maximilian B. Gorensiek, William A. Summers</i>	
A Systematic Approach towards the Synthesis and Evaluation of Hybrid Alternative Thermochemical Cycles.....	38
<i>Ryan J. Andress, Lealon L. Martin</i>	
Heat Pump Cycles to Generate Electricity From Low Temperature Waste Heat.....	39
<i>Ramalingam Subramaniam, John C. Prindle, Alexandra I. Lupulescu, Victor J. Law</i>	
Hydrogen Production by Sulphur Iodine Cycle Fed by Solar Energy: Realization of a Laboratory Plant and Possible Spin-off On the Industrial Field	40
<i>Raffaele Liberatore, Giampaolo Caputo, Paolo Favuzza, Claudio Felici, Alberto Giaconia, Michela Lanchi, Giovanni Salvatore Sau, Annarita Spadoni, Pietro Tarquini</i>	
Experimental Corrosion Tests of Metals, Metal Alloys, and Ceramic Materials, in Boiling and High Temperatures Vapours I₂-HI-H₂O Mixtures for Sulphur-Iodine Thermochemical Cycle	42
<i>Claudio Felici, Paolo Favuzza, Raffaele Liberatore, Pietro Tarquini, Adelina Borruto, Giovanni Narducci</i>	
Application of Radiation Probes to in Situ Composition Measurements of Bunsen Reaction Solution	44
<i>Shinji Kubo, Nagaya Yasunobu</i>	
The Effects of Space Time Upon the Supercritical Water Reformation of Glycerol	49
<i>Jared Bouquet, Jason W. Picou, Michael S. Stever, Jonathan E. Wenzel, Sunggyu Lee, Tae-Hoon Lim, Byoung Gwon Lee</i>	
Influence of pH On Synthesis of Homogeneous Cobalt-Doped Barium Cerium Zirconium Oxide Via Oxalate Co-Precipitation.....	57
<i>Aravind Suresh, Benjamin A. Wilhite, Prabhakar Singh</i>	
Method and System for the Separation of a Mixture Containing Carbon Dioxide, Hydrocarbon and Hydrogen	58
<i>Baruchi Barry Kimchi</i>	
Sulfur-Iodine Cycle: Phase Equilibrium Data for the Ternary Iodine-Water-HI and the Binary Iodine-Water Systems	65
<i>Sarah E. Mena, Eduardo Cervo, David A. Bruce, Mark Thies</i>	
Prevention of Sulfur Formation in Hybrid Sulfur Electrolyzer.....	66
<i>John L. Steinke, Timothy J. Steeper, David T. Herman</i>	
Effect of Water Transport On the Hybrid Sulfur Electrolyzer	67
<i>John Staser, John Weidner</i>	

Hybrid Sulfur Cycle Development for the Next Generation Nuclear Plant.....	68
<i>William A. Summers, Maximilian B. Gorensen, David T. Hobbs, John L. Steinke, Hector R. Colon-Mercado, Timothy J. Steeper, David T. Herman</i>	
A Proposed New Sulfur-Sulfur Thermochemical Cycle	69
<i>Alex Yokochi, Nicholas Auyeung</i>	
Carbon Catalysts for Hydrogen Iodide (HI) Decomposition Inside the S-I Thermochemical Cycle	71
<i>Paolo Favuzza, Luigi Bimbi, Claudio Felici, Luigi Nardi, Annarita Spadoni, Pietro Tarquini</i>	
Catalyst Stability for Sulfuric Acid Decomposition as Influenced by Platinum Group Metal Composition and Reaction Pressure	72
<i>Daniel M. Ginosar, Lucia M. Petkovic, Kyle C. Burch</i>	
Experimental Studies of the Bunsen Reaction in the Sulfur-Iodine Process.....	73
<i>Mariapaola Parisi, Alberto Giacconi, Salvatore Sau, Annarita Spadoni, Giampaolo Caputo, Pietro Tarquini</i>	
Efficient Hydrogen Production with the Reformer Sponge Iron Cycle (RESC)	81
<i>Markus Thaler, Viktor Hacker, Matthaeus Siebenhofer</i>	
H₂ Generation From Water-Splitting Using Novel Ferrite Foam Materials.....	83
<i>Rajesh Shende, Jan A. Puszynski, Rahul Bhosale, Michael Opoku</i>	
Author Index	