

Contents

Preface	ix
Acknowledgments	xi
INTERNATIONAL OVERVIEWS	
Research Priorities and Progress in Hydrogen Energy Research in the EU Constantina Filiou, Pietro Moretto, and Joaquín Martín-Bermejo	3
Global Perspectives Towards the Establishment of the Hydrogen Economy José Ignacio Galindo	17
Materials Issues for Hydrogen R&D in Canada E.E. Andrukaitis and Rod McMillan	27
Overview of U.S. Materials Development Activities for Hydrogen Technologies Ned Stetson and John Petrovic	39
HYDROGEN STORAGE	
The Hydrogen Storage Behaviour of Pt and Pd Loaded Transition Metal Oxides A. Molendowska, P.J. Hall, and S. Donet	51
Progress of Hydrogen Storage and Container Materials Y.Y. Li and Y.T. Zhang	61

Synthesis of Activated Carbon Fibers for High-Pressure Hydrogen Storage	69
M. Kunowsky, F. Suárez-García, D. Cazorla-Amorós and A. Linares-Solano	
High Density Carbon Materials for Hydrogen Storage	77
A. Linares-Solano, M. Jordá-Beneyto, D. Lozano-Castelló, F. Suárez-García, and D. Cazorla-Amorós	
A New Way for Storing Reactive Complex Hydrides on Board of Automobiles	91
Rana Mohtadi, Kyoichi Tange, Tomoya Matsunaga, George Wicks, Kit Heung, and Ray Schumacher	
Synergistic Effect of $\text{LiBH}_4 + \text{MgH}_2$ as a Potential Reversible High Capacity Hydrogen Storage Material	97
T. E. C. Price, D. M. Grant, and G. S. Walker	
Thermodynamic Analysis of a Novel Hydrogen Storage Material: Nanoporous Silicon	105
Peter J. Schubert and Alan D. Wilks	
Nanocrystalline Effects on the Reversible Hydrogen Storage Characteristics of Complex Hydrides	111
Michael U. Niemann, Sessa S. Srinivasan, Kimberly McGrath, Ashok Kumar, D. Yogi Goswami, and Elias K. Stefanakos	
HYDROGEN PRODUCTION	
Recent Results on Splitting Water with Aluminum Alloys	121
J. M. Woodall, Jeffrey T. Ziebarth, Charles R. Allen, Debra M. Sherman, J. Jeon, and G. Choi	
Materials Challenges in SYNGAS Production from Hydrocarbons	129
C. M. Chun, F. Hershkowitz, and T. A. Ramanarayanan	
Encapsulation of Palladium in Porous Wall Hollow Glass Microspheres	143
L. K. Heung, G. G. Wicks and R. F. Schumacher	
Alternative Materials to Pd Membranes for Hydrogen Purification	149
Thad M. Adams and Paul S. Korinko	
X-Ray Photoelectron Investigation of Phosphotungstic Acid as a Proton-Conducting Medium in Solid Polymer Electrolytes	159
Clovis A. Linkous, Stephen L. Rhoden, and Kirk Scammon	

HYDROGEN DELIVERY

Evaluation of the Susceptibility of Simulated Welds in HSLA-100 and HY-100 Steels to Hydrogen Induced Cracking R. E. Ricker, M. R. Stoudt, and D. J. Pitchure	169
Friction and Wear Properties of Materials Used in Hydrogen Service R.A. Erck, G.R. Fenske, and O.L. Eryilmaz	181
Effect of Remote Hydrogen Boundary Conditions on the Near Crack-Tip Hydrogen Concentration Profiles in a Cracked Pipeline: Fracture Toughness Assessment M. Dadfarnia, P. Sofronis, B. P. Somerday, and I. M. Robertson	187
Non-Destructive Hydrogen Content Sensors Angelique N. Lasseigne, David McColskey, Thomas A. Siewert, Kamalu Koenig, David L. Olson, and Brajendra Mishra	201
Temperature Programed Desorption Using an Off-the-Shelf Hybrid Microwave Oven R. Tom Walters, Paul Burket, and George G. Wicks	211

LEAKAGE DETECTION/SAFETY

Tritium Aging Effects on the Fracture Toughness Properties of Forged Stainless Steel Michael J. Morgan	223
Explosive Nature of Hydrogen in Partial-Pressure Vacuum Trevor Jones	237
Author Index	243