

Volume 39

Issue 8

6 March 2014

ISSN 0360-3199

International Journal of **HYDROGEN ENERGY**

Editor-in-Chief:

Emre A. Veziroğlu

Senior Associate Editor:

J.W. Sheffield

Associate Editors:

**S.I. Allakhverdiev, A. Basile,
M.B. Gorenssek,
E.C. Kumbur and N.Z. Muradov**

Assistant Editors:

**F. Chen, S.L. Garrison, J. Gong,
M.D. Mat and D.P. Mishra**

includes SPECIAL SECTION

Selected Papers from CONAPPICE 2012

Guest Editors: Antonio José Martín and Loreto Daza

Available online at www.sciencedirect.com

ScienceDirect



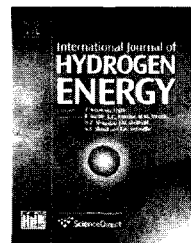


ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

International Journal of Hydrogen Energy 39 (2014) v–viii



www.elsevier.com/locate/ijhydene

Contents

Regular Articles

Hydrogen Economy

- B.G. POLLET, S. PASUPATHI, G. SWART, K. MOUTON, M. LOTOTSKYY, M. WILLIAMS, P. BUJLO, S. Ji, B.J. BLADERGROEN and V. LINKOV 3577 Hydrogen South Africa (HySA) Systems Competence Centre: Mission, objectives, technological achievements and breakthroughs

Electrolysis/Electrolyzers

- I. FLIS-KABULSKA and J. FLIS 3597 Hydrogen evolution and corrosion products on iron cathodes in hot alkaline solution

Chemical/Thermochemical Hydrogen

- J.Y. CHOI, H.C. NO and Y.S. KIM 3606 Stability of nickel catalyst supported by mesoporous alumina for hydrogen iodide decomposition and hybrid decomposer development in sulfur–iodine hydrogen production cycle

Solar Hydrogen

- S.S. RAYALU, D. JOSE, P.A. MANGRULKAR, M. JOSHI, G. HIPARGI, K. SHRESTHA and K. KLABUNDE 3617 Photodeposition of AuNPs on metal oxides: Study of SPR effect and photocatalytic activity
- H. TEBIBEL and S. LABED 3625 Design and sizing of stand-alone photovoltaic hydrogen system for HCNG production
- V. SHARMA, M. DIXIT, V.R. SATSANGI, S. DASS, S. PAL and R. SHRIVASTAV 3637 Photoelectrochemical splitting of water with nanocrystalline $Zn_{1-x}Mn_xO$ thin films: First-principle DFT computations supporting the systematic experimental endeavor

Bio Hydrogen

- C. PHUHIRAN, T. TAKARADA and S. CHAIKLANGMUANG 3649 Hydrogen-rich gas from catalytic steam gasification of eucalyptus using nickel-loaded Thai brown coal char catalyst
- K. REIFSCHNEIDER-WEGNER, A. KANYGIN and K.E. REDDING 3657 Expression of the [FeFe] hydrogenase in the chloroplast of *Chlamydomonas reinhardtii*

Catalysts/Electrocatalysts

- J.E.P. NAVALHO, J.M.C. PEREIRA and J.C.F. PEREIRA 3666 Conical-shaped foam reactors for catalytic partial oxidation applications
- I. CHOI, S.H. AHN, M.H. KIM, O.J. KWON and J.J. KIM 3681 Synthesis of an active and stable $Pt_{shell}-Pd_{core}/C$ catalyst for the electro-oxidation of methanol
- K. FAN, J. LIU, X. YANG and L. RONG 3690 Hydrocracking of Jatropha oil over $Ni-H_3PW_{12}O_{40}/nano$ -hydroxyapatite catalyst
- D. TORRES, J.L. PINILLA, M.J. LÁZARO, R. MOLINER and I. SUELVES 3698 Hydrogen and multiwall carbon nanotubes production by catalytic decomposition of methane: Thermogravimetric analysis and scaling-up of Fe–Mo catalysts

- M.A. MATIN, J.-H. JANG and Y.-U. KWON 3710 One-pot sonication-assisted polyol synthesis of trimetallic core-shell (Pd,Co)@Pt nanoparticles for enhanced electrocatalysis
- L.E. GÓMEZ, B.M. SOLLIER, M.D. MIZRAHI, J.M. RAMALLO LÓPEZ, E.E. MIRÓ and A.V. BOIX 3719 Preferential CO oxidation on Pt-Cu/Al₂O₃ catalysts with low Pt loadings
- S.-S. LI, Y.-Y. HU, J.-J. FENG, Z.-Y. LV, J.-R. CHEN and A.-J. WANG 3730 Rapid room-temperature synthesis of Pd nanodendrites on reduced graphene oxide for catalytic oxidation of ethylene glycol and glycerol
- H. YANG, H. WANG, S. JI, V. LINKOV and R. WANG 3739 Synergy between isolated-Fe₃O₄ nanoparticles and CN_x layers derived from lysine to improve the catalytic activity for oxygen reduction reaction
- Y. ZHANG, C. CHEN, X. LIN, D. LI, X. CHEN, Y. ZHAN and Q. ZHENG 3746 CuO/ZrO₂ catalysts for water-gas shift reaction: Nature of catalytically active copper species
- O. SONG-IL, J.-M. YAN, H.-L. WANG, Z.-L. WANG and Q. JIANG 3755 High catalytic kinetic performance of amorphous CoPt NPs induced on CeO_x for H₂ generation from hydrous hydrazine

Methane Hydrogen

- I.H. SON, S.J. LEE and H.-S. ROH 3762 Hydrogen production from carbon dioxide reforming of methane over highly active and stable MgO promoted Co-Ni/γ-Al₂O₃ catalyst

Hydrogen Separation

- Y. ZHENG, Y. SHI, S. LI, Y. YANG and N. CAI 3771 Elevated temperature hydrogen/carbon dioxide separation process simulation by integrating elementary reaction model of hydrotalcite adsorbent

Storage

- G. WANG, H. YUAN, A. KUANG, W. HU, G. ZHANG and H. CHEN 3780 High-capacity hydrogen storage in Li-decorated (AlN)_n (n = 12, 24, 36) nanocages
- Y. ZHANG, H. WANG, T. ZHAI, T. YANG, Y. QI and D. ZHAO 3790 Hydrogen storage characteristics of the nanocrystalline and amorphous Mg-Nd-Ni-Cu-based alloys prepared by melt spinning
- J.M. KIM, W.G. HONG, S.M. LEE, S.J. CHANG, Y. JUN, B.H. KIM and H.J. KIM 3799 Energy storage of thermally reduced graphene oxide
- W. XIONG, B.Q. LI, L. WANG, J. LI, F.Q. KONG and H.Z. YAN 3805 Investigation of the thermodynamic and kinetic properties of La-Fe-B system hydrogen-storage alloys
- A.M. JORGE JR., G. FERREIRA DE LIMA, M.R. MARTINS TRIQUES, W.J. BOTTA, C.S. KIMINAMI, R.P. NOGUEIRA, A.R. YAVARI and T.G. LANGDON 3810 Correlation between hydrogen storage properties and textures induced in magnesium through ECAP and cold rolling

Portable Hydrogen

- G. LIU, Y. WANG, L. JIAO and H. YUAN 3822 Solid-state synthesis of amorphous TiB₂ nanoparticles on graphene nanosheets with enhanced catalytic dehydrogenation of MgH₂
- L. YU and M.A. MATTHEWS 3830 A reactor model for hydrogen generation from sodium borohydride and water vapor

PE Fuel Cells

- Q. NIU, H. ZHANG and K. LI 3837 An improved TLBO with elite strategy for parameters identification of PEM fuel cell and solar cell models
- F.-C. WANG and C.-H. PENG 3855 The development of an exchangeable PEMFC power module for electric vehicles

SO Fuel Cells

- K.J. YOON, S.-I. LEE, H. AN, J. KIM, J.-W. SON, J.-H. LEE, H.-J. JE, H.-W. LEE and B.-K. KIM 3868 Gas transport in hydrogen electrode of solid oxide regenerative fuel cells for power generation and hydrogen production

X. MENG, X. GONG, N. YANG, Y. YIN,
X. TAN and Z.-F. MA

3879 Carbon-resistant Ni-YSZ/Cu-CeO₂-YSZ dual-layer hollow fiber anode for micro tubular solid oxide fuel cell

MH Batteries

Z. PU, Y. ZHU, J. ZHU, J. YUAN, J. ZHANG,
W. CHEN, J. FANG and L. LI

3887 Kinetics and electrochemical characteristics of Mg₂NiH_{4-x} wt.% MmNi_{3.8}Co_{0.75}Mn_{0.4}Al_{0.2} (x = 5, 10, 20, 40) composites for Ni-MH battery

D. GUO, E. SHANGGUAN, J. LI, T. ZHAO,
Z. CHANG, Q. LI, X.-Z. YUAN and H. WANG

3895 Effects of γ -CoOOH coating on the high-temperature and high-rate performances of spherical nickel hydroxide electrodes

Z.G. QU, W.Q. LI and W.Q. TAO

3904 Numerical model of the passive thermal management system for high-power lithium ion battery by using porous metal foam saturated with phase change material

Aerospace Applications

W. HUANG

3914 Design exploration of three-dimensional transverse jet in a supersonic crossflow based on data mining and multi-objective design optimization approaches

Transportation

J. LI, X. JIA, Z. WU and X. PENG

3926 The cavity profile of a diaphragm compressor for a hydrogen refueling station

Combustion

F. LIU, Y. AI and W. KONG

3936 Effect of hydrogen and helium addition to fuel on soot formation in an axisymmetric coflow laminar methane/air diffusion flame

Measurements

H. DING, C. WANG and Y. ZHAO

3947 Flow characteristics of hydrogen gas through a critical nozzle

Safety/Sensors

K. RAI, D. BJERKETVEDT and
A.V. GAATHAUG

3956 Gas explosion field test with release of hydrogen from a high pressure reservoir into a channel

Special Section Papers: Selected papers from CONAPPICE 2012

Guest Editors: Antonio José Martín and Loreto Daza

A.J. MARTÍN and L. DAZA

3963 Preface

A.M. BAENA-MONCADA,
R. CONEO-RODRÍGUEZ, J.C. CALDERÓN,
J. FLÓREZ-MONTAÑO, C.A. BARBERO,
G.A. PLANES, J.L. RODRÍGUEZ and
E. PASTOR

3964 Macroporous carbon as support for PtRu catalysts

M. DÍAZ, A. ORTIZ, M. VILAS, E. TOJO and
I. ORTIZ

3970 Performance of PEMFC with new polyvinyl-ionic liquids based membranes as electrolytes

M.M. ANTUXUSTEGI, A.R. PIERNA and
N. RUIZ

3978 Chemical activation of Vulcan® XC72R to be used as support for NiNbPtRu catalysts in PEM fuel cells

J. BARROSO, A.R. PIERNA, T.C. BLANCO and
N. RUIZ

3984 Trimetallic amorphous catalyst with low amount of platinum: Comparative study for ethanol, bioethanol and CO electrooxidation

M. SÁNCHEZ, A.R. PIERNA, N. RUIZ,
J. BARROSO and J.J. DEL VAL

3991 Amorphous catalysts based on (NiNb)₉₉(Pt X Y)₁ for DAFC using ethanol and bioethanol as fuels

P. FERREIRA-APARICIO and A.M. CHAPARRO

3997 Influence of the gas diffusion cathode structure on the performance of an air-breathing proton exchange membrane fuel cell

T. GUERRERO CERVERA, A.P. VEGA-LEAL,
G. ADAME GARCÍA and J. BREY SÁNCHEZ

4005 PEMFC impedance spectroscopy using synthetic wide-band signals

- M. PÉREZ-PAGE and V. PÉREZ-HERRANZ 4009 Study of the electrochemical behaviour of a 300 W PEM fuel cell stack by Electrochemical Impedance Spectroscopy
- M. HERRERO, A.M. MARTOS, A. VAREZ, J.C. GALVÁN and B. LEVENFELD 4016 Synthesis and characterization of polysulfone/layered double hydroxides nanocomposite membranes for fuel cell application
- M.V.M. DE YUSO, M.T. CUBERES, V. ROMERO, L. NEVES, I. COELHO, J.G. CRESPO, E. RODRÍGUEZ-CASTELLÓN and J. BENAVENTE 4023 Modification of a Nafion membrane by *n*-dodecyltrimethylammonium cation inclusion for potential application in DMFC
- L. VALIÑO, R. MUSTATA and L. DUEÑAS 4030 Consistent modeling of a single PEM fuel cell using Onsager's principle
- S. CURTEANU, C.-G. PIULEAC, J.J. LINARES, P. CAÑIZARES, M.A. RODRIGO and J. LOBATO 4037 Neuro-evolutionary approach applied for optimizing the PEMFC performance
- M. SARMIENTO-CARNEVALI, M. SERRA and C. BATLLE 4044 Distributed parameter model simulation tool for PEM fuel cells
- E. ROMERO-PASCUAL and J. SOLER 4053 Modelling of an HTPEM-based micro-combined heat and power fuel cell system with methanol
- A. FUERTE, R.X. VALENZUELA, M.J. ESCUDERO and L. DAZA 4060 Study of a SOFC with a bimetallic Cu–Co–ceria anode directly fuelled with simulated biogas mixtures
- R. MARTÍNEZ-CORONADO, J.A. ALONSO, A. AGUADERO and M.T. FERNÁNDEZ-DÍAZ 4067 New $\text{SrMo}_{1-x}\text{Cr}_x\text{O}_{3-\delta}$ perovskites as anodes in solid-oxide fuel cells
- R. PINEDO, I. RUIZ DE LARRAMENDI, V.O. KHAVRUS, D. JIMENEZ DE ABERASTURI, J.I. RUIZ DE LARRAMENDI, M. RITSCHELD, A. LEONHARDT and T. ROJO 4074 Microstructural improvements of the gradient composite material $\text{Pr}_{0.6}\text{Sr}_{0.4}\text{Fe}_{0.8}\text{Co}_{0.2}\text{O}_3/\text{Ce}_{0.8}\text{Sm}_{0.2}\text{O}_{1.9}$ by employing vertically aligned carbon nanotubes
- D. SÁNCHEZ, S. UBERTINI, J.M. MUÑOZ DE ESCALONA and R. CHACARTEGUI 4081 Potential of molten carbonate fuel cells to reduce the carbon footprint of large reciprocating engines
- A. SERRANO-LOTINA and L. DAZA 4089 Influence of the operating parameters over dry reforming of methane to syngas
- A.L. CÁMARA, S. CHANSAL, C. HARDACRE and A. MARTÍNEZ-ARIAS 4095 The water–gas shift reaction over CeO_2/CuO : *Operando* SSITKA–DRIFTS–mass spectrometry study of low temperature mechanism
- A. ARANGO-DÍAZ, J.A. CECILIA, E. MORETTI, A. TALON, P. NÚÑEZ, J. MARRERO-JEREZ, J. JIMÉNEZ-JIMÉNEZ, A. JIMÉNEZ-LÓPEZ and E. RODRÍGUEZ-CASTELLÓN 4102 Comparative study of CuO supported on CeO_2 , $\text{Ce}_{0.8}\text{Zr}_{0.2}\text{O}_2$ and $\text{Ce}_{0.8}\text{Al}_{0.2}\text{O}_2$ based catalysts in the CO-PROX reaction
- D. SEBASTIÁN, C. ALEGRE, L. CALVILLO, M. PÉREZ, R. MOLINER and M.J. LÁZARO 4109 Carbon supports for the catalytic dehydrogenation of liquid organic hydrides as hydrogen storage and delivery system
- J.J. BREY, R. BREY, I. CONTRERAS and A.F. CARAZO 4116 Roll-out of hydrogen fueling stations in Spain through a procedure based on data envelopment analysis
- J.J. BREY, A.F. CARAZO and R. BREY 4123 Analysis of a hydrogen station roll-out strategy to introduce hydrogen vehicles in Andalusia
- J. MEIßNER, J. PASEL, R.C. SAMSUN, F. SCHARF, C. WIETHEGE and R. PETERS 4131 Catalytic burner with internal steam generation for a fuel-cell-based auxiliary power unit for middle distillates
- B. NIETO, G. MANJAVACAS, C. MERINO and R. QUINTANA 4143 Preliminary study for the adequacy and implementation of a hydrogen laboratory