

Fuels and Petrochemicals Division 2013

**Core Programming Area at the 2013 AIChE Annual Meeting:
Global Challenges for Engineering a Sustainable Future**

**San Francisco, California, USA
3 – 8 November 2013**

ISBN: 978-1-63439-043-9

Printed from e-media with permission by:

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



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

Copyright© (2013) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2014)

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

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

(5a) Modeling of Electrochemical Energy Storage Devices for Electric Vehicles	1
<i>Rajeswari Chandrasekaran</i>	
(5b) Characterisation of Thermal Response and Gas Generation Products of Li-Ion Cells Under Abusive Conditions	3
<i>Viktor Hacker, Gernot Voitic, Andrey Golubkov</i>	
(5c) Transient Studies of a Sodium-Sulfur Cell	4
<i>Sarah Caprio, Debangsu Bhattacharyya</i>	
(5d) Cycle Life Prediction for Ncm-Composite/Graphite Lithium Ion Battery Cells	5
<i>Justin Purewal, John Wang, Jason Graetz, Harshad Tataria, Mark W. Verbrugge</i>	
(5e) Convection Battery - Elimination of Dendrite Failure	6
<i>Galen Suppes, Donald Dornbusch, Ramsey Hilton</i>	
(5f) Convection Battery - Performance Improvement and Characterization	7
<i>Galen Suppes, Ramsey Hilton, Michael Gordon, Donald Dornbusch</i>	
(5g) Key Parameters for Electrothermal Dynamics and Control of 15-Ah Prismatic Li-Ion Batteries	8
<i>Sun Ung Kim, Lynn Secondo, Charles W. Monroe, Jason Siegel, Anna Stefanopoulou</i>	
(5h) Inorganic Electrolyte Membranes for Redox Flow Batteries	10
<i>Zhi Xu, Ioannis Michos, Ruidong Yang, Junhang Dong</i>	
(5i) Slurry Electrode for An All-Iron Flow Battery for Low Cost Large-Scale Energy Storage	11
<i>Tyler J. Petek, Jesse S. Wainright, Robert F. Savinell</i>	
(5j) Acid and Alkaline Hydrogen-Bromine Fuel Cell Systems for Electrical Energy Storage	15
<i>Trung V. Nguyen, Venkata R. Yarlagadda, Guangyu Lin, Guoming Weng, Vanessa Li, Kwong-Yu Chan</i>	
(5k) Coupling Anion- and Cation-Exchange Membranes for Redox Flow Batteries With Mixed Ion Charges	18
<i>Shuang Gu, Ke Gong, Emily Yan, Yushan Yan</i>	
(24a) Intrinsic Chemistry of Biomass Pyrolysis for Biofuels: Primary and Secondary Reactions of Cellulose Decomposition	20
<i>Paul J. Dauenhauer</i>	
(24b) Cellulose-Hemicellulose, Cellulose-Lignin Interactions During Fast Pyrolysis	21
<i>Jing Zhang, Yong S. Choi, Robert C. Brown, Brent H. Shanks</i>	
(24c) Pyrolysis Chemistry of Lignin Model Compounds; β-O-4 and α-O-4 Linkages	22
<i>Yong S. Choi, Jing Zhang, Brent H. Shanks</i>	
(24d) Aromatic Hydrocarbons Production From Catalysis of Douglas Fir Sawdust Pellets Pyrolysis Vapor Over Zeolite Catalyst	23
<i>Lu Wang, Hanwu Lei, Quan Bu, Lei Zhu</i>	
(24e) Catalytic Fast Pyrolysis of Aspen Lignin Via Py-GC/MS	24
<i>Min Zhang, Fernando Resende, Alex Moutsoglou</i>	
(24f) Fast Catalytic Pyrolysis of Biomass and Relevant Model Compounds Studied in a Spouted Bed Reactor: Effect of Catalyst Type and Loading	25
<i>Shoucheng Du, Nicholas Fleming, Julia Valla, George M. Bollas</i>	
(24g) Fast Hydrolysis and Catalytic Hydrodeoxygenation of Cellulose in a Micro-Scale Batch Reactor	28
<i>Harshavardhan J. Choudhari, W. Nicholas Delgass, Fabio H. Ribeiro, Rakesh Agrawal</i>	
(48a) Dual Fluidized Bed Reforming Pilot Test Results: Tar Conversion and the Fate of Sulfur	29
<i>Karl Mayer, George Apanel, Tobias Pröll, Hermann Hofbauer</i>	
(48b) Electricity Storage in Biofuels: Selective Electro-Catalytic Reduction of Levulinic Acid to Valeric Acid Or γ-Valerolactone	30
<i>Le Xin, Ji Qi, David Chadderton, Yang Qiu, Wenzhen Li</i>	
(48c) Catalytic Deoxygenation of Octanoic Acid Over Supported Pd	31
<i>Keyi Sun, H. Henry Lamb</i>	
(48d) Aldol Condensation and Esterification of Oxygenates On Bifunctional Metal-TiO₂ Catalysts	32
<i>Shuai Wang, Konstantinos Goulas, Enrique Iglesia</i>	
(48e) Catalytic Hydrodeoxygenation of Lignin Derived Compounds: Synergic Effect Between Pd and Fe	34
<i>Yongchun Hong, He Zhang, Junming Sun, Changjun Liu, Ayman Karim, Meng Gu, Chongmin Wang, Alyssa Hensley, Renqin Zhang, Jean-Sabin McEwen, Yong Wang</i>	
(48f) Generation of Novel Diesel Additives Via Furan Condensation and Partial Hydrogenation of Biomass-Derived Molecules	36
<i>Eric R. Sacia, Balakrishnan Madhesan, Alexis T. Bell</i>	
(48g) Catalyst Deactivation in Hydrothermal Decarboxylation	38
<i>Thomas Yeh, Phillip E. Savage, Suljo Linic</i>	
(48h) Selectively Activating the C=O Bond of Furfural Using Metal Carbide and Bimetallic Surfaces	39
<i>Ke Xiong, Jingguang G. Chen</i>	
(48i) Modeling of Catalytic Cracking and Separation Units for Upgrading Heavy Oil and Residues	40
<i>M. R. Riazi</i>	
(65a) Templated Ordered Mesoporous Materials for Supercapacitors and Lithium Ion Batteries	41
<i>Jimwoo Lee</i>	

(65b) Reduced Graphene Oxide Wrapped FeS Nanocomposite for Lithium-Ion Battery Anode With Improved Performance	42
<i>Ling Fei, Hongmei Luo</i>	
(65c) Alkanethiol-Passivated Germanium Nanowires As High-Performance Anode Materials for Lithium-Ion Batteries	43
<i>Hsing-Yu Tuan, Fang-Wei Yuan</i>	
(65d) A Facile Microwave-Assisted Route to Co(OH)₂ and Co₃O₄ Nanosheet for Li-Ion Battery	44
<i>Gen Chen, Hongmei Luo</i>	
(65e) Li Adsorption and Intercalation in Graphene, Graphite and Carbon Onions By Reaxff Reactive Force Field	45
<i>Muralikrishna Raju, Panchapakesan Ganesh, Paul R. C. Kent, Adri C. T. Van Duin</i>	
(65f) Silicon-Rich Carbon Nanofibers From Water-Based Spinning to Control Combination of Silicon and Carbon for Li-Ion Battery	46
<i>Yong L. Joo, Yong Seok Kim, Kyung Woo Kim, Daehwan Cho, Nathaniel S. Hansen</i>	
(65g) Electrochemical Properties of Carbon-Coated SnO₂-Graphene Nanocomposites for Rechargeable Lithium-Ion Batteries	47
<i>Mahbuba Ara, Dr. Steven Salley, Simon K. Y. Ng</i>	
(65h) Multilayer Hybrid Electrodes of TiO₂/Mwnt for Electrochemical Applications	48
<i>Md. Nasim Hyder, Reza Kaviani, Yang Shao-Horn, Paula T. Hammond</i>	
(65i) Facile Preparation of Mesoporous α-Fe₂O₃ With Unique Cocoon-Like Hollow Nanostructure for Reversible Lithium Ion Storage	49
<i>Jian Zhu, K. Y. Simon Ng, Da Deng</i>	
(114a) Catalytic Lignin Valorization By Liquid Phase Reforming	50
<i>Anna L. Jongorius, Joseph Zakzeski, John R. Copeland, Guo Shiou Foo, Carsten Stevers, Pieter C. A. Bruijninx, Bert M. Weckhuysen</i>	
(114b) Highly Selective Fe/Mo Hydrodeoxygenation Catalysts	53
<i>Jason C. Hicks, Dallas J. Rensel</i>	
(114c) Mechanism of Ketonization of Acetic Acid Over Reducible Oxides and Zeolites	54
<i>Tu N. Pham, Abhishek Gumidyal, Tawan Sooknoi, Daniel E. Resasco, Steven Crossley</i>	
(114d) Investigation of Raney Nicu Catalysts for Hydrothermal Hydrodeoxygenation	55
<i>Jacob G. Dickinson, Phillip E. Savage</i>	
(114e) Hydrocracking of a Heavy Feedstock Using Modified USY Zeolite-Based Catalysts	56
<i>Jose Luis Agudelo V., Sonia A. Giraldo D., Emiel J. M. Hensen, Luis Javier Hoyos M.</i>	
(114f) Vapor Phase Catalytic Deoxygenation of Acetic Acid	57
<i>Mathew M. Yung, Elaine Gomez, Erum Qayyum, John N. Kuhn</i>	
(114g) Mechanistic Insights in Catalytic Conversion of Sugars to Platform Furan Derivatives	58
<i>Vinit Choudhary, Marta León, Samir H. Mushrif, Christopher Ho, Andre Anderko, Vladimiro Nikolakis, Nebojsa Marinkovic, Anatoly I. Frenkel, Stanley I. Sandler, Dionisios G. Vlachos</i>	
(134a) Identifying Defect Sites in Lithium-Ion Battery Materials: Local Disorder in LiVPO₄F and Its Influence On Bulk Properties	59
<i>Robert J. Messinger, Michel Ménétrier, Dany Carlier, Jean-Marcel Ateba Mba, Laurence Croguennec, Christian Masquelier, Dominique Massiot, Michaël Deschamps</i>	
(134b) Electrochemical Properties and Characterization of Li_{1.2}Mn_{0.54}Co_{0.13}Ni_{0.13}O₂ Composite Cathode Powders Prepared by Ultrasonic Spray Pyrolysis	60
<i>Alex Langrock, Sheryl H. Ehrman, Chunsheng Wang</i>	
(134c) Atomic Layer Deposition (ALD) On the Nanostructured Li-Mn-Rich Composite Li_{1.2}Ni_{0.13}Mn_{0.54}Co_{0.13}O₂ Cathode Powder	61
<i>Xiaofeng Zhang, Ilias Belharouak</i>	
(134d) Metal Fluoride/Graphene Composites for High-Performance Li-Ion Cathodes	64
<i>Cary M. Hayner, Xin Zhao, Yue Yang Yu, Mayfair C. Kung, Harold H. Kung</i>	
(134e) Nanostructured Li₂S-Graphene Composites As Cathode for High Energy Density Li-S Batteries	65
<i>Kai Han, Jingmei Shen, Cary M. Hayner, Yue Yang Yu, Mayfair C. Kung, Harold H. Kung</i>	
(134f) Carbon/Sulfur Microspheres With Multi-Modal Pore Structures for Lithium-Sulfur Battery Cathodes	66
<i>Cunyu Zhao, Lianjun Liu, Huilei Zhao, Ying Li</i>	
(134g) Nanofiber-Based Cathode Electrocatalysts Supported On Carbon Substrates for Lithium-Air Rechargeable Batteries	67
<i>Yong Lak Joo, Jun Yin, Jangwoo Kim</i>	
(134h) Low-Temperature Dehydrogenation From Aminoborane Complexes Under Carbon Dioxide Atmospheres	68
<i>Jae W. Lee, Ran Xiong, Junshe Zhang</i>	
(134i) Intermittent Electrical Energy Storage By Liquid Organic Hydrogen Carriers	69
<i>Wolfgang Arlt, Karsten Müller, Daniel Teichmann</i>	
(134j) Synthesis of Nanoporous Palladium Powder With Controlled Pore and Particle Size for Hydrogen Storage Applications	70
<i>Patrick Cappillino, Christopher Jones, Khalid Hattar, Blythe Clark, Michelle Hekmaty, Benjamin Jacobs, David B. Robinson</i>	
(166a) Fossil and Bio Carbon Story in FCC Co-Refining	72
<i>Nicolas Thegarid, Gabriella Fogassy, Frédéric Meunier, Yves Schuurman, Claude Mirodatos</i>	
(166b) Control of Furfural Catalytic Hydrogenation Selectivity Using Alkanethiolate Self-Assembled Monolayers	74
<i>Simon H. Pang, Carolyn A. Schoenbaum, Daniel K. Schwartz, J. Will Medlin</i>	
(166c) Hydrodeoxygenation Or Reforming of Biomass – a DFT Study	75
<i>Duygu Basaran, Cheng-Chau Chiu, Alexander Genest, Notker Roesch</i>	

(166d) Gas Phase Hydrodeoxygenation (HDO) of Furfural On Molybdenum Carbide Catalysts	76
<i>Wen-Sheng Lee, Aditya Bhan</i>	
(166e) Hydrodeoxygenation of Meta-Cresol On Pt/SiO₂ and Pt/Hbeta	77
<i>Lei Nie, Daniel E. Resasco, Xinli Zhu, Tawan Sooknoi, R. G. Mallinson</i>	
(166f) Surface Barrier Transport Limitations in MFI-Structured Zeolites	78
<i>Andrew R. Teixeira, Chun-Chih Chang, David Ford, Wei Fan, Paul Dauenhauer</i>	
(166g) Production Of Renewable Diesel A NOVEL MICRO-Scale Based Reactor	79
<i>Frederick Atadana, Goran N. Jovanovic</i>	
(167a) Unravelling the Intial Decomposition Chemistry of Renewable Fuels	80
<i>Kevin M. Van Geem, Guy B. Marin, John Simmie, Hans-Heinrich Carstensen, Ruben De Bruycker</i>	
(167b) Neopentane Hydrogenolysis Over Supported Pd and Pt Catalysts and Alloys: A Kinetics Study of Particle Size and Alloy Effects	83
<i>David Childers, Neil Schweitzer, Arindom Saha, Jeffrey T. Miller, Robert M. Rioux, Randall J. Meyer</i>	
(167c) Mechanism of C-C Hydrogenolysis On Ir Catalysts	85
<i>David D. Hibbitts, David W. Flaherty, Enrique Iglesia</i>	
(167d) A Four Step Catalytic Process for the Conversion of Aqueous Hemicellulose Stream to Hydrocarbons	86
<i>Aniruddha Upadhye, Hakan Olcay, George W. Huber</i>	
(167e) Furfural Deoxygenation Over Carbon-Supported Noble Metal Catalysts	88
<i>Simon T. Thompson, H. Henry Lamb</i>	
(167f) Effective Hydrodeoxygenation of Biomass-Derived Oxygenates By MoO₃ Catalyst With Low H₂ Pressures	89
<i>Yuriy Román-Leshkov, Teerawit A. Prasomsri, Tarit Nimmanwudipong</i>	
(167g) Aqueous-Phase Hydrodeoxygenation Activity of Pd/ZrO₂ Catalysts	90
<i>Changjun Liu, Oscar Marin, Ayman Karim, Heather Brown, Yong Wang</i>	
(167h) Utilization of Char From Biomass Gasification for Catalytic Processing of Tars	92
<i>Naomi Klinghoffer, Marco J. Castaldi, Ange Nzihou</i>	
(192a) Fabrication of Porous Carbon Nanofibers With Adjustable Pore Sizes As Electrodes for Supercapacitors	94
<i>Chau Tran, Vibha Kalra</i>	
(192b) Enhanced Energy Storage By Tunable Electrolyte Confinement in Structure-Directed CNT Arrays	95
<i>Katherine T. Nicol, Dustin Zastrow, Justin J. Hill</i>	
(192c) Multifunctional Nitrogen-Rich “Brick-and-Mortar” Carbon As High Performance Supercapacitor Electrodes and Oxygen Reduction Electrocatalysts	96
<i>Dingshan Yu, Li Wei, Yuan Chen</i>	
(192d) Multiwalled Carbon Nanotubes With Tuned Surface Functionalities for Electrochemical Energy Storage	97
<i>Huige Wei, Hongbo Gu, Jiang Guo, Suying Wei, Zhanhu Guo</i>	
(192e) Three-Dimensional Core@Shell Nanostructured Array for Microscale Electrochemical Energy Storage	98
<i>Yuanbing Mao, Xing Sun</i>	
(192f) Microfabricated Nickel Oxide Supercapacitors Based On High Aspect Ratio Concentric Cylindrical Electrodes	99
<i>Andac Armutlulu, Sue Ann Bidstrup Allen, Mark G. Allen</i>	
(192g) Pretreatment Effects On Charge Storage of Early Transition-Metal Carbides and Nitrides	100
<i>Abdoulaye Djire, Priyanka Pande, Alice E. S. Sleightholme, Aniruddha Deb, Paul G Rasmussen, James Penner-Hahn, Levi T. Thompson</i>	
(192h) Doped Transition Metal Oxide Composite Electrodes for Supercapacitor Applications	103
<i>Prashanth Jampani Hanumantha, Karan Kadakia, Dae Ho Hong, James Poston, Manivannan Ayyakkannu, Prashant N. Kumta</i>	
(192i) Novel 3-D MnO₂/Holey Graphene Nanostructure for Supercapacitor Applications With Enhanced Electrochemical Performances	104
<i>Lixin Wang, Tiejun Meng, Mahbuba Ara, Da Deng, Simon Ng</i>	
(192j) Electrochemical Energy Storage of Magnetic Carbon Nanocomposites: Role of Magnetocapacitance and Magnetohydrodynamics	105
<i>Jiahua Zhu, Suying Wei, Zhanhu Guo</i>	
(192k) Synthesis and Characterization of Orange Peel As Electrodes in Li-Ion Capacitors	106
<i>Arenst Andreas Arie</i>	
(237a) Biomasspyrolysisrefinery: Hydrodeoxygenation of Liquid Phase Pyrolysis Oil	107
<i>Hannes Pucher, Roland Feiner, Nikolaus Schwaiger, Peter Pucher, Matthäus Siebenhofer</i>	
(237b) Production of Transportation Fuels Range Hydrocarbons From Pyrolysis Oil Via A Low Hydrogen Catalytic Deoxygenation	109
<i>Sathish Tanneru, Phile Steele</i>	
(237c) Woody Biomass to Liquid Hydrocarbon Fuel	110
<i>Tianli Zhu, Sean C. Emerson, Thomas H. Vanderspurt, Ying She, Meredith Colket, Donald Hautman, Timothy Davis</i>	
(237d) Comparison of In-Situ and Ex-Situ Catalytic Fast Pyrolysis of Pinewood and Phragmites Australis	111
<i>Nicole L. Hammer, Rene Garrido, Shawn Welch, Charles G. Coe, Michael A. Smith, Justus A. Satrio</i>	
(237e) Upgrading Biomass-Derived Syngas to Mixed Hydrocarbons Over Three-Dimensionally Ordered Macroporous (3DOM) Iron Fischer-Tropsch Catalysts	112
<i>Jin Hu, Fei Yu, Yongwu Lu, Peng Zhou</i>	
(237f) Pyrolytic Biodiesel From Vacuum Pyrolysis of Plant Oil Asphalt Catalyzed By Sodium and Potassium Compounds	114
<i>Qiang Tang, Yanyan Zheng, Jiaquan Li, Jinfu Wang</i>	
(237g) Aqueous-Phase Hydrogenation of Model Bio-Oil Compounds Under Mild Condition Over CNTs Supported Catalysts	115
<i>Minghao Zhou, Hongyan Zhu, Guomin Xiao, Rui Xiao</i>	

(262a) Effects of Composition and Compositional Distribution On the Optoelectronic Properties and Function of Semiconductor Ternary Quantum Dots	116
<i>Xu Han, Sumeet C. Pandey, Dimitrios Maroudas</i>	
(262b) Molecular Modeling of Nanoparticles and Conjugated Polymers During Synthesis of Photoactive Layers of Organic Photovoltaic Solar Cells	117
<i>Sm Mortuza, Corinna Cisneros, Mark Dela Cruz Bartolo, Soumik Banerjee</i>	
(262c) Integrating Photosystem I Proteins With Advanced Materials for Biologically Inspired Solar Energy Conversion	119
<i>G. Kane Jennings, Gabriel Leblanc, Darlene Gunther, Siyuan Yang, David Cliffler</i>	
(262d) Exciton Diffusion in Quantum-Dot Thin Films	120
<i>William A. Tisdale</i>	
(262e) Photonic Curing of Nanocrystals for Photovoltaics	121
<i>C. Jackson Stolle, Taylor B. Harvey, Douglas R. Pernik, Jiang Du, Dongjoon Rhee, Brian A. Korgel</i>	
(262f) Chloride Surface Modified Cadmium Telluride Nanocrystals for Photovoltaics	122
<i>Daniel J. Hellebusch, A. Paul Alivisatos</i>	
(262g) Multistep Selenization of Copper Indium Gallium Selenide (CIGS) Nanocrystal Photovoltaics	123
<i>Taylor B. Harvey, Timothy Bogart, C. Jackson Stolle, Jiang Du, Douglas R. Pernik, Brian A. Korgel</i>	
(262h) Exciton Dissociation and Charge Carrier Generation At Core/Shell Heterojunction in Quantum Dots	124
<i>Arindam Chakraborty</i>	
(350a) On the Origin of Catalytic Activity of Zirconia in Aqueous-Phase Partial Oxidation of Cellulose to Levulinic Acid	125
<i>Hongfei Lin, Lisha Yang, Ying Liu, Ji Su</i>	
(350b) Mechanistic Requirements for the Removal of Oxygen Heteroatoms and Formation of Intra- and Inter-Molecular C=C Bond in Biomass Derived Oxygenates	126
<i>Fan Lin, Ya-Huei (Cathy) Chin</i>	
(350c) Kinetic Studies of Succinic Acid Hydrogenolysis Using Multimetallic Catalysts in a Batch Slurry Reactor	128
<i>Arely A. Torres, Bala Subramaniam, Raghunath V. Chaudhari</i>	
(350d) Synthesis, Characterization of Bimetallic Ruthenium-Rhenium Catalysts By Strong Electrostatic Adsorption for Hydrogenation of Levulinic Acid to Gamma-Valerolactone	129
<i>Shuo Cao, John R. Regalbuto</i>	
(350e) Stabilization By Atomic Layer Deposition of Copper Catalysts for Liquid Phase Reactions	130
<i>Brandon J. O'Neill, David Jackson, Anthony J. Crisci, Carrie A. Farberow, Junling Lu, Paul J. Dietrich, Tao Li, Fabio H. Ribeiro, Jeffrey T. Miller, Randall Winans, Jeffrey W. Elam, Jeff Greeley, Manos Mavrikakis, Susannah L. Scott, Thomas F. Kuech, James A. Dumesic</i>	
(350f) Understanding Solvation Effects On Biomass Derived Platform Chemicals: A Combined Spectroscopic and Theoretical Approach	132
<i>George Tsilomelekis, Christina Bagia, Tyler R. Josephson, Stavros Caratzoulas, Vladimiro Nikolakis, Dionisios G. Vlachos</i>	
(350g) Structured Solvents for Catalytic Conversion of Cellulose to Bio-Chemicals	134
<i>Z. Conrad Zhang, Jinxia Zhou, Tingyu Huang, Songyan Jia, Kairui Liu</i>	
(375a) Dye-Sensitized Solar Cells: Using Over 100 Natural Dyes As Sensitizers	135
<i>Ivan Atanayake</i>	
(375b) Dye-Anchored Nanocatalysts for Improved Solar Energy Conversion Efficiency in Dye-Sensitized Solar Cells	137
<i>Guangliang Liu, Elena Galoppini, Alexander Agrios</i>	
(375c) Bulk Heterojunction Polymer Solar Cells Based On Organic Semiconductor Nanomaterials	138
<i>Samson A. Jenekhe, Guoqiang Ren, Ye-Jin Hwang, Haiyan Li, Selvam Subramanian, Hao Xin</i>	
(375d) Engineering Energy Levels At the TiO₂:P3HT Interface Using Atomic Layer Deposition	139
<i>James Dorman, Jonas Weickert, Martin Putnik, Lukas Schmidt-Mende</i>	
(375e) Layered Double Hydroxides As An Effective Additive in Polymer Gelled Electrolyte Based Dye-Sensitized Solar Cells	140
<i>Hsu-Wen Ho, Tzu-Chien Wei, Shih-Yuan Lu</i>	
(375f) Boron-Modified TiO₂ Microsphere With Enhanced Photovoltaic Performance	142
<i>Jun Rao, Xingfu Zhou</i>	
(375g) Effect of Ionic Liquid Electrolytes in DSSCs With Titanium Dioxide (TiO₂) Inverse Opal Structures	143
<i>Naomi Ramesar, Ilona Kretzschmar</i>	
(375h) Porous Nanowire Assemblies On Graphene for Dye-Sensitized Solar Cells	144
<i>Paul A Charpentier, Qasem Alsharari, Nasrin Farhangi, Golam Moula, Serge Ayissi</i>	
(415a) Catalytic Conversion of Bio-Ethanol Into 1,3-Butadiene	146
<i>Carlo Angelici, Bert M. Weckhuysen, Pieter C. A. Brujininx</i>	
(415b) The Coupling of Ethanol to Butanol Over Calcium Hydroxyapatites	148
<i>Sabra Hanspal, Robert J. Davis</i>	
(415c) Catalytic Depolymerization of Lignin Extracted From Kraft Black Liquor	149
<i>Bethany Carter</i>	
(415d) Production of Biobased Phenol and Xylenols From Lignin	150
<i>Ofei Mante, José A. Rodriguez</i>	
(415e) On Route to Recyclable Carbon-Based Heterogeneous Catalysts for Xylan Conversion	151
<i>Po-Wen Chung, Alexandre Charnot, Alexander Katz</i>	
(415f) Bifunctional Catalysts With Improved Hydrothermal Stability for the Hydrolytic Hydrogenation of Cellulose	152
<i>Darlene Z. Galloza-Lorenzo, José L. Contreras-Mora, Rafael Méndez-Román, Nelson Cardona-Martínez</i>	

(415g) Selective Conversion of Cellobiose to Hexitols Over Solid Acid Supported Ru Catalysts Under Mild Conditions	153
<i>Hua Wang, Qingfeng Ge, Jinyu Han, Xinli Zhu, Yufei Niu, Xianna Xie</i>	
(416a) Use of Supported Group IB-Pd Bimetallic Catalysts Prepared By Electroless Deposition for the Selective Hydrogenation of Acetylene and 1,3-Butadiene	154
<i>Yunya Zhang, Christopher T. Williams, John R. Monnier</i>	
(416b) Decarbonylation and Decarboxylation of Heptanoic Acid Over Supported Pt and Pd Catalysts	157
<i>Juan A. Lopez-Ruiz, Robert J. Davis</i>	
(416c) Fast Hydroprolysis and Hydrodeoxygenation of Biomass Model Compounds	158
<i>Dhairya D. Mehta, Andrew D. Smeltz, Nicholas J. Nugent, William E. Anderson, W. Nicholas Delgass, Rakesh Agrawal, Fabio H. Ribeiro</i>	
(416d) Hydrogenation of Biomass-Derived Furans Over Noble Metal Catalysts	159
<i>Jungshik Kang, Vadim Gulians</i>	
(416e) Production of Dimethylfuran From Hydroxymethylfurfural Through Catalytic Transfer Hydrogenation With Ruthenium Supported On Carbon	160
<i>Jungho Jae, Weiqing Zheng, Raul F. Lobo, Dionisios G. Vlachos</i>	
(416f) Inhibition of Xylene Isomerization in the Cycloaddition of 2,5-Dimethylfuran and Ethylene for the Production of Renewable p-Xylene	161
<i>C. Luke Williams, Chun-Chih Chang, Matthew R. Wiatrowski, Wei Fan, Paul J. Dauenhauer</i>	
(416g) Hydrogenolysis of C-O Bond Over Ni-Based Bimetallic Nps: Application in Lignin Valorization	162
<i>Ning Yan, Jianguang Zhang</i>	
(436a) Hydrogen Production From Water	163
<i>Martin D. McDaniel, John G. Ekerdt</i>	
(436b) Core-Shell Photoelectrochemical Electrodes for Water Splitting	164
<i>Qing Peng, Berc Kalanyan, Paul Hoertz, Andrew Miller, Do Han Kim, Kenneth Hanson, Leila Alibabaei, Jie Liu, Thomas Meyer, Gregory N. Parsons, Jeffrey T. Glass</i>	
(436c) Design of Photocatalysts Active in Infrared and Visible Range	165
<i>Doh C. Lee</i>	
(436d) Efficient Photoelectrochemical Water Splitting With Si-Based Metal-Insulator-Semiconductor Photoelectrodes	166
<i>Daniel V. Esposito, Youngmin Lee, A. Alec Talin, Thomas P. Moffat</i>	
(436e) Graphene Oxide Photocatalysts for Water Splitting and Its Upconverted Photoluminescence	167
<i>Te-Fu Yeh, Hsisheng Teng</i>	
(436f) The Study of Cu₂ZnSnS₄ Nanocrystal/TiO₂ Nanorod Arrays Heterojunction Photoelectrochemical Cell for Hydrogen Generation	170
<i>Tsung-Yeh Ho, Liang-Yih Chen</i>	
(436g) Development of New Generation of Sub-Nanometer Catalysts for Sustainable Energy Applications	171
<i>Qiyuan Wu, Peichuan Shen, Shen Zhao, Girish Ramakrishnan, Dong Su, Yan Li, Alexander Orlov</i>	
(436h) ZrO₂ Incorporated ZnO/TiO₂ Mesoporous Photocatalyst for H₂ Generation	172
<i>Abdulmenan Hussein, Rajesh Shende</i>	
(450a) Bench Scale Shale Shaker Performance	173
<i>G. G. Chase, Saeid Benis</i>	
(450b) Composition of Heavy Oil From Speed of Sound Data	174
<i>M. R. Riazi, H Dashti</i>	
(450c) A Case Study Of Debottlenecking Strides In A Petrochemical Plant	175
<i>Chike Okechukwu, Bal Shrivastava, Emmanuel A. Dada</i>	
(450d) Experimental Measurements and Modelling of the Dissociation Conditions of Clathrate Hydrates for (Refrigerant + NaCl + Water) Systems	176
<i>Peterson T. Ngema, C.N. Pettecrew, Paramespri Naidoo, Amir H. Mohammadi, D. Ramjugernath</i>	
(473a) Selective Dehydration of Polyols to Commodity Chemicals	179
<i>Michael Nolan, Umayangani Wanninayake, George Kraus, Brent H. Shanks</i>	
(473b) Selective Oxidation of Guaiacol to Produce Organic Acid Over TS-1 With H₂O₂	180
<i>Ji Su, Lisha Yang, Ying Liu, Hongfei Lin</i>	
(473c) Phthalic Anhydride Production From Renewable Carbon Sources	181
<i>Eyas Mahmoud, Raul F. Lobo, Eyas Mahmoud</i>	
(473d) Reaction Kinetics of the Diels-Alder Cycloaddition of Dimethylfuran and Ethylene for Renewable p-Xylene	182
<i>C. Luke Williams, Sara K. Green, Chun-Chih Chang, Wei Fan, Paul J. Dauenhauer</i>	
(473e) Ruthenium-Catalyzed Hydrogenation of Levulinic Acid: Influence of the Support On Selectivity and Stability	183
<i>Wenhao Luo, Upakul Deka, Andrew M. Beale, Ernst R. H. Van Eck, Pieter C. A. Bruijninx, Bert M. Weckhuysen</i>	
(473f) Catalyst Design for the Integration of Heterogeneous Catalysis With Biocatalysis	186
<i>Thomas J. Schwartz, Robert L. Johnson, Javier Cardenas, Nancy A. Da Silva, Klaus Schmidt-Rohr, James A. Dumesic</i>	
(473g) Reactions of Aliphatic and Aromatic Oxygenates On Ruthenium	188
<i>Cheng-Chau Chiu, Alexander Genest, Armando Borgna, Notker Roesch</i>	
(478a) Enhanced Yield of Bio-Gas Production With Modified Themo-Reactor Configuration and Separation of CO₂	189
<i>Muhammad Suleman Tahir, Mahmood Saleem</i>	
(478b) Microwave-Assisted Catalytic Glycolysis of Poly(ethylene terephthalate) By Using Ionic Liquids	190
<i>Yuting Liu, Yanjun Xing</i>	

(478c) Degradation of Rhodamine-B By Heteropolyoxometalate Ionic Liquid Under Visible Light	191
<i>Yuting Liu, Yanan Chen, Yanjun Xing</i>	
(478d) Metal-Containing Ionic Liquid As An Effective Catalyst for the Degradation of Poly(ethylene terephthalate) in Ethylene Glycol	192
<i>Xingmei Lu, Qian Wang, Suojiang Zhang</i>	
(478e) Anaerobic Digestion Technology: The Energy, Environment and Health of Developing Nations	193
<i>Oluyemi Adetule</i>	
(478f) Phosphorus Recovery From Municipal Wastewater Treatment Sludge	194
<i>Kamal Lamichhane Upadhyaya, W. Todd French, Rafael Hernandez</i>	
(478g) Techno- Economic Analysis of Wastewater Biosolids Gasification	195
<i>Nicholas P. G. Lumley, Jason M. Porter</i>	
(499a) SiC Photoanodes for Solar Water Splitting	196
<i>Christopher Bohn, F Sharifi, M. G. Kang, Veronika Szalai</i>	
(499b) Advanced Electrocatalysts From Organic Solution Synthesis	197
<i>Chao Wang</i>	
(499c) Nanostructured Ti-Fe₂O₃/Cu₂O Bilayered Thin Films for Photoelectrochemical Water Splitting	198
<i>Dipika Sharma, Sumant Upadhyay, Surbhi Choudhary, Vibha Rani Satsangi, Rohit Shrivastav, Sahab Dass</i>	
(499d) Synthesis and Characterization of Mn₂O₃-ZnO Nanocomposites for Hydrogen Generation Via Photoelectrochemical and Photocatalytic Splitting of Water	200
<i>Nirupama Singh, Surbhi Choudhary, Vibha Rani Satsangi, Sahab Dass, Rohit Shrivastav</i>	
(499e) High Performance Fluorine Doped Oxygen Evolution Reaction (OER) Electro-Catalysts for PEM Based Water Electrolysis	201
<i>Karan Kadakia, Moni Kanchan Datta, Oleg Velikokhatnyi, Prashant N. Kuma</i>	
(499f) Multiwalled Carbon Nanotubes Drive the Activity of Metal@Oxide Core-Shell Catalysts in Modular Nanocomposites	202
<i>Matteo Cargnello</i>	
(499g) Separation of Sulphur Dioxide and Oxygen in Thermochemical Hydrogen Production	204
<i>Rachael H. Elder, Guanghu He, Denis J. Cumming, Ray W. K. Allen</i>	
(499h) Chemisorption, Physisorption, and Hysteresis of Hydrogen On Carbon Nanotubes	205
<i>Seyedhamed Barghi, Theodore T. Tsotsis, Muhammad Sahimi</i>	
(519b) Biorefinery: Liquefaction of Pyrolysis Char to Biofuel	206
<i>Roland Feiner, Nikolaus Schwaiger, Hannes Pucher, Peter Pucher, Matthäus Siebenhofer</i>	
(519c) Mechanistic Insight Into Sonochemical Biodiesel Synthesis Using Heterogeneous Base Catalyst	208
<i>Hanif A Choudhury, Vijay Moholkar</i>	
(519d) Energetic and Environmental Assessment of Biomass Processing in the Sugar-Cane Industry	209
<i>Michel Kahwaji Janho, Quinton A. Shuster, Jorge E. Gatica, Maria Rosa Hernández, Fernando Daniel Mele, Mauricio Colombo</i>	
(519e) Investigation of Solvent System for the Production of Biodiesel From Sludge Palm Oil (SPO) By Enzymatic Transesterification	210
<i>Md. Zahangir Alam, Ricca Rahman Nasaruddin, Mohammed Saedi Jami, Mohammad Shahab Uddin</i>	
(519f) Update to Biodiesel Production From Activated Sludge and Economic Analysis	211
<i>Adebola T. Coker, Rafael Hernandez, Emmanuel D. Revellame, William E. Holmes, W. Todd French</i>	
(519g) An Intensified Integrated Biodiesel Manufacturing Process for Conversion of Waste Oils and Alcohols Into Biodiesel to Power Campus Bus System	212
<i>Aydin K Sunol, Zachary Cerniga, Eilis McGranaghan</i>	
(529a) Lignocellulosic Biomass Pyrolysis Product Comparison From a Micropyrolyzer, Batch and Continuous Reactor Systems	213
<i>Rene Garrido, Nicole L. Hammer, Alexander Zmiewski, Justinus A. Satrio</i>	
(529b) Spatio-Temporal Carbohydrate Characterization of Wood Particles During Fast Pyrolysis	215
<i>Alex D. Paulsen, Blake Hough, Daniel Schartz, Jim Pfaendtner, Paul J. Dauenhauer</i>	
(529c) Numerical Investigation of Multiphase Dynamic Effects in Catalytic Upgrading of Biomass Pyrolysis Vapor	216
<i>Jesse S. Capececlatro, Olivier Desjardins, Perrine Pepiot, Mark Jarvis, Thomas D. Foust</i>	
(529d) Catalytic Effects of MgSO₄ and ZnCl₂ On Fast Pyrolysis of Pine for the Production of Bio-Oils	217
<i>Liang Yuan, Yun-Quan Liu, Dong-Can Lv, Duo Wang</i>	
(529e) Pyrolysis of Alkali Pre-Treated Biomass and Biomass Constituents	218
<i>Paige Case, Elizabeth Stemmler, William J. Desisto, M. Clayton Wheeler</i>	
(529f) Study On the Aging Mechanism of Pyrolysis Bio-Oil	219
<i>Jiajia Meng, David Tilotta, Sushil Adhikari, Steve Kelley, Sunkyu Park</i>	
(529g) Effects of Post-Condensation Centrifugal Filtration On Pyrolysis Oil	220
<i>Anandavalli Varadarajan, Keisha B. Walters</i>	
(529h) Transportable Fast-Pyrolysis Process for Distributed Conversion of Waste Biomass to Renewable Liquid Fuels	221
<i>Paul E. Yelvington, Nicholas Schwartz, Dustin Zastrow, Ted Amundsen</i>	
(529i) Biomasspyrolysisrefinery: Product Stability of Intermediates and Products	222
<i>Nikolaus Schwaiger, Roland Feiner, Hannes Pucher, Lisa Steiner, Lisa Ellmaier, Peter Pucher, Matthäus Siebenhofer</i>	
(529j) Biomass Gasification: Effect of Sulfur Compounds On Catalytic Tar Removal Activity Using Nickel-Clay Catalysts	224
<i>Joeseph Vutukuri, Prashanth Buchireddy, R. Mark Bricka, John Guillory, Rakesh Bajpai, Mark E. Zappi</i>	
(534a) Plate Food Waste: A Valuable Source of Energy	225
<i>Stephanie Jung</i>	

(534b) Biofuel Production and Kinetics Study of Catalytic Microwave Pyrolysis of Douglas Fir Pellet Over Activated Carbon Supported Metal Catalyst	226
<i>Quan Bu, Hanwu Lei, Lu Wang, Juming Tang</i>	
(534c) Molecular-Level Modeling of Municipal Solid Waste Gasification	227
<i>Scott R. Horton, Yu Zhang, Craig A. Bennett, Michael T. Klein, Frank Petrocelli</i>	
(534d) Performance Analysis of Rdf Gasification in a Two Stage Fluid Bed - Plasma Process	229
<i>Massimiliano Materazzi, Paola Lettieri, Chris Chapman, Richard Taylor</i>	
(534e) Process Modeling of Continuous Catalytic Gasification As a Waste to Energy Alternative	233
<i>Charles F. Tillie, Melissa J. Riedthaler, Stephen A. Reeves, Shreya Adhikari, Jorge E. Gatica</i>	
(534f) Performance Evaluation of Accelerated Carbonation of Basic Oxygen Furnace Slag Via a Rotating Packed Bed: Modeling, Analysis and Maximization	234
<i>Shu-Yuan Pan, Pen-Chi Chiang, Yi-Hung Chen, E-E Chang, Chung-Sung Tan</i>	
(534g) Production of Alumina From Fly Ash By a Mild and Cleaner Hydrometallurgical Process	235
<i>Li Zhong, Dongping Duan, E Zhou, Hongliang Han</i>	
(575a) Direct Land Use Change Greenhouse Gas Emissions Associated With Forest-Based Biofuels and Bioenergy Production in Michigan	236
<i>Jiqing Fan, Robert E. Froese, David R. Shonnard, Robert M. Handler</i>	
(575b) Light-Limited Continuous Culture of Micro Algae in a Taylor Vortex Reactor	237
<i>R. Dennis Vigil, Bo Kong</i>	
(575c) Algae Derived Bio-Oil Separation By Supercritical Fluid Fractionation	238
<i>Daniel M. Ginosar, Foster Agblevor, Lucia M. Petkovic, Deborah T. Newby, John M. Moses</i>	
(575d) Enhanced Separation of Algal Biomass By Vibratory Shear Microfiltration for the Sustainable Production of Biofuels	239
<i>C. Stewart Slater, Mariano J. Savelski, Pavlo Kostetskyy</i>	
(575e) Multi-Objective Optimization of Biobutanol Production: Continuous Fermentation Coupled With Vacuum Separation Unit	240
<i>Aida Sharif Rohani, Jules Thibault, Poupak Mehrani</i>	
(575f) Growth, Harvesting, and Modeling of Lipomyces Starkeyi Lipids On Waste Sweet Potatoes	241
<i>Melissa Mason, Stephen Dufreche, Mark E. Zappi, Ramalingam Subramanyam, Rakesh Bajpai</i>	
(575g) A New Approach to Study Selected Aspects of Biomass Oxidation in Supercritical Water	242
<i>Javeed Mohammad, Uday G. Hegde, Michael Hicks, Janusz A. Kozinski</i>	
(592a) Catalytic Fast Pyrolysis of Forest Thinnings in a Bubbling Fluidized Bed Reactor With ZSM-5 Catalysts	243
<i>Ville Paasikallio, Foster Agblevor</i>	
(592b) Effects of Reactor Configurations and Catalyst Properties for Vapor Upgrading in HZSM5 Catalyzed Pyrolysis Vapor Upgrading	244
<i>Shaolong Wan, Christopher Waters, Abhishek Gumidyala, Rolf Jentoft, Lance Lobban, Steven Crossley, Daniel E. Resasco, R. G. Mallinson</i>	
(592c) CFD Modeling of the Catalytic Pyrolysis of Biomass With Zeolite in Fluidized Bed	246
<i>Dan Sun, Konstantinos Papadikis, Sai Gu</i>	
(592d) Deoxygenation of Bio-Oil Intermediates: Examination of Methane As a Direct Reducing Agent	247
<i>Aaron A. Oberg, Dennis J. Miller</i>	
(592e) Fast-Hydropyrolysis and Catalytic Hydrodeoxygenation for Conversion of Biomass to Liquid Fuel	248
<i>Vinod Kumar Venkatakrishnan, John Degenstein, W. Nicholas Delgass, Rakesh Agrawal, Fabio H. Ribeiro</i>	
(592f) Low-Oxygen Bio-Crude From Hydropyrolysis in a Pressurized Fluid-Bed Reactor	249
<i>John R. Carpenter, Josh Hlebak, Justin Farmer, David C. Dayton</i>	
(592g) Catalytic Fast Pyrolysis of Isotopically Labeled Biomass and Plastic Blends	250
<i>Christina Dorado, Charles Mullen, Akwasi A. Boateng</i>	
(592h) Mild Pyrolysis of P3HB/Switchgrass Blends for the Production of Bio-Oil Enriched With Crotonic Acid	251
<i>Charles A. Mullen, Akwasi A. Boateng, Christina Dorado, Dirk Schweitzer, Kevin Sparks, Kristi Snell</i>	
(641a) Algal Biorefinery: Production of Biocrude Oil & Byproducts	252
<i>Harvind Kumar Reddy, Thinesh Selvaratnam, Tapaswy Muppaneni, Nagamany Nirmalakhandan, Tanner Schaub, Barry Dungen, Nilusha Sudasinghe Appuhamilage, Peter Lammers, Wayne Voorhies, Shuguang Deng</i>	
(641b) Biodiesel Production Through Microwave Assisted Transesterification of Microbial Cells	253
<i>Yi Cui</i>	
(641c) Design Optimization By Response Surface Methodology for Continuous Fermentative Production of 1,3 Propanediol From Waste Glycerol By Product of Biodiesel Processes	254
<i>Baishali Kanjilal, Iman Noshadi, Nicholas Intoci, Matthew Dowding, William Hale, Brittany Brendel, Ranjan Srivastava, Richard Parnas</i>	
(641d) Review of Bio-Jet Fuel Conversion Pathways	255
<i>Wei-Cheng Wang, Ling Tao</i>	
(641e) Pellets From Lignocellulosic Materials: Briquetting Process Evaluation	256
<i>Yuri Gonzalez, Sagra Rincon, Gabriel Camargo, Fabio Sierra, Carlos A Forero N</i>	
(641f) Pyrolytic Liquid Yields From Bamboo Species (Bambusa Oldhamii and Bamboo Angustifolia)	257
<i>Y. S. Pliego-Bravo, Lidia Cervantes- Pesado, Eusebio Bolanos-Reynoso, Pedro Gonzalez-Garcia</i>	
(641g) The Impact of Ethanol and Iso-Butanol Blends on Regulated Emissions, Air Toxics, and Particle Emissions from SIDI Vehicles	260
<i>Georgios Karavalakis, Daniel Short, Diep Vu, Thomas Durbin, Akua Asa-Awuku</i>	
(652a) Development of a Heterogeneous Guanidine Base Catalyst for the Conversion of Lipids to a Sustainable Biofuel	262
<i>Keyvan Mollaieian, M. R. Islam, Bleinie Dickerson, Tracy J. Benson</i>	

(652b) A Highly Active and Stable Silica-Carbon Supported Palladium Catalyst for Decarboxylation of Oleic Acid to Produce Green Diesel	263
<i>Elvan Sari, Manhoe Kim, Steven O. Salley, K. Y. Simon Ng</i>	
(652c) Catalytic Deoxygenation of Cyanobacteria-Derived Fatty Acids to Hydrocarbons	264
<i>Taylor Schulz, Mason Oelschlagel, David. R Nielsen, Willem Vermaas, H. Henry Lamb</i>	
(652d) Co-Solvent Enhanced Production of Fuel Precursors From Lignocellulosic Biomass	266
<i>Charles M. Cai, Nikhil Nagane, Taiying Zhang, Rajeev Kumar, Charles E. Wyman</i>	
(652e) Direct Conversion of Oxygenated Fuels to Power Using Solid Oxide Fuel Cells	267
<i>Brittany R. Lancaster, Suljo Linic</i>	
(652f) Kinetic Characterization of Catalytic Wet Air Oxidation of Polymers for Waste Management	268
<i>Charles F. Tillie, Shreya Adhikari, Joshua C. Cmar, Stephen A. Reeves, Jorge E. Gatica</i>	
(652g) Kinetics of Self-Buffering Hydrolysis of Pectin in Batch Reactor	269
<i>Heman P Asher, Raul C. Rivas, Patrick L. Mills</i>	
(653b) Compositional Analysis and Advanced Distillation Curves for Mixed Alcohols Produced Via Syngas On a K-Comosx Catalyst	270
<i>Jesse Hensley, Tara Lovestead, Earl Christensen, Abhijit Dutta, Thomas Bruno, Robert McCormick</i>	
(653c) Production and Characterization of Straight-Run Thermal Deoxygenation (TDO) Fuels	271
<i>Scott Eaton, M. Clayton Wheeler, Sedat H. Beis, Sampath A. Karunaratne, Adriaan Van Heiningen</i>	
(653d) Oxy-Combustion of Low-Volatility Fuel With High Water Content	272
<i>Fei Yi, Richard L. Axelbaum</i>	
(653e) Hierarchical Pore Structure Zeolites for the Catalytic Upgrading of Tars	273
<i>Ameya Akkalkotkar, Shoucheng Du, George M. Bollas, Julia Valla</i>	
(653f) Production of Fuels From Natural Gas Through a Hybrid Thermochemical/Biochemical Gas Fermentation Process	277
<i>Derek W. Griffin</i>	
(653g) JP-10 Combustion Studies Using Automatic Reaction Mechanism Generation	278
<i>Connie Gao, Nathan Yee, Gregory R. Magoon, Robin Edwards, Hsi-Wu Wong, Nick Vandewiele, William H. Green</i>	
(653h) Fischer-Tropsch Synthesis: Comparison of Process Based On Fossil and Biomass Feedstock	279
<i>Burtron H. Davis</i>	
(653i) Conversion of Dimethylether Into Target Hydrocarbons Over Zeolite Catalysts	280
<i>Aaron C. Gonzales, Ryan E. Tschannen, Sunggyu Lee</i>	
(653j) Characterization of Heavy Petroleum Fractions and Its Application in Design and Operation of Upgrading Related Processes	281
<i>M. R. Riazi</i>	
(712a) Nature-Inspired Fractal Gas Distributor for Low-Temperature PEM Fuel Cell Cathodes	282
<i>Jeffrey Marquis, Marc-Olivier Coppens</i>	
(712b) Optimizing Rotary Reactor Parameters to Achieve Higher Process Yield in Ex-Situ Oil Shale Processing	283
<i>Hassan Golpour, Joseph D. Smith</i>	
(712c) Impact of Internals Size and Configuration On Bubble Dynamics in Bubble Columns	284
<i>Moses Kagumba, Muthanna H. Al Dahhan</i>	
(712d) A New Closed-Loop Relay System for Oil Sand Extraction	285
<i>Andy Hong, Xinyue Zhao</i>	
(712e) Gas Production From the Scoop	286
<i>Richard Long</i>	
(712f) Steam Gasification of Glycerin Using a Entrained Flow Gasifier	287
<i>Larry Pearson, Hossein Toghiani</i>	
(712g) Cascade Utilization of Fuel Gas Energy in Gtl Plant	288
<i>Shimin Deng, Rory Hynes, Maytinee Vatanakul</i>	
(712h) Distribution and Diffusion of Sara Fractions in Bituminous Layer of Athabasca Oil Sands: Instrumental Measurements and Molecular Dynamic Simulation	289
<i>Lin He, Guozhong Wu, Hong Sui, Xingang Li</i>	
(712i) Direct Cracking of Raw Oil Sands Bitumen - A New Approach	290
<i>Stauw H. Ng, Jinsheng Wang, Fuchen Ding, Ying Zheng, Qiang Wei, Sok M. Yui</i>	
(712j) Modeling of Plant Simulation of MRC Plant Under Variable Working Conditions and Operation Optimization	293
<i>Heng Sun, Fengyuan Yan, Feng Liu</i>	
(722a) Water-Gas Shift Catalysis Over Supported Platinum Nanoparticles	294
<i>Mayank Shekhar, Junling Lu, M. Cem Akatay, Jeffrey Elam, Jeffrey T. Miller, W. Nicholas Delgass, Fabio H. Ribeiro</i>	
(722b) A Kinetic Study On the Structural and Functional Roles of Lanthana in Iron-Based Catalysts for High-Temperature Water-Gas Shift Reaction	295
<i>Basseem Hallac, Morris D. Argyle, Jared C. Brown</i>	
(722c) Flame Spray Pyrolysis Synthesized Cu-CeO2 Catalysts for Low Temperature WGS Reaction	297
<i>Krishna Reddy Gunugunuri, Siva Nagi Reddy Inturi, Panagiotis Smirniotis</i>	
(722d) On the Importance of Metal-Oxide Interface Sites for the Water-Gas Shift Reaction Over Pt/CeO2 Catalysts	298
<i>Andreas Heyden, Sara Aranifard, Salai C. Ammal</i>	
(722e) Theoretical Analysis of Formic Acid Decomposition On Transition-Metal Catalysts	299
<i>Jong Suk Yoo, Felix Studt, Frank Abild-Pedersen, Jens K. Nørskov</i>	

(722f) TiO₂/Au Nanocomposites for Photocatalytic Water Splitting: Understanding the Mechanisms By Which Au Impacts Activity	301
<i>Michelle Przybyłek, Suljo Linic</i>	
(722g) Dendritic Au/TiO₂ Nanorod Arrays for Visible-Light Driven Photoelectrochemical Water Splitting	302
<i>Jinlong Gong, Fengli Su, Jijie Zhang, Tuo Wang, Peng Zhang</i>	
(768a) Hot Water Flowthrough Pretreatment of Cellulosic Biomass	303
<i>Véronique Archambault-Léger, Xiongjun Shao, Lee R. Lynd</i>	
(768b) Visualization Studies of the Evaporation and Combustion of Alternative Liquid Fuels At Elevated Temperatures	305
<i>Vignesh Venkatasubramanian, Jingran Duan, Stephen A. Giles, Steve R. Duke</i>	
(768c) Continuous Vacuum Drying of Wood Chips for Residential/Commercial/Industrial Heating Applications	306
<i>Jeffrey Marquis, B. Wayne Bequette</i>	
(768d) Effect of Storage Conditions On Extraction of Algal Carbohydrates and Oils for Biofuel Production	307
<i>Christa N. Hestekin, Alice C. Jernigan, Tom Potts, Robert R. Beitle, Jamie A. Hestekin</i>	
(768e) Methane-Derived Biofuels: Choosing Among Options	308
<i>Benjamin Woolston, Greg Stephanopoulos</i>	
(768f) Green Algae Photobioreactor	309
<i>Joe Bob Machado, Bradley Anderson, Travis Buse</i>	
(768g) A Parametric Study of Light-Duty Natural Gas Vehicle Competitiveness in the United States Through 2050	310
<i>Meghan B. Peterson, Garrett E. Barter, Todd H. West, Dawn K. Manley</i>	
(768h) Diesel Fuel Property Data and Predictions Using Highly-Saturated Bio-Renewable Feedstocks in Diesel Fuel Blends	311
<i>Andrew M. Duncan, Aaron M. Scurto, Susan M. Stagg-Williams</i>	
(768i) Property Prediction for Diesel Fuels Based Upon Surrogates Composed of Real Components	312
<i>Anton Reiter, Thomas Wallek, Andreas Pfennig</i>	
(768j) Characterization Of Agro-Waste As An Alternative Fuel Source	313
<i>Muhammad Suleman Tahir, Muhammad Danish, M. Ajaz Ahmad, Mahmood Saleem, Ayyaz Ahmad, Nadeem Feroze</i>	
(771a) Maximizing Active Sites On Molybdenum Sulfide Nanomaterials: Hydrogen Evolution On Thiomolybdate [Mo₃S₁₃]²⁻ Clusters	314
<i>Jakob Kibsgaard, Thomas F. Jaramillo, Flemming Besenbacher</i>	
(771b) Reforming of Model Biodiesel Over Ni-MoO₂	316
<i>Shreya Shah, Su Ha, M. Grant Norton</i>	
(771c) Oxidative Steam Reforming of Iso-Butanol Over Promoted Nickel Xerogel Catalysts	317
<i>Venkata Phanikrishna Sharma Mangalampalli, Jale Akyurtlu, Ates Akyurtlu</i>	
(771d) Fundamental Understanding of the Surface Structures of Bimetallic Catalysts for Aqueous-Phase Reforming of Glycerol	318
<i>Zhehao Wei, Ayman Karim, David L. King, Yong Wang</i>	
(771e) New Insight Into Reaction Mechanisms of Ethanol Steam Reforming On Co/ZrO₂	319
<i>Junming Sun, Ayman Karim, Donghai Mei, Mark Engelhard, Yong Wang</i>	
(771f) Modified Zirconia As Gold Catalyst Support for Low-Temperature Methanol Steam Reforming	321
<i>Chongyang Wang, Howard M. Saltsburg, Maria Flytzani-Stephanopoulos</i>	
(771g) Ni-Mg/Al₂O₃ and Ni-La/Al₂O₃ Catalysts for Steam Reforming of Biomass Tar	322
<i>Gabriella Garbarino, Elisabetta Finocchio, Ioannis Valsamakis, Chongyang Wang, Maria Flytzani-Stephanopoulos, Guido Busca</i>	
(800a) High-Titer and High-Yield n-Butanol Production From Lignocellulosic Biomass By Engineered Clostridium Tyrobutyricum	325
<i>Yinming Du, Shang-Tian Yang</i>	
(800b) Evaluation of Ascorbic Acid and Acetic Acid As Catalysts in the Transesterification of Virgin Soybean Oil	326
<i>Jonathan E. Wenzel, Endel Maricq, Michael Stogsdill, Ali Zand</i>	
(800c) In-Situ Conversion of the FOG in Trap Grease Into Biodiesel	327
<i>Qingshi Tu, Ming Chai, Mingming Lu</i>	
(800d) Synthesis of Polyoxymethylene Dimethyl Ethers From Dimethoxymethane and Paraformaldehyde Catalyzed By Cation Exchange Resins	328
<i>Yanyan Zheng, Qiang Tang, Tiefeng Wang, Jinfu Wang</i>	
(800e) Biodiesel Production With a Membrane Reactor Over Heterogeneous Alkali Catalyst	329
<i>Wei Xu, Guomin Xiao</i>	
(800f) Study On the Hydrogenation Technology of Vegetable Oil	330
<i>Peng Chong, Fang Xiangchen, Zeng Ronghui</i>	
(800g) Heterogeneous Catalysis for Biodiesel Production of Rapeseed Oil	332
<i>Naomi Ramesar, Yohannes Kiros</i>	
(800h) Systematic Evaluation of Jatropha Curcas L.Oil Obtention By Mechanical and Solvent Extraction	333
<i>Paulo C. Narvaez, Alvaro Orjuela, Andrea Yate, Adriana Hernández, Helmer Acevedo</i>	
(800i) CaO-Catalyzed Biodiesel Preparation With a Novel Deep Eutectic Ionic Liquid	334
<i>Wei Huang, Shaokun Tang</i>	
(800j) Characterisation of Blended Biodiesel Produced By Trans-Esterification of Jatropha Oil	335
<i>Rafi Ullah Khan, Arslan Akram</i>	
Author Index	