

Environmental Division

Presentations at the 2008 AIChE Annual Meeting

**Philadelphia, Pennsylvania
16 - 21 November 2008**

ISBN: 978-1-61567-224-0

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© (2008) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2009)

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

Revealing Microbial Strain Dynamics Case Study In An Oil-Absorber Bioscrubber System	1
<i>Ines R. Baptista, Michalis Koutinas, Athanasios Mantalaris, Andrew G. Livingston</i>	
Molecular Analysis of Bioaugmentation and Biostimulation of Biological Acid Mine Drainage Remediation Systems	3
<i>Sage R. Hiibel, Luciana P Pereyra, Elizabeth Perrault, Amy Pruden, Kenneth F Reardon</i>	
Formulation of Microbial Consortium for Btex Biodegradation	5
<i>Karthiga Nagarajan, Kai-ChEe Loh</i>	
Degradation and Biosorption of Environmental Endocrine Disruptor Di-(2-ethylhexyl) Phthalate (DEHP) by <i>Gordonia</i> Sp. YK1	6
<i>Youngsoon Um, Byoung-In Sang, ChEol-Hee Kang</i>	
Bioleaching of Metals from Electronic Waste	14
<i>Mercedes A. Rivero-Hudec, Manbir Sodhi, Diana Goglia-Arora</i>	
Control of Wood Decay Fungi by Brominated Furanones	15
<i>Kristen Manchester, Yongbin Han, Susan Anagnost, Yan-Yeung Luk, Dacheng Ren</i>	
Importance and Methods for Regulation of Building Resources in An Environmentally Conscious World	16
<i>Robert W. Peters, Dana Lackey</i>	
A Study on the Affected Population Surrounding the Industries Releasing OSHA Carcinogens in Jefferson County Using Toxic Release Inventory	25
<i>Robert W. Peters, Shammi Rahman</i>	
Potential Toxicity of Nanomaterials	26
<i>John Andrew Pickrell, Kiran Dhakal, Larry E. Erickson, Kenneth J Klabunde, Ronaldo G Maghirang, Mermagya Dhakal, Deon van der Merwe, Frederick W. Oehme</i>	
Physiologically-Based Inhalation Dosimetry Modeling for Nanoparticles: Considerations of Activity, Age, and Gender	34
<i>Pamela R. Shade, Panos G. Georgopoulos</i>	
Carbon Nanotube Bacterial Cytotoxicity: Does the Type of Carbon Nanotubes Matter?	35
<i>Seoktae Kang, Moshe Herzberg, Debora F. Rodrigues, Menachem Elimelech</i>	
In-Situ Evaporation of Water within Mining Rock Piles - A Modeling and Laboratory Study	36
<i>Edward M. Trujillo, Paul S. Evans</i>	
Performance Targets for Batch Wastewater Treatment Operations	52
<i>Benjamin J. Davis, Vasilios I. Manousiouthakis</i>	
Sensitivity Analysis of Adsorption Isotherms Subject to Measurement Noise in Data	53
<i>Karim K. Farhat</i>	
A Systematic Methodology for the Selection of Particles with Optimal Material Properties for Advanced Oxidation Process Applications	69
<i>David M. Follansbee, Lealon L. Martin, John Paccione, Joel L. Plawsky</i>	
Laboratory-Scale Fast Pyrolysis of Cca-Treated Wood Waste	70
<i>Amy M. Parker, Mark Bricka</i>	
Pre- and Post-Combustion Carbon Capture Using Metal-Organic Framework Adsorbents	71
<i>Craig M. Tenney, Tran D. Trinh, Christian M. Lastoskie</i>	

Natural Gas Based Hydrogen Production with No Carbon Dioxide Emissions	72
<i>Jorge Pena Lopez, Vasilios I. Manousiouthakis</i>	
New Developments in Instrumentation for Characterizing Nano-Particles for Health Exposure Studies	73
<i>Richard C. Flagan</i>	
Spectroscopic and Microscopic Characterization of Ambient Carbonaceous Particulate	74
<i>Randy L. Vander Wal, Victoria M. Bryg, Michael D. Hays</i>	
Measurement of Particulate Matter within School Bus Passenger Compartments Under Realistic Operating Conditions: An Evaluation of Retrofit Devices	75
<i>Robert P. Hesketh, David Martinez-Morett, Krishan K. Bhatia, Anthony J. Marchese</i>	
Relationships Between Composition and Pulmonary Toxicity of Prototype Particles from Coal Combustion and Pyrolysis	76
<i>William P. Linak, Seung-Hyun Cho, Jong-Ik Yoo, Audrey T. Turley, C. Andrew Miller, Jost O.L. Wendt, Frank E. Huggins, M. Ian Gilmour</i>	
PhysicoChemical Properties of Diesel Exhaust Particles Collected during Inhalation Exposure Studies	77
<i>Seung-Hyun Cho, William P. Linak, Dennis G. Tabor, Charly J. King, Jost O.L. Wendt, Q. Todd Krantz, M. Ian Gilmour</i>	
Searching for Answers	78
<i>Rick D. Saylor, Eric S. Edgerton, Benjamin E. Hartsell</i>	
Multi-Pollutant Plume-in-Grid Modeling	87
<i>Prakash Karamchandani, Krish Vijayaraghavan</i>	
Hygroscopic Properties of Microstructured Aerosols	94
<i>Asit K. Ray, Harry H. Hunter Jr.</i>	
A Computationally Efficient Model for Simulating Aerosol Interactions and Chemistry (MOSAIC)	95
<i>Rahul A. Zaveri, Richard C. Easter, Jerome D. Fast, Leonard K. Peters</i>	
Effect of Temporal Averaging of Vertical Eddy Diffusivity on the Forecast Quality of Surface Zone Concentration of the National Air Quality Forecast Capability	109
<i>Pius C. Lee, Youhua Tang, Jeff McQueen, Hochun Huang, Sarah Lu, Marina Tsidulko, Rohit Mathur, Jon Pleim, Tanya Otte, George Pouliot, Ken Schere, Paula Davidson</i>	
Solvent Extraction of Low Grade Coals for Clean Liquid Fuels	110
<i>Elliot B. Kennel, Mayuri Mukka, Alfred H. Stiller, John W. Zondlo</i>	
Effects of Quench Rate, NO, and Quartz Surface Area on Gas Phase Oxidation of Mercury by Bromine	116
<i>Brydger Cauch, Geoffrey Silcox, JoAnn Slama Lighty, Constance L. Senior</i>	
Bench- and Pilot-Scale Studies on Mercury Removal by Potassium Iodide in Coal-Fired Flue Gas	126
<i>Ying Li, S. Michael Daukoru, Achariya Suriyawong, Pratim Biswas</i>	
The Effects of the Renewable Portfolio Standards in the State of Alabama	134
<i>Robert W. Peters, Candace Watson</i>	
Enhancement of the Desulfurization Performances of Waste Cement Particles by Acid Treatment	142
<i>Jiawei Wu, Akihiro Yamasaki, Atsushi Iizuka, Kazukiyo Kumagai, Yukio Yanagisawa</i>	
A Practical Route for Greening of Coal	143
<i>Li Zhou</i>	

High Temperature Adsorption of Mercury on Non-Carbon Based Sorbents	148
<i>Sung Jun Lee, Jost O.L. Wendt, Joep Biermann</i>	
Optimization of Nanostructured Smart Biosensors Incorporated in a Fouling Resistant Ultrafiltration Membrane Used for Water Treatment	149
<i>Amr Zaky, Guang Cai, Cyndee L. Gruden, Colleen Gorey, Isabel Escobar</i>	
Determining the Extent and Influence of Flagella, Injection Concentration, and Solution Chemistry In Salmonella Transport	150
<i>Berat Z. Haznedaroglu, Sharon L. Walker</i>	
Biomedical Imaging Gold Nanoparticles: Interactions with Humic Substances	151
<i>Vasanta L. Pallem, Holly A. Stretz, Martha J. M. Wells</i>	
Interaction of Fullerene (C₆₀) Nanoparticles with Humic Acid and Alginate Coated Silica Surfaces: Implications for Fate and Transport	152
<i>Kai Loon ChEn, Menachem Elimelech</i>	
Environmental Remediation through Double Sequestration of Pollutants by Surfactant Templating Mesoporous Materials	153
<i>Jia Zhou, Jingjing Zhan, Grace Tan, Vijay T. John, Gary L. McPherson, JiBao He, Vladimir L. Kolesnichenko</i>	
Filtration Mechanisms of Single-Walled Carbon Nanotubes In Porous Media	154
<i>Deb P. Jaisi, Navid Saleh, Ruth E. Blake, Menachem Elimelech</i>	
Particle and Bacterial Deposition: Role of Gravity	155
<i>Gexin ChEn, Yongsuk Hong, Sharon Walker</i>	
Surface Properties of Metal and Metal Oxide Nanoparticles In Aqueous Environments and Their Toxicity	156
<i>John M. Pettibone, Vicki H. Grassian</i>	
A Review of Computational Methods for Predicting Environmental Transport and Fate	157
<i>David A. Gallagher</i>	
Estimating the Transient Source Strength of Soil Fumigants for Use In Air Dispersion Calculations	158
<i>Steven A. Cryer, Ian J. Van Wesenbeeck</i>	
Self-Organizing Classification of Ecotoxicological and Molecular Information as a Proxy for Identifying Persistent Bioaccumulative and Toxic Substances	159
<i>Gabriela Espinosa, Rallo Robert, Giralt Francesc</i>	
Carbon-Metal Redox Reaction: Its Implications In Particle Toxicity and Air Pollution Control	160
<i>Bing Guo</i>	
Ultra-Fine PM Derived from Fullerene-Like Carbon In Electrostatic Precipitator Fly Ash	161
<i>Uschi M. Graham, Alan Dozier, Rajesh A. Khatri, Michael Tseng, James C. Hower, Burtron H. Davis</i>	
Hydrocarbons Adsorbed to Combustion-Derived PM Localize to Lipid Droplets and Activate Oxidative Stress Response Genes in Respiratory Cells	164
<i>Arthur L. Penn, Gleeson Murphy, Rodney L. Rouse, William W Polk</i>	
Soot Nanoparticles Promote Biotransformation, Oxidative Stress, and Inflammation in Murine Lungs	172
<i>Rodney L. Rouse, Gleeson Murphy, Daniel B Paulsen, Arthur L. Penn</i>	
Speciation of Iron, Carbon, and Sulfur In Diesel Exhaust Particulate from Combustion of Diesel Fuel with and without Addition of 0.1 Wt% Ferrocene	181
<i>Frank E. Huggins, Naresh Shah, Artur Braun, Gerald P. Huffman, Kerry Kelly, David Wagner, Adel F. Sarofim</i>	

Coagulation of Charged Nanoparticles: Refined Classical Approach and Its Limits	182
<i>Vladimir Y. Smorodin</i>	
Numerical Analysis of the Behavior of PhotoChemical Products in Local Flows Over Central Japan in Summer Season: Sensitivity of Ozone Concentration to Emission Sources Over Coastal Urban Areas	188
<i>Toshihiro Kitada, Kiyoshi Okamura</i>	
The Fate and Transport of Ammonia at the Local to Regional Level	211
<i>Robin L. Dennis, Rohit Mathur, Jon Pleim, John T. Walker</i>	
Development, Testing, and Applications of An Integrated on-Line Meteorology Atmospheric Chemistry Modeling System	212
<i>Rohit Mathur, Jonathan Pleim, David Wong, Tanya Otte, Robert Gilliam, Shawn Roselle, Jeffrey Young, Frank Binkowski, Aijun Xiu</i>	
Carbon Emissions from Tropical Fires	213
<i>Prasad Kasibhatla</i>	
Regional and Global Perspectives of Megacity Air Pollution	214
<i>Gregory R. Carmichael</i>	
Closing Comments	215
<i>Leonard K. Peters</i>	
Surface-Bulk Partitioning of Organic Material In Aqueous Aerosols	216
<i>V. Faye McNeill, Julia Szprengiel, Michael Giordano</i>	
Field and Modeling Studies of Atmospheric Nanoparticles	217
<i>Alicia Pettibone, Sang-Rin Lee, Jay Raife, Yifang Zhu, Chad Bailey, Charles O. Stanier</i>	
Understanding the Evolution of Cloud Condensation Nuclei In Urban Plumes: Effects of Aerosol Ageing and Mixing	218
<i>Akua Asa-Awuku, Richard H. Moore, Chuck Brock, Roya Bahreini, Ann Middlebrook, Joshua Schwarz, Ryan Spackman, John Holloway, Dave Tanner, Greg Huey, Athanasios Nenes</i>	
Relating Cloud Condensation Nuclei Activity, Volatility, and Droplet Growth Kinetics of Terpene Secondary Organic Aerosol	219
<i>Gabriella J. Engelhart, Akua Asa-Awuku, Athanasios Nenes, Spyros N. Pandis</i>	
Airborne Size-Resolved Ccn Activity and Droplet Growth Kinetic Measurements In Pristine and Polluted Airmasses	222
<i>Luz T. Padro, Harmony Gates, Shane M. Murphy, Armin Sorooshian, Hafliði Jonsson, Richard C. Flagan, John H. Seinfeld, Athanasios Nenes</i>	
Multi-Component Organic Aerosols: Relationships among Hygroscopic Growth, Ccn Activity, and Phase State as Measured with Htdma, Cenc, and AFM	223
<i>Timothy M. Raymond, Juan Alberto Lopez Ruiz</i>	
Heterogeneous Uptake of Octamethylcyclotetrasiloxane (D4) and Decamethylcyclopentasiloxane (D5) on Reactive Dust Aerosol: Experiments and Atmospheric Implications	224
<i>Juan G. Navea, Charles O. Stanier, Mark A. Young, Vicki H. Grassian, Shihe Xu</i>	
Evaluation of Long-Range Transport of Atmospheric Particulate Matter Using a Regional Chemical Transport Model	225
<i>Kristina M. Wagstrom, Spyros N. Pandis</i>	
Decomposition of the Primary Ozonide: Towards a Better Understanding of Ozonolysis Kinetics	226
<i>Scott A. Epstein, Neil M. Donahue</i>	

The Sensitivity of Modeled Ozone to Changes In the Temporal Distribution of Area, Point, Mobile and Non-Road Emissions	227
<i>Patricia Castellanos, Sheryl Ehrman, Russell Dickerson, Jeffrey Stehr, Dale Allen</i>	
Use of a Pseudo-Lattice Approach to Model the Mean Activity Coefficient of Water+Organic+Inorganic Aerosols	229
<i>Elsa Moggia, Bruno Bianco</i>	
Environmental Foresight through Computational Chemistry: Improved Radiative Forcing Predictions for Global Warming Potentials	230
<i>Paul Blowers, Maurice Lee</i>	
Data-Driven Statistical Analysis of Global Climate Change	231
<i>Ian J. Laurenzi</i>	
An Updated Site Scale Saturated Zone Ground Water Transport Model for Yucca Mountain	232
<i>Sharad Kelkar, Mei Ding, Shaoping Chu, Bruce Robinson, Bill Arnold, Arend Meijer</i>	
Colloid-Facilitated Transport of Plutonium in Saturated Porous Med	240
<i>Amr Abdel-Fattah, S. Doug Ware, Paul Reimus, Sean Reilly</i>	
Dynamic Modeling of the Microbial Community Prior to and During Uranium-Bioremediation	241
<i>Kai H. Zhuang, Mounir Izallalen, Derek R. Lovley, Radhakrishnan Mahadevan</i>	
Migration of Chemotactic Bacteria toward Residual Contamination in a Sand Column with Structured Heterogeneity	269
<i>Meng Wang, Roseanne M. Ford</i>	
Enhanced Anaerobic Bioremediation Shuts Down a Tce Plume Groundwater Treatment System	270
<i>William K. Glynn, Michael E. Miller, Kevin P. Molloy</i>	
Btex Treatment in a Solid-Liquid Two-Phase Partitioning Bioscrubber: Comparison of Stirred Tank and Airlift Configurations	278
<i>Jennifer V. Littlejohns, Andrew J. Daugulis</i>	
Leaching of Brominated Flame Retardants (BFRs) and Metals from Electronic Wastes	280
<i>R. Mark Bricka, Otho Barnes</i>	
Photocatalytic Degradation of 1,3 Dinitrobenzene In Aqueous Suspension for Site Remediation	281
<i>Randy D. Weinstein, Dorothy W. Skaf, Amanda M. Grannas</i>	
Delivery and Targeting of Functional Nanoparticles In DNAPL Remediation	282
<i>Vijay T. John, Jingjing Zhan, Gerhard Piringer</i>	
Electrokinetic Enhancement of Air Sparging for Groundwater and Soil Remediation	283
<i>Pedro E. Arce, Thorbjorn Holm, Mario Oyanader</i>	
Science and Technology for Sustainable Water Supply	284
<i>Menachem Elimelech</i>	
PhotoChemical and ElectroChemical Advanced Oxidation Processes	285
<i>Christoph Hoislbauer, Matthäus Siebenhofer</i>	
Advanced Oxidation Processes for Destruction of Endocrine Disrupting Chemicals In Water Treatment: Kinetic Modeling and Free-Radical Reaction Mechanisms	286
<i>Badri N. Badriyha, Wonho Song, Varadarajan Ravindran, Massoud Pirbazari</i>	
Photocatalytic Degradation of Bisphenol A in an Aqueous Suspension of Titanium Dioxide	288
<i>Luisa Gomez, Joaquin Tirano, Gabriel Camargo, Victor Sarria</i>	

Applicability of the Fe-Assisted Photocatalytic Reactions to Dissimilar Compounds: Positive Effect of Fe Ions on Mineralization Rates of Maleic Acid, Oxalic Acid, Formic Acid, Paraquat, Phenol and 4-Chlorophenol	295
<i>Aaron Ortiz Gomez, Benito Serrano, Jesus Moreira del Rio, Hugo de Lasa</i>	
Chelate-Modified Hydroxyl Radical Reactions for Detoxification of Chlorinated Organics: Experimental Results and Model Development	297
<i>Scott R. Lewis, a. Montague, Y. Li, S. Daunert, L. Bachas, D. Bhattacharyya</i>	
Pretreatment of Primary Sludge Prior to Anaerobic Digestion	298
<i>Saad Aldin, Sayed Elbeshbishy, Fuzhou Tu, George Nakhla, Madhumita Ray</i>	
Kinetic Studies on Enhanced Mercury Adsorption in Zeolite Nay and Waste Fcc Catalyst	311
<i>Juana Juyo, Joaquin Tirano, Gabriel Camargo, Liliana Giraldo, Juan Carlos Moreno-pirajan</i>	
Simultaneous ElectroChemical Oxidation and Coagulation for the Treatment of Dye-Containing Wastewater by Using RuO₂ Coated Titanium Electrode	320
<i>Rita Farida Yunus, Yuming Zheng, K.G.Nadeeshani Nanayakkara, J. Paul ChEn</i>	
Photocatalytic Activity Assessment of TiO₂ for Water Treatment: Substrate-Specificity and Its Implications	321
<i>Wonyong Choi, Jungho Ryu</i>	
Renewable Energy Technologies: Corona Discharges in Water Contaminated with Oil Spillage	322
<i>Chinyere P. Mbachu</i>	
Optimization of the Ultrasonic Cavitation-Induced Removal of Nitric Oxide from Flue Gases Using Taguchi Statistical Experimental Design Methodology	323
<i>Yusuf G. Adewuyi, Nymul E. Khan, Naresh N. Mahamuni</i>	
Modeling the Ultrasonic Cavitation-Enhanced Removal of Nitric Oxide from Flue Gases In a Bubble Column Reactor	324
<i>Nymul E. Khan, Naresh N. Mahamuni, Yusuf G. Adewuyi</i>	
Falling Film UV-Reactor for off Gas Purification	325
<i>Christoph Gruber, Matthäus Siebenhofer</i>	
Studies on the Decontamination of Surfaces Exposed to Cytotoxic Drugs	326
<i>Marek Kuzma, Jaroslav Cerveny, Petr Kacer, Jiri Svrcek, Kamila Syslova, Libor Cerveny, Libor Panek</i>	
Hydrolysis Enhancement of Swine Wastewater by Ultrasonication	331
<i>Seungmin Na, Sun-Mee Kim, Young Haeng Lee</i>	
Reductive Dehalogenation of Trichloroethylene Using Aerosol-Assisted Fe/silica Nanoparticles	332
<i>Gerhard Piringer, Jingjing Zhan, Yunfeng Lu, Vijay T. John, Gary L. McPherson</i>	
Removal of Orange II Dye from Wastewater by Catalytic Wet Air Oxidation-Catalyst Selection and Reaction Kinetics	333
<i>Pinar Ozdural, Jale F. Akyurtlu, Mujde Erten-Unal, Vidya Sagar Guggilla, Ates Akyurtlu</i>	
Degradation of Acetaldehyde with Doped TiO₂ Photocatalyst Under Visible Light Irradiation	340
<i>Xiangxin Yang, Chundi Cao, Larry Erickson, Keith Hohn, Ronaldo Maghirang, Kenneth J. Klabunde</i>	
Application of Photocatalytic Oxidation Systems for Indoor Air Cleaning	352
<i>Lynette de Ausen Vera, Xiangxin Yang, Larry E. Erickson, Ronaldo G. Maghirang, Kenneth J. Klabunde</i>	
CO₂ Reduction by Nanoscale Galvanic Couples	353
<i>Kanchan Mondal</i>	

Regeneration and Framework Stability of Heavy Metal Exchanged Nanoporous Zincosilicates	355
<i>Tyler J. Selbe, Jennifer L. Anthony</i>	
Synthesis and Characterization of Visible-Light-Active TiO₂-Based Photocatalysts	356
<i>Xiangxin Yang, Chundi Cao, Larry Erickson, Keith Hohn, R.G. Maghirang, Kenneth J. Klabunde</i>	
Particulate Methane Monooxygenase-Catalyzed Sustainable Methanol Production from Atmospheric Methane	366
<i>Katherine K. Bearden, Daniela S. Mainardi</i>	
Accelerated Demineralization of Reverse Osmosis Concentrate of High Gypsum Scaling Propensity	367
<i>Anditya Rahardianto, Brian C. McCool, Yoram Cohen</i>	
Development and Optimization of a Highly Effective and Low Energy Intensive Electro-Disinfection System for Ballast Water Treatment	368
<i>K.G.Nadeeshani Nanayakkara, Yu-Ming Zheng, J. Paul ChEn</i>	
Treatment of Reverse Osmosis Concentrate to Improve Overall Recovery: The Effect of Prior Antiscalant Oxidation on Particle Characteristics and the Extent of Precipitation	373
<i>Lauren F. Greenlee, Elise Barbot, Benny D. Freeman, Benoit Marrot, Philippe Moulin, Desmond F. Lawler</i>	
A Hybrid Membrane-Biofilm Process for Concurrent Nitrification and Dentrification	376
<i>Leon Downing, Robert Nerenberg</i>	
Removal of Arsenate Ions from Water Using Micellar Enhanced Ultrafiltration	385
<i>Miklós Szidarovszky, Kyle Heckel, A. Eduardo Sáez, Wendell Ela</i>	
Crossflow Nanofiltration (NF) of Silica Nano-Particles and Natural Organic Matter (NOM): Fouling, Transport and Interaction Effects	386
<i>James (Chip) Kilduff, Yanxiao Yuan</i>	
Overview of Nanotechnology Activities at EPA Under the Toxic Substances Control Act (TSCA)	387
<i>Jim Alwood</i>	
Nanotechnology: Chemical and Toxicological Risk Assessments Issues with Antimicrobials	388
<i>Najm Shamin, Jenny Tao, Jonathan ChEn</i>	
Human Health Effects of Nanomaterials	397
<i>David A. Jones, Megan J. Winter</i>	
Classification of Engineered Nanoparticles According to Their Long Time Risk Potential for Human Health and Environment	398
<i>Wendelin J. Stark, Ludwig K. Limbach</i>	
Engineered Nanomaterial Interactions with Suspended Lipid Bilayers	399
<i>Steven A. Klein, Trevor J. Thornton, Jonathan D. Posner</i>	
In Vitro Toxicity Testing of CdTe Nanoparticles In Three-Dimensional Cell Culture	400
<i>Jungwoo Lee, G. Daniel Lilly, Nicholas A. Kotov</i>	
Regulation and Societal Considerations of Nanotechnology in Commerce	401
<i>Michael E. Heintz</i>	
Sampling and Analysis of Nanomaterials in the Environment. A State-of-the-Science Review	402
<i>Anthony Gaglione, Meghan Camp, Kurt Rindfus</i>	
Removal of Oxide Nanoparticles In a Model Waste Water Treatment Plant	404
<i>Ludwig K. Limbach, Robert Bereiter, René Gälli, Wendelin J. Stark</i>	

Aggregation of Fullerene (C₆₀) Nanoparticles in Monovalent and Divalent Electrolytes: Implications for Fate, Transport, and Bioavailability	406
<i>Kai Loon ChEn, Menachem Elimelech</i>	
Desalination Membranes Based on Directly Sulfonated Poly(arylene ether sulfone) Copolymers	407
<i>Ho-Bum Park, Wei Xie, Joe Cook, James McGrath, Benny D. Freeman</i>	
Energy Cost Optimization in Membrane Desalination and the Thermodynamic Restriction	408
<i>Richard Zhu, Yoram Cohen, Panagiotis D. Christofides</i>	
Utilization of Block Copolymers as Ultrafiltration Membranes	418
<i>William A. Phillip, Mark Amendt, Brandon O'Neill, Marc A. Hillmyer, Edward L. Cussler</i>	
Kinetics of Mineral Precipitation and Organics Removal In Brackish Water	425
<i>Brian C. McCool, Anditya Rahardianto, Yoram Cohen</i>	
Passive Vacuum Solar Flash Desalination	426
<i>Mohammad Abutayeh, Yogi Goswami</i>	
The Effect of the Presence of Antiscalants on Calcium Carbonate Precipitation: Evaluation of Calcium Precipitated, Particle Characteristics, and Fouling Potential	442
<i>Lauren F. Greenlee, Elise Barbot, Benny D. Freeman, Desmond F. Lawler, Benoit Marrot, Philippe Moulin</i>	
Climate Change Legislation and Litigation Update	445
<i>Mary Ellen Ternes</i>	
Climate Change Under the Clean Air Act	446
<i>Robert B. McKinstry Jr.</i>	
Greenhouse Gas Cap and Trade Programs: Moving Forward	447
<i>Michael E. Heintz</i>	
Calculation of Greenhouse Gas Emissions	448
<i>Mike Bradford, Lan ChEah, Bill Keesom</i>	
N₂O Production by Fungal Denitrification in a Semiarid Soil	453
<i>Lin Yang, Vallejo Antonio, Yulin Deng</i>	
Application of Fe-Pd Nanoparticles for Chloro-Organic Degradation	461
<i>Abhijit Patil, D. Bhattacharyya</i>	
Catalytic Wet Peroxide Oxidation of Phenol : H₂O₂ Gradual Addition Study	462
<i>Asghar Molaei Dehkordi, Amir Ali Ebrahimi, Seyedehmansoureh Shahalami</i>	
Catalytic Activities of Transition Metal Oxides for Plasma PM Removal	466
<i>Shin Yamamoto, Shuiliang Yao, Satoshi Kodama, Chieko Mine, Yuichi Fujioka</i>	
Recovering Magnetic Powder from Sludge Discharged during Magnetic Separation of Oily Wastewater at Oil Production Sites	467
<i>Tadashi Sano, Hisashi Isogami, Akira Mochizuki, Norihide Saho</i>	
Mechanism of the Diesel PM Removal by Dielectric Barrier Discharges	471
<i>Satoshi Kodama, Shuiliang Yao, Shin Yamamoto, Chieko Mine, Yuichi Fujioka</i>	
Human Urine Utilization : a Waste Management Strategy	472
<i>Oluoyemi Olasoji Adetule, Olufunke Helen Moreyibi, Ayoteju Adetutu Ogun, Tolulope Adewole Odeshi</i>	
Biodegradation of Refinery Wastewater Using O. Intermedium	486
<i>Aditi Banerjee, Alope Kumar Ghoshal</i>	
Decomposition of 2-Chlorophenol In Supercritical Water Oxidation Using Anticorrosive Continuous Reactor	488
<i>Jae-Hyuk Lee, Tran Tan Viet, Chang-Ha Lee</i>	

Modeling and Design of Fluidized Bed Reactors for Biological Denitrification of Reverse Osmosis Brine Concentrates	489
<i>Ilknur Ersever, Huan-Hao Tsai, Varadarajan Ravindran, Massoud Pirbazari</i>	
Diversity and In Situ Quantification of Tributyltin-Degrading/resistant Bacteria Under Different Cultivating Conditions	491
<i>Young Haeng Lee, Soohyun Park, Yongsu Choi, Hee-Deung Park</i>	
Characterization of Multilayer Ceramic Cake Filtration System: Collection Efficiency, the Porosity, and the Pressure Drop	492
<i>Hern Kim, In-Seob Lee</i>	
Analysis and Retrofit Design of Wastewater Treatment Facilities Using Process Simulation Tools	493
<i>Victor Papavasileiou, Charles Siletti, Demetri Petrides</i>	
Chemical Speciation of Heavy Metals in Ground and Surface Waters	494
<i>H. S. Hundal, Kuldip Singh, Dhanwinder Singh</i>	
Absorption of CO₂ on CaSiO₃	499
<i>Minghua Wang, Choong-Gon Lee, Chong-Kul Ryu</i>	
Modeling of a Closed-Loop Heat Pump Dryer for Cabin Solid Waste on Long-Duration Space Missions	505
<i>J.M.R. Apollo Arquiza, Jean Hunter, Robert Morrow, Ross Remiker</i>	
Dynamic Optimization Approaches for the Determination of Bottom-up and Top-down Control In Lakes and Reservoirs	506
<i>Vanina Estrada, Elisa Parodi, Maria Soledad Diaz</i>	
Fractional Uptake Efficiency of Ozone In Human Subjects	508
<i>Tim Brenza, James Ultman</i>	
Consideration of Toxicological Aspects in the Development of Lubricants Based on Synthetic Esters	510
<i>Bibiane Erlenkaemper, Wolfgang Dott, Marcel A. Liauw, Sven Eichholz, Adolf Eisentraeger</i>	
Biofuel Generation from ChEese Whey In a Two –Stage Anaerobic Process	511
<i>Georgia Antonopoulou, Katerina Stamatelatu, Gerasimos Lyberatos</i>	
Biocrude Production from Switchgrass Using Subcritical Water	513
<i>Sandeep Kumar, Ram B. Gupta</i>	
Noncatalytic Reformation of Sucrose in Supercritical Water	514
<i>Jason W. Picou, Jonathan E. Wenzel, Michael S. Stever, Jared Bouquet, Sunggyu Lee</i>	
Synthesis of Biodegradable Lubricant from Jatropha Oil with High Content of Free Fatty Acids	524
<i>Tinia Idaty Mohd. Ghazi, Mohamad Faiz Mukhtar Gunam Resul, Azhari Muhammad Syam, Azni Idris</i>	
Wastewater Treatment Systems: The Next Biorefinery	531
<i>Jaelyn Hall, W. Todd French, Rafael Hernandez, Andro H. Mondala, Earl Alley, William E. Holmes, Ashli Brown, Mark G. White</i>	
Author Index	