

Sustaining Water for Future Generations

Topical Conference at the 2012 AIChE Annual Meeting

**Pittsburgh, Pennsylvania, USA
28 October - 2 November 2012**

ISBN: 978-1-62276-753-3

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© (2012) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2013)

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

Self-Assembly and Superhydrophobicity in Membrane Development for Water Application (Keynote Talk)	1
<i>Suzana Nunes</i>	
Water and Ion Transport in Polymer Membranes for Water Purification	7
<i>Benny Freeman</i>	
Membrane Distillation Processes for Water Desalination	8
<i>Kamalesh K. Sirkar, Dhananjay Singh</i>	
Effect of Preparation Variables On Morphology and Water Flux of PVDF Hollow Fiber for Membrane Distillation	9
<i>Lan Ying Jiang</i>	
The Importance of Mass Transfer Limitations in the Application of Forward Osmosis (Keynote Talk)	10
<i>Robert W. Field, Jun Jie Wu</i>	
An Advanced Design of Membrane Structure for Wastewater Treatment Through Forward Osmosis	13
<i>Jincai Su, Rui Chin Ong, Bradley J. Helmer, Jos S. De Wit, Tai-Shung Chung</i>	
Charged and Hydrophilized Polybenzimidazole (PBI) Membranes for Forward Osmosis	14
<i>Michael Flanagan, Isabel C. Escobar</i>	
Development of High-Flux and Fouling-Resistant Reverse Osmosis Membranes for Brackish Water Desalination	15
<i>Lin Zhao, W. S. Winston Ho</i>	
High-Flux Reverse Osmosis Membranes for Brackish Water Desalination	16
<i>Lin Zhao, W. S. Winston Ho</i>	
Zeolitic Imidazolate Framework-8 As a Reverse Osmosis Membrane for Water Desalination: Insight From Molecular Simulation	17
<i>Zhongqiao Hu, Jianwen Jiang</i>	
Novel Copper-Charged Anti-Microbial Reverse Osmosis Membranes	18
<i>Sunitha Asapu, Cyndee L. Gruden, Isabel C. Escobar</i>	
Characterization of Aluminum-Neutralized Sulfonated Styrenic Pentablock Copolymer Films	19
<i>Geoffrey M. Geise, Carl L. Willis, Cara M. Doherty, Anita J. Hill, Timothy J. Bastow, Jamie Ford, Karen I. Winey, Benny D. Freeman, Donald R. Paul</i>	
Membrane – Iron Oxide Nanoparticle System for Pollutant Degradation	20
<i>Minghui Gui, Vasile Smuleac, Dibakar Bhattacharyya</i>	
Novel Hydrophilic Cast Nylon 6,6 Microfiltration (MF) Membrane Supported Thin Film Composite (TFC) Membrane for Engineered Osmosis (EO)	21
<i>Liwei Huang, Ngoc Bui, Mark T. Meyering, Jeffrey R. McCutcheon</i>	
Integrating Forward Osmosis Into Microbial Fuel Cells for Sustainable Wastewater Treatment	22
<i>Zheng Ge, Fei Zhang, Zhen He</i>	
Removal of Tcep From Aqueous Solutions by Adsorption with Zeolites	23
<i>Scott Grieco, Bandaru V. Ramarao</i>	
Enhanced Effectiveness of Dispersants in Oil Spill Remediation Through the Use of Modified Polysaccharides	24
<i>Jingjian Tang, Pradeep Venkataraman, Etham Frenkel, Gary L. McPherson, Jibao He, Srinivasa R. Raghavan, Vladimir L. Kolesnichenko, Vijay T. John</i>	
Electrooxidation of Organic Pollutants with Boron-Doped Diamond Anodes: Evaluation of Process Parameters in Pilot Scale	25
<i>Dieter Woisetschlager, Michael Koncar, Matthaus Siebenhofer</i>	
Hydrophilic Electrospun Nanofibrous Mat: An Effective Support for High Osmotic Water Flux Thin-Film-Composite Membrane	27
<i>Ngoc Bui, Jeffrey R. McCutcheon</i>	
Hollow-Fiber Membrane Bioelectrochemical Reactor for Wastewater Treatment	29
<i>Zheng Ge, Zhen He</i>	
Performance Decline Due to Cake Enhanced Concentration Polarization In Cross Flow Membrane Filtration: An Unsteady Electrokinetic Model and Experimental Observation	30
<i>Md Abdullaha Al Mamun, Mοhtada Sadrzadeh, Subir Bhattacharjee</i>	
2-Step Interfacial Polymerization of Trimesoyl Chloride(TMC)/Metaphenylenediamine(MPD)-Derived Polyamide for Preparation of Organic/Inorganic Hybrid Reverse Osmosis Membranes	38
<i>Toshinori Tsuru, Shoichi Sasaki, Masakoto Kanezashi, Tomohisa Yoshioka</i>	

Multiple-Effect Membrane Distillation for Desalination of Seawater and Deep Concentration of the Brine Drained From Conventional Desalination Plants	39
<i>Yingjie Qin, Ben Wang, Junbao Jin, Bin Wang, Liqiang Liu, Dongsheng Cui</i>	
Membrane Fouling Behavior Evaluated by Constant Flux and Constant Transmembrane Pressure Filtration	41
<i>Daniel J. Miller, Sirirat Kasemset, Donald R. Paul, Benny D. Freeman</i>	
Effect of Mixed Monovalent and Divalent Ion Feeds On Sulfonated Polysulfone Desalination Membrane Performance	42
<i>Joseph R. Cook, Geoffrey M. Geise, Habis Al-Zoubi, Benny D. Freeman, Kwansoo Lee, Benjamin Sundell, James E. McGrath</i>	
Self-Adaptive Operation of Ultrafiltration (UF)/Reverse Osmosis (RO) System for Desalination of Brackish Water and Coastal Seawater	43
<i>Han Gu, Larry Gao, Anditya Rahardianto, Panagiotis D. Christofides, Yoram Cohen</i>	
Model Predictive Control Strategy for Optimizing Biological Nitrogen Removal (BNR) Processes Accounting for Greenhouse Gas Emissions	44
<i>Babji Srinivasan, Kartik Chandran, Venkat Venkatasubramanian</i>	
Improved Emulsion Breaking for Treatment of Bilge Water by Induced-Air Flotation	45
<i>Alexander Castillo, Ailenn D. Nieva, Alvin R. Caparanga</i>	
Bimetallic Nanoparticles for Water Purification	46
<i>Lauren F. Greenlee, Nikki Goldstein</i>	
Integrated Electrokinetic and Microbial Fuel Cell Technologies for Enhanced Transport and Bioremediation of Hexavalent Chromium in Groundwater	47
<i>Ryan Thacher, Lewis Hsu, Massoud Pirbazari</i>	
Scaling Microbial Fuel Cells for the Treatment of Municipal Sludge	48
<i>Orianna Bretschger, Greg Wanger</i>	
Optical Enzymatic Biosensor for Sensitive Detection of 1,2,3-Trichloropropane	49
<i>Brian Heinze, Kenneth F. Reardon</i>	
Smartphone Integrable High Density Nano Gas Sensor Array for Pollutant Detection	50
<i>Lauren Brook, Heng Su, Miluo Zhang, Albert Chen, N. V. Myung</i>	
Metal Oxide Nanowire Sensors and Sensor Arrays for Hazardous Gas Detection	51
<i>Zhiyong Gu</i>	
Aptamer Engineering for Ultrasensitive Detection of Pandemic Viruses and Emerging Contaminants	52
<i>Man Bock Gu</i>	
Microfluidic in-Channel Growth of 3-D Nanostructures and Their Applications	53
<i>Joseph Parisi Jr., Yu Lei</i>	
Non-Biological Inhibition Based Sensing (NIBS) for Detection of Trihalomethanes (THMs) in Drinking Water	54
<i>Isaac K. Afreh, Chelsea N. Monty</i>	
A Metabolism-Inspired Assay to Predict Toxicity in Drinking Water Systems	55
<i>Alvaro A. Rodriguez, Chelsea N. Monty</i>	
Sensitive Piezoelectric Cantilever Sensors for DNA, Parasites and Toxins	56
<i>Kishan Rijal, Sen Xu, Raj Mutharasan</i>	
Plenary Lecture: Biological Sensing Applications of II-VI Semiconductor Nanocrystals	58
<i>T. J. Mountziaris</i>	
Quaternized Chitosan Electrospun Membranes for Virus Removal	59
<i>Caryn L. Heldt, Bingyu Bai</i>	
Membrane Development From Banana Peel Fibers for Waste Water Treatment At Low Cost	60
<i>Shounak Datta, Sudeb Karmoker, Tanvir Sowgath</i>	
Engineering Biochars for Plant-Available Water Soil Applications	69
<i>Catherine E. Brewer, Robert Brown</i>	
Characterization and Assessment of Industrial Wastewaters in Egypt	70
<i>Mohamed Mostafa, Robert W. Peters</i>	
Moringa Oleifera Tree for Producing Drinkable Water: Quantifying Biochemical Changes within the Seeds	79
<i>Darrell Velegol, Stephanie B. Velegol, Danny Hoover, Georgia Karmee, Benjamin Kutz, Kamil Siniakowicz</i>	
Removal of Barium From Ground Water Using Clinoptilolite	80
<i>Liie Lumiste, Sundaravadivelnathan Ponnusamy, Rein Munter, Shuguang Deng</i>	
Magnetic Polyaniline Nanocomposites for Environmental Remediation	81
<i>Hongbo Gu, Sowjanya B. Rapole, Yudong Huang, Suying Wei, Zhanhu Guo</i>	
Alternative WATER Treatment Using Cactus Mucilage From Opuntia SPP.: Application in Bacteria Removal	82
<i>Daniela M. L. Stebbins</i>	

Remove of Textile Dyes Using Agriculture Wastes	83
<i>Erika Montes, Sebastian Velasco, Gabriel Camargo</i>	
Arsenic Adsorption On Xerogel, Aerogel, and Nanogel Activated Alumina	93
<i>Lucy Mar Camacho, Sundaravadevlnathan Ponnusamy, Isaac Campos, Tom Davis, Shuguang Deng</i>	
Production of Activated Carbon From Fast Pyrolysis Biochar	94
<i>Bernardo G. Del Campo, Robert C. Brown, David Laird, Laura R. Jarboe</i>	
Immobilization of Vesicles Incorporated with Aquaporins Onto Polymeric Membranes for Low Energy Water Purification	95
<i>Wenyuan Xie, Yen Wah Tong</i>	
Membrane Bioreactor Process and Fouling Control for Water Reclamation and Groundwater Recharge Applications	96
<i>Woonhoe Kim, Varadarajan Ravindran, Ryan Thacher, Massoud Pirbazari</i>	
Optimal Design and Operation of Real-Time Response Systems for Water Security	98
<i>Angelica Mann, Gabriel Hackebeit, Jose Rodriguez, Katherine A. Klise, Carl Laird, Terranna Haxton</i>	
Effects of the Different Stages of Superstructure Development On the Efficiencies and Designs of Heat-Integrated Process-Water Networks	99
<i>Elvis Ahmetovic, Zdravko Kravanja</i>	
Global Optimization of Water Network Synthesis Under Uncertainty with Risk Management	100
<i>Cheng Seong Khor, Nilay Shah</i>	
Cooling Tower Wastewater Treatment and Reuse	101
<i>Anditya Rahardianto, Han Gu, Larry Gao, John Thompson, Panagiotis D. Christofides, Yoram Cohen</i>	
Improving the Quality of Pulp & Paper Mill Waste Water Employing Electroflocculation Technology	102
<i>Rita Tandon</i>	
A Combined Cost Model for Analysis of Degraded Water Utilization in Thermoelectric Power Plants	113
<i>Iman Safari, Michael E. Walker, Javad Abbasian, Hamid Arastoopour, Ming-Kai Hsieh, Ranjani B. Theregowda, David A. Dzombak, Liu Wenshi, Radisav Vidic, David C. Miller</i>	
Author Index	