

Engineers Australia

CHEMeca 2007: Academia and Industry Strengthening the Profession

September 23-26, 2007
Melbourne, Victoria, Australia

Volume 1 of 3

Printed from e-media with permission by:

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

ISBN: 978-1-60560-302-5

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

Engineers Australia

CHEMeca 2007: Academia and Industry
Strengthening the Profession

TABLE OF CONTENTS

VOLUME 1

Production of Nano and Micro Particles via Ultrasonication for Biopharmaceutical Delivery	1
<i>G. Forde, J. Ho, W. Li, J. Sahaynathan, N. Uduman, C. Wimalajeewa</i>	
Energy and Economy Saving in H₂O₂ Commercial Production Unit Using Pilot Plant Data.....	12
<i>M. Majidi Givi, M. Jafari Nasr, M. Fallah Jafari</i>	
Production of Floral Dye from Different Flowers Available in West Bengal for Textile & Dye Industry	26
<i>P. Saha, S. Datta</i>	
Removal of Lead from Waste Water Using Clay as Liner Materials	34
<i>P. Saha, S. Datta, S. Kanti Sanyal</i>	
Simulation of NZ Coal Gasification for an IGCC Application	43
<i>S. Nathen, R. Kirkpatrick, B. Young</i>	
Advanced Regulatory Control of Dissolved Oxygen at the Mangere Wastewater Treatment Plant.....	54
<i>B. Young, T. Board</i>	
A Concept Inventory for Material and Energy Balances.....	61
<i>D. Shallcross, E. Ventura-Medina</i>	
Nanoporous Carbon Membranes for CO₂ Capture	76
<i>C. Anderson, G. Arora, S. Kentish, S. Sandler, G. Stevens</i>	
Pandemic Preparedness Planning (An example of Business Risk Management).....	84
<i>D. Sinclair</i>	
Controlled Production and Characterisation of Biopolymer Gel Particles	90
<i>P. Burey, B. Bhandari, T. Howes, M. Gidley</i>	
Effects Dopant & Biologic Part on Optical Properties of ZnS Nanocrystal	97
<i>M. Rabiee</i>	
Opportunities for Reducing Energy Consumption and Greenhouse Gas Emissions in Mineral Processing and Metal Production	105
<i>T. Norgate, S. Jahanshahi</i>	
Biodiesel Production from Rubber Seeds: In-Situ Transesterification.....	117
<i>M. Azizan, S. Yusup, A. Omar, H. Rahman, S. Metarespi, W. Kadheri</i>	
Control Structure Analysis for Multi-scale Process Systems - A Case Study of Bioreactors	124
<i>J. Nandong, Y. Samyudia, M. Tade</i>	

Effect of Fouling Factors, and Helical Baffles on the Required Area and Cost of Preheat Exchangers of Atmospheric Distillation Unit	131
<i>M. Majidi Givi, M. Jafari Nasr, A. Shafeqhat</i>	
Development and Implementation of a Dedicated ESL Tutorial Stream in Level One Engineering	143
<i>A. Everaert, G. Codner, K. Hapgood</i>	
Crude Preheat Train - New Design Concept.....	151
<i>D. Singh</i>	
Particulate Emissions from a Diesel Engine Operated with Gaseous Fuels	156
<i>N. Mustafi, R. Raine, B. James</i>	
Greywater Treatment by UVC/H₂O₂, Fenton and Photo-Fenton Reagents	165
<i>W. Chin, F. Roddick, J. Harris</i>	
Purification of Multi-Walled Carbon Nanotubes Synthesized by Fluidised-bed Chemical Vapour Deposition	171
<i>J. Liu, A. Harris</i>	
Gas-Liquid Multi-Stage Separation Technology for Subsea and Downhole Gas Upstream Processing	178
<i>M. Noui-Mehidi, J. Wu, P. Cueille, G. Sanchez-Soto, M. Rivero, E. Nakagawa</i>	
Solubility of a <i>Bacillus licheniformis</i> Alpha-amylase.....	185
<i>A. Chan, E. White, J. Litster</i>	
Effect of Gelatin, Tannin and pH on Clarification of SHAHANI Date Juice	192
<i>L. Nouri, A. Mohammadi, M. Saeedi</i>	
Collapse Dynamics of Homo-Polymers in a Poor Solvent: Influence of Hydrodynamic Interactions.....	196
<i>T. Pham, J. Ravi Prakash</i>	
Evaluation of Electrostatic Drop Making of Sodium-Alginate Liquids for Manufacturing of Gel Type Beads	202
<i>A. Samimi, M. Ghadiri</i>	
Synthesis of a Novel Compatibilizer for Polypropylene Clay Nanocomposite	210
<i>M. Pannirseslvalam, R. Gupta, S. Bhattacharya, R. Shanks</i>	
Investigation of Math Skills on Food Engineering Learning of Food Science and Technology Students.....	216
<i>M. Saeedi, A. Mohammadi, L. Nouri</i>	
Synthesis and Physical Characterization of Core/Shell Structured Polymeric Microspheres with Polyaniline Shell.....	227
<i>F. Fang, M. Cho, H. Choi</i>	
Isolation and Analysis of Pharmacologically-Active Compounds of <i>Microcystis Flos-aquae</i>	233
<i>K. Victory, D. Lewis, C. Thomas, K. King</i>	
Synthesis of Mesoporous Silica for Controlled Biomolecule Delivery	240
<i>J. Ho, G. Forde, H. Wang</i>	
Synthesis and Organic-functionalization Sodalite Nanocrystals	248
<i>D. Li, J. Yao, H. Wang, N. Hao, D. Zhao, K. Ratinac, S. Ringer</i>	
Interparticle Forces Arising from Chemical Additives used in the Flotation of Zinifex Century Mineral Slurries.....	255
<i>Y. Leong, Y. Lai, P. Tee, E. The</i>	

Synthesis of Ordered Microporous Carbons Containing Well Dispersed Transition Metal Nanoparticles by Direct CVD from Acetylene Gas	264
Y. Yang, P. Webley	
Breakup of a Rectangular Laminar Jet in Immiscible Liquid-Liquid Systems	270
C. Phan, G. Evans, E. Doroodchi, A. Nguyen, R. Goodridge	
Why Some TEG Dehydration Units Fail to Perform?	277
A. Datta	
The Role of the Organisation in Encouraging Diversity in the Workplace	283
R. Care, M. Foley, A. Wisdom	
The Influence of Process Parameters on Desulfurization and Demineralization of Mezino Coal by HNO₃/HCl Leaching.....	292
H. Gholami Alam, A. Zarringhalam Moghaddam	
Genos SCAL-1 Conversion Project.....	301
G. Cox, D. Miller	
Economic Viability of Ethanol Production from Mallee Biomass in Western Australia	307
Y. Yu, H. Wu	
Biomass Hydrolysis for Sugar Recovery: A Review	320
Y. Yu, X. Lou, H. Wu	
Triethylenetetraamine in the Depression of Pyrrhotite Flotation	334
H. Bal, A. Wijenayaka, D. Fornasiero	
Multi-Objective Optimisation of Multistage Gas Phase Refrigeration Processes Using a Genetic Algorithm	340
N. Shah, G. Rangaiah, A. Hoadley	
A Study of Important Factors for Coalescence in Iron Ore Sintering	347
G. Yap, C. Loo, N. Tame, H. See, T. Langrish	
Diverse Assessment Methods in Group Work Settings.....	353
T. Langrish, H. See	
Hydrophobicity of Coal Particles	359
K. Quast, L. Ding, J. Ralston, D. Fornasiero	
Effects of Particle Size on Coal Flotation	365
K. Quast, L. Ding, D. Fornasiero, J. Ralston	
A Scalable and Whole-systems Approach to Therapeutic Plasmid DNA Production: Meeting Fast Turn-Around and Future Demand of Plasmid-Based Biopharmaceutical Products	371
M. Danquah, G. Forde	
Translational and Rotational Motion of Cylinders Down Narrow Inclined Channels at Low Reynolds Numbers	378
J. Brinch, B. Moghtaderi, K. Galvin	
Modelling of Gas Solubility in Polymer/Clay Nanocomposites.....	385
S. Bhattacharya, R. Gupta, S. Bhattacharya	
Establishing the Moisture Transport Kinetics in Porcine Skin	392
S. Kar, X. Chen	
Stabilisation Studies of Nucleic Acid Transfection Complexes	404
D. Fornasiero, M. Trinh, J. Ralston	

Synthesis of Stable Gold-Coated Superparamagnetic Iron Nanoparticles	410
<i>W. Yuen, C. Selomulya</i>	
Comparative Study of Lead Removal Using Fish Scales and Activated Carbon - pH and Concentration Effects	418
<i>B. Abdullah, N. Mirus, W. Ilias</i>	
Effect of Oxidation on the Flotation of Copper Sulfide Minerals	425
<i>D. Fornasiero, A. Henderson</i>	
Physico-chemical Modeling of the Human Stomach	431
<i>M. Yoo, X. Chen</i>	
Enhanced H₂ Production from Biomass Coupled with CO₂ Capture Using CaO	439
<i>N. Florin, A. Harris</i>	
The Effect of Pulsed Electric Field on <i>Saccharomyces cerevisiae</i>'s Cellular Contents Leakage and Cell Death	448
<i>X. Zeng, Y. Zhang, X. Fu, B. Zhang</i>	
Micron Size Lactose Manufacture using High Shear Crystallization	456
<i>X. Zeng, X. Chen, K. Chen, S. Yu</i>	
Measurement of Wine Proteins by Size Exclusion HPLC	464
<i>S. Nordestgaard, C. Colby, B. O'Neill, E. Waters</i>	
CREW Revisited in 2007 - The Year of Women in Engineering	475
<i>J. Mills, V. Mehrtens, E. Smith, V. Adams</i>	
Accelerating Wine Aging by Alternating Electric Field	481
<i>X. Zeng, S. Yu, X. Chen, G. Li</i>	
Evaluation of Electro-Phoretic Deposition (EPD) of Colloidal Co-Cr-Mo Nano-Particles	489
<i>A. Samimi, M. Ghadiri, S. Williams, I. Leslie, J. Fisher</i>	
The P³ Formalism: A Basis for Improved Diagnosis in Complex Systems	498
<i>I. Cameron, B. Seligmann, K. Hangos, R. Lakner, E. Nemeth</i>	
The Effect of Freezing Rate, Duration of Frozen Storage and Comminution on the Dielectric Properties of Pork	510
<i>L. Zhang, J. Lyng</i>	
Cost Effective Technician Training Simulator for New Acetylene Hydrogenation Reactor	518
<i>C. Bowly, R. Wawrzon</i>	
Enthalpy of Mixing and Heats of Vaporization of Toluene with n - Butyl Alcohol, and t - Butyl Alcohol at 298.15 K and 308.15 K	528
<i>K. Shivabasappa, P. Babu, Y. Rao</i>	
Fast Pyrolysis of Oil Mallees Woody Biomass	536
<i>M. Garcia-Perez, S. Wang, M. Rhodes, F. Tian, W. Lee, C. Li</i>	
Multivariable Control Configurations for Fluidized Catalytic Cracking Unit	544
<i>K. Singh, D. De Padova, V. Pareek, M. Tade</i>	
Modelling Heat Transport in a New Type of Protective Clothing During Fire Exposure	551
<i>G. Mercer, H. Sidhu</i>	
Improving Ethanol Production Through Continuous Fermentation	558
<i>S. Watt, H. Sidhu, M. Nelson, A. Ray</i>	

Low Energy Photosynthesis of Gold and Silver Nanoparticle Catalysts.....	566
<i>R. Kydd, J. Scott, K. Chiang, R. Amal</i>	
Melt Crystallization - Inclusion Kinetics of Mineral Ions during Ice Formation.....	574
<i>K. Fukui, Y. Asakuma, K. Maeda</i>	
Mathematical Analysis of the Activated Sludge Process for Domestic Wastewater Treatment.....	580
<i>H. Sidhu, M. Nelson</i>	
Importance of Radical Desorption during Catalytic Pyrolysis of Ethane using Ni Mesh Catalyst.....	589
<i>W. Lee, C. Li</i>	
Facility Design for Coselle Based CNG Transport	596
<i>M. Trebble</i>	
Nanocrystalline Zeolite A: Synthesis and Heavy Metal Adsorption	602
<i>S. Muhammad, S. Wang, M. Tade</i>	
Gas-phase Photocatalytic Degradation of Volatile Organic Compounds Using Metallised Titania	609
<i>S. Lee, J. Scott, K. Chaing, R. Amal</i>	
A Spatially Uniform Model of Oxidative Self-Heating in Compost Piles	617
<i>M. Nelson, H. Sidhu, X. Chen</i>	
Attrition and Fragmentation Behavior by Micro-hardness Parameters in Suspension-Crystallization Processes.....	628
<i>Y. Asakuma, T. Terashima, H. Honda, K. Maeda, H. Miki, K. Fukui</i>	
Development of an Advanced Catalyst for Carbon Nanotube Synthesis	635
<i>C. See, A. Harris</i>	
Development of a Problem Based Learning Elective in "Green Engineering".....	641
<i>A. Harris</i>	
The Purification of Cobalt and Lithium from Spent Battery Leach Solutions with a Mixed Solvent Extractant System	648
<i>C. Cheng, Y. Pranolo, W. Zhang</i>	
Experimental Investigation of Bubble Dynamics Using Four Point Optical Probe.....	659
<i>M. Akhtar, M. Tade, V. Pareek</i>	
Understanding Transient Adhesion and Anti-Adhesion by Analyzing the Ink Transfer in Waterless Offset Printing	665
<i>Y. Mao, J. Tian, G. Murray, W. Shen</i>	
The Fixed Bed Study of Dye Removal on Chitosan Beads at High pH	673
<i>S. Hein, K. Wang</i>	

VOLUME 2

Synthesis of Ni-Supported Porous Cu Nanocatalyst for Catalytic Wet Oxidation of Industrial Wastes	679
<i>V. Bansal, H. Jani, S. Bhargava</i>	
CFD Simulation of UV Disinfection Reactors: Effect of Baffling on UV Dose Distribution	686
<i>D. To, T. Mueller, C. Colby, B. O'Neill</i>	

Field Testing of Nanofiltration for Tartrate Stabilisation of Wine at Berri Estates Winery	696
<i>L. Low, C. Colby, B. O'Neill, C. Ford, J. Godden, M. Gishen</i>	
Depression of Iron Sulphide Minerals in the Flotation of Copper Ores	705
<i>S. He, D. Fornasiero</i>	
Rigorous Screening of a Cyanobacterium for Production of PHB in a Closed Photo-bioreactor	711
<i>M. Roberts, K. King, D. Lewis, D. Desai</i>	
Assessing the Benefits of Sustainable Processing Research in the Minerals Industry	721
<i>B. McLellan, G. Corder, S. Green</i>	
Preparation of Molecular Sieving Carbon by Carbonization of Phenol-3,5-Dimethylphenol-Formaldehyde Resin	729
<i>J. Hayashi, R. Hirayama</i>	
Preparation of Titanium-Containing Mesoporous SBA-15 and Evaluation of its Photocatalytic Properties	735
<i>G. Li, X. Zhao</i>	
Key Issues Facing Project Delivery Organisations and Possible Solutions	N/A
<i>L. Wheeler</i>	
Preparation and Characterization of Mesoporous Micelle-Templated Silica Materials Produced by Sol-Gel Method	750
<i>M. Pakizeh, A. Zarringhalam Moghaddam</i>	
A New Graphical Methodology for Energy Integration in Power Plants	760
<i>M. Khoshgoftar Manesh, G. Salehi, M. Amidpour</i>	
Thermoeconomic Analysis of Coupling Desalination with Power Plants	767
<i>M. Khoshgoftar Manesh, G. Salehi, M. Hamed, M. Amidpour</i>	
Thermoeconomic Evaluation of Steam Turbines	774
<i>M. Amidpour, M. Khoshgoftar Manesh</i>	
Investigation and Simulation of Replacement of Propane as Refrigerant in NGL Plant	783
<i>M. Shanazari, F. Shahraki, M. Khorram</i>	
Reduction of CO₂ Emission from Isfahan Crude Oil Distillation Unit with Heat Integration	789
<i>M. Jafari Nasr, M. Khoshgoftar Manesh, M. Amidpour</i>	
Temperature Mediated Adsorption of Poly(N-isopropylacrylamide) onto α-Alumina	797
<i>J. O'Shea, G. Qiao, M. Spinello, G. Franks</i>	
Inhibition of Protein Adsorption onto Stainless Steel by a PEG Layer	805
<i>N. Ngadi, J. Abrahamson, C. Fee, K. Morison</i>	
Dynamic Simulation and Optimisation of Direct Contact Membrane Distillation in Hollow Fibre Module	817
<i>V. Bui, L. Vu, M. Nguyen</i>	
Real-time Analysis of Plasmid DNA Binding Interactions with Immobilized Peptide Ligands Using a Surface Plasmon Resonance Biosensor	823
<i>Y. Han, G. Forde</i>	

Integrating Green Engineering into Undergraduate Science and Engineering Courses.....	832
<i>S. Muryanto</i>	
Electrochemical Cleaning-In-Place of Milk Fouling in Plate Heat Exchangers	839
<i>L. Naidu, D. Patterson, X. Chen, D. Spurway</i>	
Nano-particle Suspension Rheology: Effect of Particle Size	847
<i>G. Frank, S. Jailani</i>	
Catalytic Wet Oxidation of Ferulic Acid: Reaction Kinetics and Oxidation Pathway	854
<i>H. Jani, J. Tardio, S. Bhargava, M. Hoang</i>	
The Implications of Microstructure on Mass Transfer through Integrally Skinned Polyimide Nanofiltration Membranes.....	861
<i>D. Patterson, A. Havill, Y. See-Toh, A. Turner, A. Livingston</i>	
Using Ionic Liquid-Organic Solvent Mixtures for the Dynamic Kinetic Resolution of 1-Phenylethanol	869
<i>D. Patterson, C. Roengpithya, P. Taylor, A. Livingston</i>	
Stability Analysis for Nonlinear Process Systems from a Network Perspective	879
<i>R. Setiawan, O. Rojas, J. Bao, P. Lee</i>	
Adsorption of Water in Finite-Length Carbon Nanopores: Computer Simulation and Experimental Studies	888
<i>A. Wongkoblap, D. Do</i>	
Importance of Volatile-Char Interactions on Char Reactivity During the Gasification of Victorian Brown Coal.....	895
<i>S. Zhang, F. Tian, J. Hayashi, A. Campisi, C. Li</i>	
Antimicrobial Effects of the Herbal Extract Supplementation in Bacterial Cellulose Fish Snack	900
<i>S. Kongruang</i>	
Heat Transfer during Ohmic Heating of Milk.....	907
<i>H. Tham, X. Chen, B. Young, L. Zhang, B. Bansal</i>	
An Experimental Study of the Decomposition of Pyrite in a Lignite During Pyrolysis	914
<i>S. Yani, D. Zhang</i>	
Herbal Antibacterial Liquid Soap Development against Bacterial Causing Skin Diseases.....	921
<i>S. Kongtun, W. Suracherdkaiti</i>	
Reducing Acrylamide Formation in Fried Potato Crisps by Pre-drying and Vacuum Frying Techniques	926
<i>T. Mai Tran, X. Chen</i>	
The Synthesis of Metallic Nanoparticles Inside Live Plants.....	939
<i>R. Bali, A. Harris</i>	
Ultimate Properties Evaluation of Biodegradable Poly (lactic acid) (PLA) and Poly (butylene succinate) (PBS) Blends for Packaging Application.....	948
<i>A. Bhatia, R. Gupta, S. Bhattacharya</i>	
Determining and Interpreting Minor Element Distributions in Copper Matte Smelting	954
<i>T. Kho, D. Swinbourne</i>	
Short Industry Placements - Implementation and Evaluation.....	962
<i>D. Swinbourne, M. Latham</i>	

Ultrasonic Atomization of Two Phase Liquids and Implications for Roll Coating	969
<i>F. Kendel, I. Parker, G. Garnier</i>	
Freezing on Subcooled Surfaces, Phenomena, Modelling and Applications.....	974
<i>F. Qin, X. Chen, K. Free</i>	
Biohydrogen Production from Synthetic Wastewater in Anaerobic Sequencing Batch Reactors	986
<i>H. Neramitsuk, P. Rangsuvigit, T. Sreethawong, S. Chavadej</i>	
Preparation of Porous Carbon Material with Controlled Pore Structure from Phenol-Formaldehyde Resin Synthesized with Addition of Metals (K, Na, Ni)	N/A
<i>R. Umemoto, H. Yoshida, J. Hayashi, K. Muroyama</i>	
Understanding Copper Smelting and Converting through Computational Thermodynamics	993
<i>T. Kho</i>	
Roll Vibration in Roll Coating Nip	1001
<i>F. Kendel, I. Parker</i>	
Monitoring Fouling of Reverse Osmosis Membranes using Electrical Impedance Spectroscopy	1006
<i>J. Kavanagh, T. Chilcott, H. Coster</i>	
Measurement of Timber Moisture Content and Gradients by Non-Invasive Electrical Impedance Spectroscopy	1014
<i>J. Kavanagh, T. Langrish, T. Chilcott, H. Coster</i>	
Best Practice Transfer using Virtual Communities in a Global Mineral Processing Organisation	1022
<i>D. White, J. Grey, V. Reilly</i>	
Full Plant Models - Why Bother?.....	1028
<i>A. Douglas</i>	
Advanced Modelling in Performance Optimization of an Industrial CO₂ Removal Unit	1037
<i>M. Ahmadi, V. Gomes, K. Ngian</i>	
Effect of Plate Material on the Dispersed Phase Hold Up in Karr Reciprocating Columns	1043
<i>R. Arunachalam, T. Bowser, G. Stevens</i>	
In-Situ High Temperature XRD Study of Pyrite	1051
<i>N. Subasinghe, S. Bhargava, D. Akolekar</i>	
Conformational Studies of Iprodione.....	N/A
<i>R. Jacob, A. Jacob</i>	
Development of Soft-Sensors for Flow Pattern Detection Guided by DEM Models	1057
<i>L. McElroy, J. Bao, R. Yang, A. Yu</i>	
Modeling Solid Settling Rate in Palm Oil Mill Effluent (POME) Treatment.....	1066
<i>F. Wong, P. Lu, J. Nandong, Y. Samyudia</i>	
Purification of Single-Walled Carbon Nanotubes (SWNTs) Using Froth Flotation: Effects of Oxidative Pretreatment and Surfactant Type	1074
<i>N. Lertrojanachusit, S. Chavadej</i>	
The Effects of Both Hydrocarbon and Water Vapor Contamination of Natural Gas Streams upon Polymeric Membrane Performance.....	1082
<i>R. Hasan, S. Kentish, G. Stevens</i>	

Formation of Hollow Granules from Hydrophobic Powders	1090
<i>B. Khanmohammadi, L. Yeo, K. Hapgood</i>	
Women in Engineering: A Simple Mathematical Theory for the Rate of Adverse Experiences	1099
<i>K. Hapgood</i>	
Evaluation of Pilot Scale Drying of Lignite in a Keith Rotary Superheated Steam Dryer	1105
<i>S. Clayton, D. Desai, A. Hoadley</i>	
Callus Induction of Beet Root for Speed up Economical Plant Production	1114
<i>B. Wonganu</i>	
Oily Soil Detergency under Microemulsion Conditions: Effects of Hardness and Builder	1120
<i>A. Nakrachata-Amorn, P. Tanthakit, S. Chavadej, J. Scamehorn, C. Tongcumpou</i>	
Biosurfactant Production from <i>Pseudomonas aeruginosa</i> SP 4 Using Sequencing Batch Reactors	1127
<i>S. Maksung, S. Chavadej, R. Rujiravanit, M. Abe</i>	
Design and Commissioning of a Flight Unloading Device	1135
<i>A. Lee, P. Britton, P. Schneider, M. Sheehan</i>	
Fabrication of Matrix-Structured Microspheres through Break-Up of a Flow-Focused Laminar Water-In-Oil Emulsion Jet	1142
<i>Y. He</i>	
Formulation and Stability Evaluation of Surfactant-Free Water-in-(Highly Volatile) Oil Emulsions	1149
<i>Y. Jin, Y. He, N. Davies</i>	
Solids Transport Correlations in a Horizontal Rotating Drum with Segmented Lifters	1157
<i>I. Hwan, M. Martella, D. Zhang, H. Wu</i>	
DEM Simulations of the Effects of Lifters on Solid Mixing in a Rotating Drum	1163
<i>C. Jones, I. Hwan, D. Zhang, M. Martella, H. Wu</i>	
Passivity Based Operability Analysis for Unstable Processes	1171
<i>H. Santoso, J. Bao, Y. Kho, P. Lee</i>	
Isolation of Biosurfactant-Producing Bacteria: Effect of Carbon Source and Activity of Oil Recovery	1179
<i>N. Artaweepon, R. Rujiravanit, S. Chavadej, M. Abe</i>	
Supercritical Water Gasification Experiments on Sewage Sludge	1185
<i>D. Yamaguchi, P. Sanderson, L. Aye, S. Lim</i>	
Role of Temperatures-Sensitive Polymers in Solids Dewatering	1192
<i>H. Li, J. O'Shea, G. Franks</i>	
Determination of the Gel Point from the Fractal Dimension	1199
<i>S. Usher, Y. Zhou, G. Franks, P. Scales</i>	
Optimization of Ammonia Synthesis Reactor using Genetic Algorithm	1205
<i>A. Kavianiboroujeni, M. Sadeghi</i>	
Dynamic Simulation and Sensitivity Analysis of an Ammonia Synthesis Reactor	1214
<i>L. Azari, M. Sadeghi</i>	

Retrofit of Crude Distillation Unit Using Process Simulation and Process Integration.....	1220
<i>M. Shanazari, F. Shahraki, M. Khorram</i>	
Spreading of AKd and ASA on Wet Paper During the Curing Phase of Paper Sizing.....	1226
<i>M. Hudry-Clergeon, S. Champ, W. Shen</i>	
Solar-Thermal Splitting of Water Using a ZnO/Zn Thermochemical Cycle.....	N/A
<i>A. Weimer</i>	
Comparative Studies on Carbonate Mineral Decomposition using In-Situ High Temperature XRD.....	1232
<i>N. Subasinghe, S. Bhargava, D. Akolekar</i>	
The Influence of Thermal Oxidation on the Surface Chemical and Adsorbent Properties of Porous Silicon.....	1242
<i>K. Jarvis, T. Barnes, C. Prestidge</i>	
Drop Motion on Partially Wetted Powder Surfaces	1250
<i>K. Hapgood, W. Shen, S. Iveson, T. Nguyen</i>	
Dry Processing Using an Air-Magnetite Dense Medium in the Reflux Classifier.....	1258
<i>S. Macpherson, B. Moghtaderi, K. Walton, K. Galvin</i>	
Synthesis of One-Part Geopolymer Mixes	1264
<i>A. Hajimohammadi, J. Provis, J. van Deventer</i>	
Composition and Mechanical Properties of Polypropylene Montmorillonite Nanocomposites	1270
<i>M. Pannirselvam, I. Ivanov, S. Bhattacharya, R. Shanks</i>	
Preparation of Nanoporous Silicon Carbide Materials for High Temperature Gas Separation Applications	1276
<i>A. Maddocks, A. Harris</i>	
Designing Nanoparticles to Harness Solar Energy for Environmental Remediation.....	1284
<i>W. Teoh, R. Amal</i>	
Colloid-Inspired Virus Processing Cell-Free Reactors	1293
<i>Y. Chuan, D. Lipin, L. Lua, A. Middelberg</i>	
Rhodamine Extraction from Sawdust Waste of Swietenia Mahagoni and Shorea sp. and Extractor Design Parameters Determination	1298
<i>E. Rahayuningsih, H. Petrus, S. Pertiwi, S. Lastiningsih</i>	
Demonstration of Common History Behaviour using Growth of Bimodal Crystals	1310
<i>N. Iswanto, M. Hardin, T. White</i>	
Simulation of Radiata Pine Veneer Drying: Thermal Energy Consumption and Efficiency	1317
<i>J. Li, S. Pang, J. Bransfield</i>	
Development of a Tissue Creping Test Rig.....	1326
<i>J. Ho, B. Hutton, J. Proctor, W. Batchelor</i>	
An In-Situ Optical Microscopic Study of Sodium Nitrate Crystallisation.....	1333
<i>A. Rossiter, S. Freij, D. Zhang</i>	
Preparation of Porous Carbons from Phenol-Formaldehyde, Urea-Formaldehyde Resins and their Application	1341
<i>H. Yoshida, R. Hirayama, J. Hayashi, K. Muroyama</i>	

Acid Mist Formation in the Electrowinning of Copper.....	1346
<i>J. Liow, A. Frazer, Y. He, K. Eastwood, C. Phan</i>	
Nanoporous Silica Materials as Supports for Bioaffinity Separations.....	1354
<i>A. O'Connor, S. Boskovic, T. Turney, G. Stevens, M. Gee</i>	

VOLUME 3

A Parametric Study of Carbon Nanotube Synthesis in Fluidised Beds	1357
<i>K. MacKenzie, O. Dunens, C. See, A. Harris</i>	
Thermal Cracking of Glycerol to Liquid Fuels on the Tubular Reactor	1367
<i>W. Charusiri, J. Ubonwat</i>	
Impregnation of Silver Nanoparticles into Bacterial Cellulose as Antimicrobial Wound Dressing.....	1378
<i>T. Maneerung, S. Tokura, R. Rujiravanit</i>	
Photocatalytic Production of Hydrogen from Water over Pt/N-Doped Titania under Visible Light Irradiation	1385
<i>S. Laehsalee, T. Sreethawong, S. Chavadej, S. Yoshikawa</i>	
Methacrolein Formation over Cesium Containing Oxidation Catalysts.....	1393
<i>S. Kendell, T. Brown, R. Burns</i>	
Chromium Uptake on Speciation and Phytotoxicity Using Hydroponics by Aquatic Plants	1399
<i>P. Sampanpanish, K. Tippayasak</i>	
Mechanism of Non-Coalescence for Liquid Droplets at the Air-Liquid Interface.....	1406
<i>M. Khan, D. kannangara, W. Shen, G. Garnier</i>	
Speciation and Modelling of Toxic Trace Elements in Australian Coal Fired Power Stations	1415
<i>P. Shah, V. Strezov, P. Nelson</i>	
Rigorous Control of Environmental Parameters in a Biofilter Using a Differential Reactor.....	1423
<i>A. Beuger, P. Gostomski</i>	
Formation Mechanism of Mesoporous Silica Microsphere in the Presence of Dodecylamine as Template and Catalysis	1429
<i>K. Tada, T. Hirao, T. Kitaura, Y. Iwashita, S. Tanaka, Y. Miyake</i>	
0273 Preparation and Application of Mesoporous Silica Materials with Reversed MCM-41 Nano-structure.....	1435
<i>M. Asada, Y. Hara, Y. Kuroda, S. Tanaka, S. Araki, Y. Miyake</i>	
Amino-Functionalized Silica Membrane for Pervaporation of Ethanol/Water Mixtures	1441
<i>S. Araki, T. Satoh, H. Doi, H. Yano, Y. Miyake</i>	
Functionalization of Ultrafine Particles by Atomic Layer Deposition	1446
<i>D. King, J. Spencer II, X. Liang, L. Hakim, A. Weimer</i>	
The Relationship Between the Performance and Surface Energy of Salmeterol Xinafoate Powders for Inhalation during Long Term Storage at Different Relative Humidity.....	1466
<i>S. Das, I. Larson, P. Young, P. Stewart</i>	

Preparation of Zeolite from Ordered Mesostructured Carbon-Silica Nanocomposites	1473
<i>S. Tanaka, C. Yuan, Y. Miyake</i>	
Women in Engineering - The Challenges of Part Time Working in Engineering Design	1479
<i>A. Hosey</i>	
Thermo-Rheological Characteristics of Low-Density Polyethylene (LDPE)/Linear Low-Density Polyethylene (LLDPE) Blends and their Processibility in the Blown Film Extrusion	1487
<i>K. Kanti Majumder, G. Hobbs, Y. Ding, S. Bhattacharya</i>	
Degradation of VOCs Using a Photoreactor with Glass-Supported TiO₂ and Ozone Addition.....	1493
<i>O. Park, K. Kim, I. Jung</i>	
Hydrogen Network Retrofit in Oil Refineries, Part I: Without Capital Investment Limitation	1498
<i>M. Amidpour, M. Jafarinaser, R. Salary</i>	
Relating Froth Vision to Cell Operating Performance in Industrial Flotation Plants	1504
<i>E. Wightman, M. Zanin, J. Franzidis, S. Grano</i>	
Mechano-Activated Surface Modification of Calcium Carbonate Particles in Aqueous Medium	1510
<i>H. Ding, Y. Deng, G. Du</i>	
Research on Effects of Grinding Aids in Wet Ultrafine Grinding of Mineral	1516
<i>H. Ding, Y. Deng, G. Du</i>	
Drying Applications for the Reflux Classifier	1521
<i>M. McKay, B. Moghtaderi, K. Galvin</i>	
TiRO™ - The Development of a New Process to Produce Titanium.....	1530
<i>C. Doblin, G. Wellwood</i>	
Use Of The Foam Drainage Equation to Model Water Flow in Flotation Froth.....	1537
<i>A. Randriamananjosa, S. Grano</i>	
Froth Stability as a Performance Indicator in Sulphide Minerals Flotation Plants	1544
<i>M. Zanin, E. Wightman, S. Grano, J. Franzidis</i>	
Optimising Configurations for Enhanced Performance of Adsorptive Reactors	1552
<i>S. Rawadieh, V. Gomes</i>	
Group-Work and Assessment in Problem-Based Learning	1560
<i>V. Gomes, H. See</i>	
Investigation of Laboratory Scale Absorption of CO₂ in a Packed Column using Aqueous K₂CO₃ and MEA.....	1567
<i>A. Khan, M. Simioni, S. van Zijl de Jong, S. Kentish, G. Stevens</i>	
Application of Discrete Particle Simulation to Flow in a Screen Deck Transfer Chute	1575
<i>B. Wright, D. Pinson</i>	
Natural Organic Matter Oxidation by TiO₂ Photocatalytic Process: Molecular Weight Characterisation Study.....	1583
<i>M. Lim, K. Chiang, R. Amal, R. Fabris, C. Chow, M. Drikas</i>	
Improved Treatment of the Softening-Melting Zone in an Ironmaking Blast Furnace Model.....	1589
<i>D. Maldonado, S. Chew, A. Yu</i>	

Effect of Initial Packing Condition on Nanoparticle Fluidization	1598
<i>F. Rahman, X. Wang, M. Rhodes, A. Weimer</i>	
Entrainment of Nanoparticles in a Fluidized Bed	1607
<i>X. Wang, V. Palero, J. Soria, A. Weimer, M. Rhodes</i>	
Preparation and FTIR Study of Organo-Zeolite for the Removal of Phosphate in Greywater.....	1613
<i>N. Widiasuti, H. Wu, H. Ang, D. Zhang</i>	
Preparation of High Porous Chitosan Microspheres with a Sulfur Ligand and its Application to Recovery of Precious Metals	1621
<i>Y. Baba, Y. Kanai, T. Oshima</i>	
Orica's Groundwater Treatment Plant and Use of Renewed Water at Botany NSW	1628
<i>M. Selleck, J. Lear, F. Barendregt, T. Taylor-Evans, S. Corish, S. Huo, C. Wiley</i>	
The General Properties of Nanoparticles Distributions.....	1641
<i>N. Sokolov</i>	
Disperse Particle Separation Scientific Law	1644
<i>N. Sokolov</i>	
On the Pseudo-Dynamic Modelling of an Alumina Refinery Residue Lake System.....	1652
<i>M. Lee, G. Tindall, C. Elms</i>	
The Teaching of Process Control at Undergraduate Level	1657
<i>L. Alban</i>	
Effect of Mixing Speed and Time on Dispersion of Cohesive Drug Powder Mixtures Measured During Drug Dissolution.....	1663
<i>K. Kale, K. Hapgood, P. Stewart</i>	
Options for New Capacity in Australian Electricity Generation.....	1673
<i>D. Brennan</i>	
Techno-Commercial Importance of Polyethylene Naphthalate.....	1681
<i>R. Padhye, R. Gupta, N. Momin, K. Sinnappoo</i>	
Assisted Fluidization of Nanoparticles through Gas-Phase Pulsation	1690
<i>A. Akhavan, F. Rahman, X. Wang, M. Rhodes</i>	
Oxo-Biodegradation of Polyethylene by <i>pseudomonas aeruginosa</i>.....	1698
<i>M. Reddy, M. Deighton, R. Gupta, S. Bhattacharya, R. Parthasarathy</i>	
Predicting Nuclei Size Distributions in Wet Granulation Using Dimensionless Spray Flux.....	1705
<i>K. Hapgood, M. Tan, D. Chow</i>	
Scaffolding First-Year Chemical Engineering Course with Project-Based Assessment	1714
<i>E. Quah, C. Wardjiman, M. Rhodes</i>	
Innovative Engineering Design in Circulating Fluid Bed Technology	1719
<i>S. Sneyd, I. Sidorenko, A. Orth, M. Laumann</i>	
Detection of Bubbling Onset in Fluidized Beds Using the Standard Deviation of Bed Pressure Drop.....	1725
<i>C. Davies, D. Krouse, A. Carroll</i>	
The Design, Construction, Installation and Commissioning of a Large Scale Cell Culture Facility	1730
<i>J. Dinatale, L. Bartels, J. Keane, A. Stowers</i>	

Multivariable Constraint Control at Esso Australia's Gippsland Operational Facilities	1731
<i>M. Vines</i>	
Application of Best Practices and Innovation in the Safe Execution of Brownfield Modifications to the Esso Australia Pty Ltd/BHP Milliton Bass Strait Facilities	1738
<i>D. McCleane, B. Kewish</i>	
Innovation in Fuels and Chemicals Production Offshore	1744
<i>J. Robert</i>	
Photoelectrocatalytic Activity of Mesoporous Thin Film TiO₂ Electrodes	1755
<i>W. Gan, M. Lee, K. Chiang, R. Amal, S. Zhang, H. Zhao</i>	
Estimation of Effective Heat Transfer Coefficient for Spherical Particles in a Vertical Airlift Conveyor	1763
<i>C. Davies, R. Davies</i>	
Introducing Quantitative Life Cycle Analysis into the Chemical Engineering Curriculum	1769
<i>G. Evans, K. Galvin, E. Doroodchi</i>	
Critical Issues Facing Engineering Education and Research	1777
<i>R. Williams</i>	
Creation of Capsules and Droplets Using High Throughput Manufacturing Methods	1786
<i>R. Williams, Q. Yuan, N. Aryanti, S. Biggs</i>	
Blow Tester Results Compared to Jenike Cell Shear Tester Results	1795
<i>A. Paterson, X. Wang</i>	
Improving the Permeability of Sewage Sludge by Conditioning with Lignite	1802
<i>K. Thapa, E. Qi, S. Clayton, A. Hoadley</i>	
Academia and Business Collaboration: A New Priority for Higher Education	1811
<i>D. Hind</i>	
¹⁷O MQMAS NMR Characterisation of Geopolymers	1822
<i>P. Duxson, J. Gehman, C. White, J. Provis, F. Separovic, Z. Gan, J. van Deventer</i>	
Geopolymer Technology and its Role in a Sustainable Concrete Industry	1824
<i>J. van Deventer, J. Provis, P. Duxson, G. Lukey</i>	
Hydrothermal Synthesis of FeNi₂S₄, a Thiospinel	1826
<i>F. Xia, A. Pring, Y. Ngothai, B. O'Neill, J. Brugger, G. Chen, C. Colby</i>	
Development and Deployment of an Immersive Learning Environment for Enhancing Process Systems Engineering Concepts	1833
<i>C. Norton, I. Cameron, C. Crosthwaite, N. Balliu, M. Tade, A. Hoadley, G. Barton</i>	
Colloid Forces Between Silica Surfaces in Alum Solutions	1849
<i>B. Donose, A. Nguyen, G. Evans, Y. Yan</i>	
Nanoscale Friction Forces Between Hydrophobic Surfaces	1855
<i>M. Hampton, B. Donose, A. Nguyen</i>	
Effect of Surfactant Adsorption and Surface Properties on Emulsion Film Drainage	1861
<i>S. Karakashev, A. Nguyen, G. Evans</i>	
The Mechanism of Pentlandite Oxidation in the Temperature Range 530-600° C	1869
<i>F. Xia, A. Pring, Y. Ngothai, B. O'Neill, J. Brugger, G. Chen, C. Colby</i>	

The Kinetics of Pentlandite Oxidation in the Temperature Range 530-600° C	1878
<i>F. Xia, A. Pring, Y. Ngothai, B. O'Neill, J. Brugger, G. Chen, C. Colby</i>	
The Catalytic Role of Pyrrhotite in Hydrothermal Alteration of Pentlandite to Violarite	1886
<i>F. Xia, A. Pring, Y. Ngothai, B. O'Neill, J. Brugger, G. Chen, C. Colby</i>	
The Casino Pipeline - Prediction and Performance	1893
<i>S. Henzell, N. Smith</i>	
Guidelines for a Motor Driven Centrifugal Compressor Package Specification	1902
<i>K. Chinthamani</i>	
The Jet Pump Experience: Increased Production from Ageing Assets	1915
<i>J. Hargreaves</i>	
Petroleum Hydrocarbon Remediation in Antarctica; the Use of Permeable Reactive Barriers's	1921
<i>G. Stevens, K. Mumford, I. Snape, D. Gore, J. Rayner</i>	
Protein Aggregation: the Good, the Bad and the Ugly	1931
<i>S. Gras</i>	
Fungal Biodegradation of NOM Concentrate from MIEX™ Resin	1936
<i>M. Lee, F. Roddick, J. Harris</i>	
On Techniques of Food Powder Reconstruction Measurements	1942
<i>Y. Fang, C. Selomulya, X. Chen</i>	
Bromelain Precipitation Temperature Control: Development and Experimental Testing	1950
<i>R. Santos, T. Fujiki, M. Leite, F. Silva, A. Fileti</i>	
A Personal Approach from a Female Engineer on Career Issues	1957
<i>B. Husband</i>	
Altona Refinery Clean Fuels Venture	1958
<i>R. Purcell, B. Hons</i>	
Synthesis of Zeolite Nanocrystals in Polymer Hydrogels	1964
<i>J. Yao, L. Han, H. Wang</i>	
A DSC Study of Thermal Properties of Rice	1967
<i>J. Sharma, M. Jollands, M. Allan, D. Small, S. Rolfe</i>	
Inactivation of PPO, POD and Colour Changes During Microwave Heating Treatment on Sugarcane	1973
<i>Z. Zhao, S. Yu, X. Zeng, X. Fu, H. Qin</i>	
Coordination Mode of Hesperidin with Cu(II) and the Antioxidation Mechanism of Hesperidin	1982
<i>S. Zhu, S. Yu, X. Zeng, X. Fu</i>	
Secondary Treatment of Molasses Stillage with Chitosan	1989
<i>S. Zhu, S. Yu, X. Zeng, X. Fu</i>	
Bioremediation of Chemical Pesticides - A Novel Enzymatic Approach	1994
<i>S. Gupta, H. Nguyen</i>	
The Effect of Composition on the Physical Properties of a Meat Batter System Related to RF and MW Thermal Process	2007
<i>L. Zhang, J. Lyng</i>	
Chemical Engineering in Bioengineering and Bionanotechnology	2019
<i>N. Peppas</i>	

Neutron and Synchrotron Science: World Class Science in Your Own Backyard	N/A
<i>M. James</i>	
"Networking Innovation" Successful Collaborations between Industry, Academia and Government.....	2020
<i>M. Dureau</i>	
Food Process Engineering: Running to Stand Still	2021
<i>I. Wilson</i>	
Barbarians at the Gate: Curricular Challenges in Chemical Engineering Education	2022
<i>E. Cameron</i>	
Exploring the Union of Membranes and Nanotechnology in Water Production	2023
<i>E. Hoek</i>	
Reducing the Rate Limiting Step in Chemical Engineering Growth.....	2024
<i>C. Grant</i>	
There is no Single Answer - Why Innovation and Applied Technology is Key to Meeting our Future Energy Needs	2025
<i>G. Lewin</i>	
Engineers in the Boardroom?	2026
<i>J. McIlvenny</i>	
The Energy Climate Balance.....	2027
<i>M. Nolan</i>	
Water Conservation in Cooling Tower Systems of Industrial and Commercial Customers of Yarra Valley Water	2028
<i>M. Loughrey, A. Hoadley</i>	
Genos Formation and Ownership by China National Chemical Company - A Case Study	2038
<i>R. McCann</i>	
Doing Engineering Leadership Differently.....	2039
<i>A. Sinclair</i>	
Future Directions for Chemical Engineering	N/A
<i>D. Brown</i>	
ANSTO - Advancing Australian Industry	2040
<i>N. Chapman</i>	
Plenary Session 8	N/A
<i>T. Sridhar</i>	
CO2CRCis Geosequestration Progress.....	N/A
<i>B. Hooper</i>	
ANSTO - Advancing Australian Industry	N/A
<i>N. Chapman</i>	
Genetically Modified Plants	N/A
<i>K. Calderwood</i>	

Author Index