

Particle Technology Forum 2018

Core Programming Area at the 2018 AIChE Annual Meeting

Pittsburgh, Pennsylvania, USA
28 October - 2 November 2018

ISBN: 978-1-5108-7630-9

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© (2018) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2019)

For permission requests, please contact AIChE
at the address below.

AIChE
120 Wall Street, FL 23
New York, NY 10005-4020

Phone: (800) 242-4363
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: 845-758-2633
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

(9b) Development of Nanoparticle Alignment Regimes in Drying Cellulose Nanocrystal Droplet Suspensions for Additive Manufacturing	1
<i>Michael J. Bortner, Cailean Pritchard, Maren Roman</i>	
(9c) Characterization of Poly(ether imide) Towards the Development of a Fused Filament Fabrication (FFF) Process Model	2
<i>Eric L. Gilmer, Craig D. Mansfield, Donald G. Baird, Michael J. Bortner</i>	
(9d) Additive Manufacturing of Core-Shell Microparticles Containing Thermosetting Resins	3
<i>Guozhen Yang, Mengfei Huang, John Klier, Jessica D. Schiffman</i>	
(9e) Supersonic-Impaction Printing of Flame-Made Doped-Perovskite Nanoparticles	4
<i>Souvik Ghosh, Eirini Goudeli, Chenxi Li, Bernard Olson, Christopher J. Hogan Jr.</i>	
(9f) Simulating Powder Handling Processes in Additive Manufacturing Using the Discrete Element Method	5
<i>David Curry, Carles Bosch Padros</i>	
(56a) 3D Printed Complex Dosage Forms Embedded with Engineered BCS Class II Drug Particles	6
<i>Guluzar Gorkem Buyukgoz, Marian Abdelmalak, Rahul Kapoor, Jeremiah Castro, Shen Ji, Scott Quirie, Murat Guvendiren, Rajesh Dave</i>	
(56b) 3D Printing for Rapid Prototyping of Innovative Process Equipment for Pharmaceutical Crystallization	7
<i>Kiran Mathew Thomas, Dong Ik Shin, Richard Lakerveld</i>	
(56c) Direct Write of UV Curable Polymer Bonded Magnets	8
<i>Alan Shen, Anson Ma, Sameh Dardona, Callum Bailey</i>	
(56d) Before You Click "Print": Regulatory Considerations for 3D Printed Oral Drug Products	9
<i>Ahmed Zidan, Alaadin Alayoubi, James Coburn, Bahaa Ghamraoui, Celia N. Cruz, Muhammad Ashraf</i>	
(56e) Two-Color Photo-Inhibited Systems for Rapid Additive Manufacturing	10
<i>Martin De Beer, Harry Van Der Laan, Riley Whelan, Timothy F. Scott, Mark A. Burns</i>	
(56f) Glass-Forming Polymer Networks for Shape-Memory Contact Printing	11
<i>Mitchell Anthamatten, Xinquan Chen, Dezhi Liu</i>	
(71a) High Resolution Nanoparticle Sizing with Maximum a Posteriori Nanoparticle Tracking Analysis (MANTA)	12
<i>Kevin Silmore, Xun Gong, Michael Strano, James Swan</i>	
(71b) Core-Shell Graphene/Silicon Nanoparticles for Use As Lithium-Ion Battery Anodes	13
<i>M. Silvana Tomassone, Kurt B. Smith</i>	
(71c) Multiparameter Paramagnetic Particle Characterization By Dark-Field Imaging	14
<i>Abhinav Sannidhi, Paul W. Todd, Thomas R. Hanley</i>	
(71d) Numerical Study of the Evolution of Particle Size and Morphology in an Industrial Titanium Dioxide Reactor	25
<i>Astrid Boje, Markus Kraft</i>	
(71e) Multiscale Modelling and Simulation of Particle Formation through Mono-Disperse Droplet Spray Drying	26
<i>Jie Xiao, W. D. Wu, X. D. Chen</i>	
(71f) Atomic Structure and Stress Release Mechanism of Core-Shell Au-Pd Nanocubes	27
<i>Michael Nathanson, Krishan Kanhaiya, Hendrik Heinz</i>	
(71g) Development and Application of a Computer Simulation Package for Wet Bead Milling of Nanoscale Pharmaceutical Particles Using Population Balance and Fundamental Principles	28
<i>Husheng Yang</i>	
(71h) Quantitative Study of Conduction and Convection Heat Transfer Mechanisms in a Rotary Drum	29
<i>Manogna Adepu, Heather N. Emady</i>	
(87h) Development of a Continuum Model for Predicting Particle Segregation in Industrial Particulate Flows	30
<i>Yi Fan</i>	
(87a) Effect of Cohesion on Gas Residence Time Distribution in Fluidized Beds	31
<i>Jari Kolehmainen, Ali Ozel, Yundi Jiang, Sankaran Sundaresan</i>	
(87b) Drag Models and Their Validation: Unanswered Questions from the Past and Targeting Future Validation	32
<i>Casey Q. Lamarche, Ben Freireich, Ray Cocco</i>	
(87c) Assessment of Mesoscale Solid Stress in Coarse Grid TFM Simulation of Geldart a Particles in All Fluidization Regimes	33
<i>Xi Gao, Tingwen Li, William A. Rogers</i>	
(87d) Structured Bubbling Fluidized Beds: Nucleation and Self-Arrangement Under Pulsation	34
<i>Victor Francia, Kaiqiao Wu, Marc-Olivier Coppens</i>	
(87e) Cluster-Induced Deagglomeration in Unbounded Fluidization of Cohesive Particles	35
<i>Peiyuan Liu, Christine M. Hrenya</i>	
(87f) Discrete Particle Model for Non-Spherical Large Objects in Dense Gas-Solid Flows	36
<i>Yuya Sakamoto, Takuya Tsuji, Kimiaki Washino, Toshitsugu Tanaka, Koshi Uemoto, Shusaku Harada, Shunsuke Kato, Jun Oshitani, Hirokazu Kajiwara, Kei Matsuoka</i>	
(375t) Influence of Model Parameters on Runtime and Accuracy of CFD-DEM Simulations of a Prismatic Spouted Bed	37
<i>Thomas Eppinger, Leonard Becker, Felix Klippel, Oleh Baran, Ravindra Aglave</i>	

(94a) Flow Behavior of Particulate Pine Forest Residues and Corn Stover: A Comparison of Experiments and Simulations	38
<i>Tyler L. Westover, Yidong Xia, Kunal S. Pardikar, Jordan Klinger, Sergio Hernandez, Hai Huang, Carl Wassgren</i>	
(94b) Flow Rate Interference Effects in a Silo with Two Openings	39
<i>Luke Fullard, Eric Breard, Clive E. Davies, Jonathan Godfrey</i>	
(94c) Dissolution of Polymer Particulate Systems: Population Ensemble Modeling	40
<i>Mohammad Ghasemi, Marina Tsianou, Paschalis Alexandridis</i>	
(94d) Benchmarking a Novel 0-D Model Against Data from Two-Fluid Model Simulations of a Wet Fluidized Bed	41
<i>Stefan Radl, Maryam Askarishahi, Mohammad-Sadegh Salehi</i>	
(94e) Scale up Studies of Dry Catalyst Impregnation for Improved Content Uniformity Using Simulations and Experiments	42
<i>M. Silvina Tomassone, Yangyang Shen, William G. Borghard, Sai Sasidhar Guduru, Deval Sharma, Matthew Borsellino</i>	
(94f) Dense Packing of Cell Monolayers: Jamming of Deformable Polygons	43
<i>Arman Boromand, Corey S. O'Hern, Mark D. Shattuck, Fangfu Ye</i>	
(94g) Blend Uniformity Prediction Based on Discrete Element Method	44
<i>Shuichi Tanabe, Srikanth R. Gopireddy, Shuichi Ando, Hidemi Minami, Nora A. Urbanetz, Regina Scherlieb</i>	
(94h) One-Way Coupled CFD-DEM Analysis of Particulate Flows in a Monodose Dry Powder Inhaler	46
<i>Yu Liu, Ariel Muliadi, Lucilla Almeida, Carl Wassgren, Rahul Bharadwaj, Edward Yost, Ajit Narang</i>	
(123a) Nano- and Microfabricated Hydrogels for Regenerative Engineering	47
<i>Ali Khademhosseini</i>	
(123b) Commercial Scale Manufacturing of a Pharmaceutical Product Using Powder-Liquid 3D Printing Technology	48
<i>Timothy Tracy</i>	
(123c) Closing the Circle on Design, Hardware, and Materials for Additive Manufacturing	49
<i>Nathan Wilmot</i>	
(123d) Additive Manufacturing and Architected Materials	50
<i>Christopher Spadaccini</i>	
(143a) A DEM Study of Shear Flows of a Binary Mixture of Non-Spherical Particles	51
<i>Jiecheng Yang, Yu Guo, Jennifer S. Curtis</i>	
(143b) Comparisons of Continuum FEM Models of Hopper Flow of Particulate Materials to Experimental Measurements	52
<i>Kunal S. Pardikar, Carl R. Wassgren, Tyler L. Westover</i>	
(143c) Development of a Coupled CFD - DEM Simulation Method for a Tablet Coating Process	53
<i>Peter Bohling, Wen-Kai Hsiao, Frederik Detobel, James Holman, Matthew Metzger, Laura Wareham, Johannes G. Khinast</i>	
(143d) Implementation of a Non-Local Granular Fluidity Model in Openfoam for Simulation in Arbitrary 3D Geometries	54
<i>Jonathan J. Stickel, Hariswaran Sitaraman, James J. Lischeske, Mohammad Rahimi</i>	
(143e) Multi-Scale Modelling of Biomass Gasification: The Effects of Intraparticle Transfer on Syngas and Biochar Production	55
<i>Zhiyi Yao, Avi Uzi, Tiansu Ge, Chi-Hwa Wang</i>	
(143f) Coarse-Grained Discrete Element Model for Powder Shear Flow	56
<i>Hideya Nakamura, Hiroharu Takimoto, Shuji Ohsaki, Satoru Watano</i>	
(143g) Numerical and Experimental Studies of Granular Materials in the Quasi-Static Regime	57
<i>Lyes Ait Ali Yahia, Riccardo Maione, Ali Ozel, Raffaella Ocone</i>	
(150a) Experimental Observation of the Initial Stages of Localized Fluidization	58
<i>Sarah E. Mena, Florian Brunier, Jennifer S. Curtis, Pierre Philippe</i>	
(150b) Bubbles Distribution in a 0.6-m-Diameter Disk and Donut Fluidized Bed Stripper	59
<i>Allan Issangya, S. B. Reddy Karri, T. M. Knowlton, Ray Cocco, Ben Freireich</i>	
(150c) Magnetic Resonance Imaging of Injected Bubble and Jet Dynamics in Fluidized Beds	60
<i>Christopher M. Boyce, Alexander Penn, Maxim Lehnert, Klaas P. Pruessmann, Christoph R. Muller</i>	
(150d) Experimental Validation of Indirect Conduction Model and Biot Number Analysis for Wall-to-Particle Heat Transfer	61
<i>Ipsita Mishra, Aaron Lattanzi, Aaron Morris, Christine M. Hrenya</i>	
(150e) Heat Transfer Measurement and Modelling in a Fluidized Bed with Pulsed Gas Flow	62
<i>Dening Jia, Xiaotao Bi, C. Jim Lim, Shahab Sokhansanj, Atsushi Tsutsumi</i>	
(150f) Behavior of Nanosized TiO₂ Catalyst in a Microjet and Vibration Assisted Fluidized Bed	63
<i>Keju An, Jean M. Andino</i>	
(150g) Identification and Characterization of Meso-Scale Flow Structure in the Dense Gas-Solid Flow in a Fluidized Bed	70
<i>Li Niu, Mengxi Liu, Zhimin Chu</i>	
(150h) Kutta-Joukowski Force: The Radial Distribution of Particles Concentration in a Riser	77
<i>Yiping Fan, Chen Li, Mengxi Liu, Chunxi Lu</i>	
(170a) Insights from Microhydrodynamic Modeling of Nanomilling in a Wet Stirred Media Mill	84
<i>Ecevit Bilgili, Paulina Alvarez, Naveen Yaragudi, Meng Li, Afolawemi Afolabi</i>	
(170h) Recent Advances in the Modeling of Non-Linear Particle Breakage	85
<i>Ecevit Bilgili</i>	
(170c) Surface Dynamics of Micronized Active Particles	86
<i>Vibha Puri, Jag Shur, Robert Price, Ajit Narang</i>	
(170d) An Investigation into the Performance of an Industrial-Scale Roll Mill	89
<i>Karl Jacob, James F. Koch, Ben Freireich, Madhusadhan Kodam</i>	

(170i) Are Low Molecular Weight Polymers Really Effective for Stabilization of Wet-Milled Drug Suspensions?	90
<i>Mahbubur Rahman, Danny Palacios, Faustín Arevalo, Ecevit Bilgili</i>	
(170f) Attrition in Submerged Jetting Region in Fluidized Bed	91
<i>Yeook Arrington, Ben Freireich, Reddy Karri, Ray Cocco</i>	
(170g) Dust Dispersion Particle Breakage: Classification Based on Brittleness Index	92
<i>Pranav Bagaria, Qiang Li, Ashok G. Dastidar, Chad Mashuga</i>	
(205a) Compartmental Modeling and Simulation Study of Wet Twin Screw Granulator	93
<i>Gurmeet Kaur, Themis Matsoukas, Mehakpreet Singh, Jitendra Kumar</i>	
(205b) Developing a Formulation Dependent Mechanistic Kernel to Predict the Granule Size Distribution in a Two Component High Shear Wet Granulation Process	94
<i>Indu Muthancheri, Rohit Ramachandran</i>	
(205c) A Model-Based Design of Experiment (MB-DOE) Approach Towards Scale-up of High Shear Wet Granulation Operation	95
<i>Maitraye Sen, Salvador Garcia-Munoz</i>	
(205d) A Population Balance Based Rheological Model for Fresh Cement Paste	96
<i>Juan Pablo Gallo-Molina, Ingmar Nopens, Karel Lesage</i>	
(205e) Agglomeration-Driven Product Selection in a Continuously Operated Fluidized-Bed Crystallizer	97
<i>Andreas Voigt, Viktoria Wiedmeyer, Kai Sundmacher</i>	
(205f) Roller Compaction Modelling: Pharmaceutical Application	98
<i>Ricardo Sousa, Slavomira Doktorovova, Vanessa Sainz, Pedro Valente, Jean-Rene Authelin, Lionel Bardet</i>	
(205g) Anisotropic Mechanical Properties of Compacted Powders with Cohesive Contacts	101
<i>Peter Loidolt, Johannes G. Khinast</i>	
(213a) Development of CFD-DEM Coupling Model for Particles-Liquid-Gas Flow	102
<i>Kimiaki Washino, Tetsushi Kaji, Yoshiaki Matsuno, Ei L. Chan, Takuya Tsuji, Toshitsugu Tanaka</i>	
(213b) Meso-Scale Nonequilibrium Characteristics in a Bubbling Fluidized Bed	103
<i>Haifeng Wang, Yanpei Chen, Wei Wang</i>	
(213c) Development of Drift Velocity Transport Equation for Filtered Drag Force Model	104
<i>Yundi Jiang, Ali Ozel, Jari Kolehmainen, Yannis G. Kevrekidis, Sankaran Sundaresan</i>	
(213d) Numerical Study on a Gas-Solid Flow in an Arbitrary Shape Boundary Including Thin Plates	105
<i>Kazuya Takabatake, Mikio Sakai</i>	
(213f) Catalytic Propane Oxidative De-Hydrogenation with High Propylene Selectivity in a Downer Fluidized Bed Reactor: Kinetics and CPFD Simulation	106
<i>Samira Rostom, Imtiaz Ahmed, Hugo De Lasa</i>	
(213g) An Orthogonal Recursive Bisection (ORB) Based Time Advancement Algorithm for CFD-DEM Solvers	107
<i>Hariswaran Sitaraman, Ray Grout</i>	
(213h) Effect of Collision Angle on Particle-Particle Adhesion of Colliding Particles through Liquid Droplet	108
<i>Hideya Nakamura, Hiroyuki Kan, Satoru Watano</i>	
(224a) Spatially-Averaged Models for Heat Transfer in Gas-Solid Flows	109
<i>Stefanie Rauchenzauner, Simon Schneiderbauer</i>	
(224c) Effect of Baffles on the Rate of Heat Transfer in Rotating Drums	110
<i>Bereket Yohannes, Calvin Kim, William G. Borghard, Fernando. J Muzzio, Benjamin Glasser, Alberto M. Cuitino</i>	
(224e) A Novel Approach for Radiative Thermal Exchange in Coupled Particle Simulations	111
<i>Thomas Forgber, Johannes G. Khinast, Stefan Radl</i>	
(224f) Experimental Studies of Thermal Properties of Packed Powder Beds	112
<i>Anna Nachtigal, Calvin Kim, Bereket Yohannes, Fernando. J Muzzio, William G. Borghard, Benjamin Glasser, Alberto M. Cuitino</i>	
(224g) Particle Dynamic Simulations of Heat Transfer in a Bladed Mixer: Effect of Material and Process Parameters	113
<i>Clara Hartmanshenn, Benjamin J. Glasser</i>	
(252a) Synthetic and Compositional Control of Multicomponent Copolymers to Promote Drug Solubility and Bioavailability	114
<i>Theresa M. Reineke</i>	
(252b) Nanocellulose Gels As a Flexible, High Surface Area Material for Crystallizing Pharmaceuticals	115
<i>Blair Kathryn Brettmann</i>	
(252c) Controlling the Particle Morphology of Spray Dried Poly(methacrylic acid-co-methyl methacrylate) (Eudragit L100) Polymer	116
<i>Kimberly B. Shepard, Michael Morgen</i>	
(252d) Application of Fundamental Relationships and Models to Predict Spray-Dried Dispersion Particle Size	117
<i>John Baumann, Alyssa Ekdahl, Chris Craig</i>	
(252e) Improving Spray Drying Processing through Modeling and Characterization	118
<i>Pavithra Sundararajan</i>	
(252f) Mechanistic Approach to Predict Amorphous Solid Dispersion Thermal Degradation in Spray Drying Processes	119
<i>G. Poeiras, Tiago Porfirio, C. S. Couto, J. Pereira, Rui C. Silva, I. Duarte, M. D. Afonso, J. Vicente</i>	
(252g) Downstream Processing of a Ternary Amorphous Solid Dispersion: The Impacts of Spray Drying and Hot Melt Extrusion on Powder Flow, Compression and Dissolution	122
<i>Mark Davis, Catherine Kelly, Gavin Walker</i>	
(267a) Intrusive Probes in Riser Applications	144
<i>Ray Cocco, Reddy Karri, T. M. Knowlton, John Findlay, Thierry Gauthier, Christine Hrenya, Jia Wei Chew</i>	

(267b) Non-Intrusive Measurement and Imaging of Circulating Fluidized Beds Using Electrical Capacitance Volume Tomography	145
<i>Cody Park, Yaswanth Pottimurthy, Tien-Lin Hsieh, Benjamin Straiton, Mingyuan Xu, Dawei Wang, Qussai Marashdeh, Liang-Shih Fan, Andrew Tong</i>	
(267c) Method of Estimating the Solids Mass Flow Rate in a Gas-Solids Riser Using the Integrated Mixture Momentum Equation and the Dynamic Pressure Gradient Distribution	146
<i>John Paccione</i>	
(267d) Influence Parameters and Modeling of Solids Circulation Rate in the High-Density Circulating Fluidized Beds	147
<i>Xin Su, Chengxiu Wang, Xingying Lan, Jinsen Gao</i>	
(267e) Full-Loop Simulation of Gas-Solids Flow in Circulating Fluidized Beds with Different Sizes	148
<i>Min Wang, Yingya Wu, Xiaogang Shi, Xingying Lan, Jinsen Gao</i>	
(267f) A Very, Very Small-Scale Experiment of Fluidized Particle Segregation: A Prerequisite for the Uncertainty Quantification of CFD-DEM Simulations	149
<i>Casey Q. Lamarche, Steven R. Dahl, William Fullmer, Christine M. Hrenya</i>	
(267g) Modeling the Hydrodynamics of Tapered Gas-Solid Risers	150
<i>Xinhua Liu, Meng Zhao, Shanwei Hu, Wei Ge</i>	
(267h) Validation Study on an Eulerian-Lagrangian Method in a Circulating Fluidized Bed	151
<i>Yuki Mori, Mikio Sakai</i>	
(298a) Carrier Based Dry Powder Inhaler Formulation - a Particle Engineering Perspective	152
<i>Joana T. Pinto, Sarah Zellnitz, Eva Roblegg, Amrit Paudel</i>	
(298b) Spray-Dried Nanocomposites and Amorphous Solid Dispersions with Identical Formulation for Comparative Assessment of Drug Dissolution Enhancement	155
<i>Mahbubur Rahman, Alexander Coelho, Sayali Bhujbal, Faustin Arevalo, Ecevit Bilgili</i>	
(298c) Fabrication of Biodegradable Rod-Shaped Drug Carriers with Modified Two-Step Emulsion Solvent Evaporation Technique	156
<i>Hanieh Safari, Reheman Adili, Michael Holinstat, Omolola Eniola-Adefeso</i>	
(298d) Surface Engineering of Lactose Particles By Atomic Layer Deposition for Modified Release	157
<i>Damiano La Zara, Di Zhang, Mike J. Quayle, Gunilla Petersson, Staffan Folestad, J. Ruud Van Ommen</i>	
(298e) Improving Blend and Tablet Properties of Binary Mixtures Containing Cohesive and Poorly-Compactable APIs Using Surface Engineered MMC Based Fine Excipients	158
<i>Liang Chen, Xiaoyi Ding, Siqi Fan, Zizhou He, Rajesh Dave</i>	
(298j) Fast, Immediate Drug Release from High Drug-Loaded Spray-Dried Nanocomposites: Criticality of Polymer Molecular Weight	159
<i>Mahbubur Rahman, Danny Palacios, Faustin Arevalo, Ecevit Bilgili</i>	
(298g) Formulation of Microcarriers for Levodopa Delivery Via the Pulmonary System	160
<i>Mahasweta Paul, Raymond Lau</i>	
(298h) Surface Modification to Improve Drug-Excipient Mixing for DPI Formulation	161
<i>Neetu Varun, Chinmay Ghoroi</i>	
(298i) Impregnation of Catalysts with Viscous Metal Solutions Using Experiments and DEM Simulations	162
<i>M. Silvina Tomassone, Yangyang Shen, Jiao Yang, William G. Borghard</i>	
(301a) Understanding the Pressure Loss in Wyes for Dust Collection and Vacuum Cleaning Systems	163
<i>Yi Fan, Karl Jacob</i>	
(301b) Limiting Flow Rate of Fine Powders through Hoppers - Investigation of Methods to Increase the Flow Rates	164
<i>Madhusudhan Kodam, Karl Jacob</i>	
(301c) Prediction of Loss-in-Weight Screw Feeder Performance and Quantification of Failure Modes from Attribute Measurements of Pharmaceutical Materials	165
<i>Anthony Tantuccio, Kendall Moyer, David Goldfarb, Sara Koynov, Stephen L. Conway, Robert Meyer</i>	
(301d) The Use of Fine Excipients to Improve the Manufacturability of Pharmaceutical Tablets	166
<i>Maxx Capece</i>	
(301e) Deduster : The Leading Dust and Streamer Removal System	167
<i>Amit K. Gautam, William F Sahrhage III, Joseph Lutz</i>	
(301f) Improved Combustible Dust Minimum Ignition Energy (MIE) Test Method and Prediction Using CFD Simulation	168
<i>Purvali Chaudhari, Bharatvaaj Ravi, Pranav Bagaria, Chad Mashuga</i>	
(311a) The Impact of Shale Gas and Oil on the Chemical Industry	169
<i>Jeffrey J. Sirola</i>	
(311b) Sustainable Energy and Chemicals: Past, Present, and Future	170
<i>Joseph B. Powell</i>	
(311c) Disruptions: What the Future May Hold	171
<i>Scott F. Mitchell</i>	
(311d) Geopolitical Factors Influencing the Evolution of the Chemical Industry	172
<i>David West</i>	
(311e) Agility & Resilience: How to Maintain Career Competitiveness in the Changing Chemical Industry	173
<i>Antonis Papadourakis</i>	
(336a) Griseofulvin-Laden Extrudates Prepared Via Nanoextrusion: Impact of Dry-Milling on Dissolution Enhancement	174
<i>Ecevit Bilgili, Meng Li, Casey Furey, Jeffery Skros, Rajesh Dave</i>	

(336b) The Effect of Inorganic Salt on Disintegration of Tablets with High Loadings of Kollidon® VA64-Based Amorphous Solid Dispersion	177
<i>Hanmi Xi, Jie Ren, Julie Novak, Eric Kemp, Greg Johnson, Jerry R. Klinzing, Mary Ann Johnson, Wei Xu</i>	
(336c) Miniaturized Formulation and Processability Screening for the Rational Design of Ethylene Vinyl Acetate Based Co-Extrudates	178
<i>Ioannis Koutsamanis, Simone Eder, Stefan Mohr, Karin Eggenreich, Michela Beretta, Amrit Paudel, Klaus Nickisch, Maika Friedrich, Eva Roblegg</i>	
(336d) Advances in Dissolution Modeling for Oral Dosage Forms with Amorphous Solid Dispersions	179
<i>Pedro Valente, Mafalda Paiva, Ricardo Sousa, J. Henriques, M. Temtem</i>	
(336e) Modeling the Bead-Dissolution Kinetics for Composite Melt-Spray Congealed (MSC) Multiparticulates	182
<i>Avik Sarkar, Brian Shoemaker</i>	
(336f) Linking Process, Product and Performance By Raman Imaging Analysis	183
<i>P. Nunes, Mafalda Paiva, Pedro Valente, Ana Aguiar-Ricardo, C. Cacula, M. Temtem, Susana Campos</i>	
(336g) Repurposing Pollen Grains for Oral Delivery of Biologics	184
<i>Pedro Gonzalez-Cruz, Shantanu V. Lale, Md Jasim Uddin, Shashwati Arwe, Noureddine Abidi, Harvinder Singh Gill</i>	
(340a) Estrogen Receptor-Targeted Multiplexing Photoacoustic Polymeric Nanoparticles for Diagnostic and Treatment of Breast Cancer	185
<i>Carolina Salvador-Morales, C. Nino-Vargas, E. Blatchford-Rodriguez, Z. Begnell, R. Khalid, G. Petruncio, M. Paige</i>	
(340b) Engineering of Charge Transfer Complex Nanocrystals By Electrocrystallization	186
<i>Mohamed Kilani, Korosh Torabi, Guangzhao Mao</i>	
(340c) Silica-Coated, Near-UV Activated YVO₄:Eu³⁺,Bi³⁺ Nanophosphors for Dynamic Cell Imaging	187
<i>Georgios A. Sotiriou</i>	
(340d) Stimuli Responsive Nano-Agents: From Drug Delivery to Oil and Gas Industry	188
<i>Afnan Mashat, Amr Abdel-Fattah, Nan Shi</i>	
(358a) Global System Analysis of Twin Screw Granulation Using Population Balance Modelling in gPROMS	189
<i>Li Ge Wang, Dana Barrasso, David Slade, James D. Litster</i>	
(358b) Effect of Crystal Size on the Breakage of High Aspect Ratio Crystals in Stirred Slurries	190
<i>Priscilla J. Hill</i>	
(358c) Fundamental Prediction of Agglomeration and Entrainment Rates for Cohesive Powders in a Riser Flow	191
<i>Kevin M. Kellogg, Peiyuan Liu, Casey Lamarche, Christine M. Hrenya</i>	
(358d) Molecules As Building Blocks in a Novel Population Balance Model for Flash Nano-Precipitation: Investigation of the Different Good Solvents Effect on Nanoparticle Formation	192
<i>Alessio D. Lavino, Marco Ferrari, Daniele Marchisio</i>	
(358e) Distribution Reconstruction from Moments Via Orthogonal Polynomials	194
<i>R. Bertram Diemer Jr.</i>	
(358f) Modeling of Breakage Process Using Monte Carlo Simulations in Spray Fluidized Bed Granulator	218
<i>Ashok Das, Jitendra Kumar</i>	
(364a) Differentiated Research Strategy	219
<i>Yutaka Tsuji</i>	
(364b) DEM Simulation with Scaled-up Particles	220
<i>Kimiaki Washino</i>	
(364c) Multi-Scale Modeling of Reactive Dense Flows	221
<i>Kun Luo</i>	
(364d) Real-Time Magnetic Resonance Imaging of Dynamic 3D Granular Systems	222
<i>Christoph R. Muller</i>	
(364e) Insights and Model Development Enabled By DEM and CFD-DEM Simulations	223
<i>Sankaran Sundaresan</i>	
(213e) Application of a Modified CFD-PBM Method to the Simulation of a Slurry Bed Reactor	224
<i>Wu Su, Yingya Wu, Xiaogang Shi, Xingying Lan, Jinsen Gao</i>	
(375a) Direct Numerical Simulations of Hydrodynamic Forces on Assemblies of Non-Spherical Particles	225
<i>Sathish K. P. Sanjeevi, Johan T. Padding</i>	
(375b) Reactive Crystallization of Metal-Amino Acid Chelates and their Nucleation Kinetics	226
<i>Wang-Soo Kim, Chun-Il Park, Moonyong Lee, Young-Gyu Kim, Kee-Kahb Koo</i>	
(375d) Investigation of Particle-Size Dependent Charging	227
<i>Xiaoyu Liu, Ifunanya Nwogbaga, Pranav Saba, Jari Kolehmainen, Ali Ozel, Troy Shinbrot, Sankaran Sundaresan</i>	
(375e) Effect of Particle Friction on Binary Granular Shear Flows of Inelastic Grains	228
<i>Jiecheng Yang, Yu Guo, Jennifer S. Curtis</i>	
(375f) Economic Analysis of Alternative Continuous Crystallization Technologies for Mass Production	229
<i>Kwan-Ling Wu, Jeffrey D. Ward</i>	
(375g) Bimetallic Atomic Layer Deposition for Extended Surface Electrocatalysts	230
<i>William McNeary IV, Annika Lai, Audrey Linico, Chilan Ngo, Sarah Zaccarine, Jason Zack, Katherine Hurst, Shaun M. Alia, Scott A. Mauger, K. C. Neyerlin, Karen J. Buechler, J. Will Medlin, Svitlana Pylypenko, Bryan S. Pivovar, Alan W. Weimer</i>	
(375h) An Experimental Study of Cylindrical Particle's Effective Size in a Rotating Tumbler	231
<i>Siyang Liu, Joseph J. McCarthy</i>	
(375i) Laser Pyrolysis Synthesis of Novel Nanoparticles Using Spray-Based Precursor Delivery	232
<i>Mohammad Malekzadeh, Parham Rohani, Mayuresh Keskar, Mark T. Swihart</i>	
(375j) Particle Size Techniques/Capabilities Used in the Coatings Industry	233
<i>Chris Sierka, Kristin Nuzzio, Mike Werkmeister, Ethan Swope, Denise Schmidt</i>	
(375k) Modeling Granular Material Segregation Using a Multi-Scale Model	234
<i>Yu Liu, Marcial Gonzalez, Carl Wassgren</i>	

(375l) Oxidation of Fractal-like Soot Agglomerates	235
<i>Georgios A. Kelesidis, Sotiris E. Pratsinis</i>	
(375m) Experimentally Validated Computational Models to Predict the Impact of Humidity on the Flow of Pharmaceutical Mixtures.....	236
<i>Koyel Sen, Raj Mukherjee, Chen Mao, Bodhisattwa Chaudhuri</i>	
(375n) Conduction and Convection Heat Transfer in a Rotary Drum Using an Integrated PIV/IR Technique.....	237
<i>Manogna Adepu, Heather N. Emady</i>	
(375o) Light Alkane Valorization to Ethylene Via Chemical Looping Oxidative Dehydrogenation	238
<i>Vasudev Pralhad Haribal, Luke Neal, Seif Yusuf, Fanxing Li</i>	
(375p) Optimising Granulate Formulation through Uniaxial Powder Testing	239
<i>Tim Freeman, Jamie Clayton, John Yin, Rajeev Dattani</i>	
(375q) Optimising Powder Properties for DPI Capsule Filling Performance	240
<i>Tim Freeman, Rajeev Dattani, Jamie Clayton, John Yin, Dave Seaward, Jessica Binnie</i>	
(375r) The Effect of Storage Time on Flow Characteristics of Maic-Modified Compounds	241
<i>Charles R. Bowman, William A. Hendrickson, Tim Freeman, Christopher J. Rueb</i>	
(714b) Bioinspired Silica: A Novel, Green and Biocompatible Drug Delivery System.....	242
<i>Scott Davidson, Dimitrios A. Lamprou, Andrew Urquhart, M. Helen Grant, Siddharth V. Patwardhan</i>	
(375v) Purdue University's Center for Particulate Products and Processes.....	243
<i>Dhananjay A. Pai, Carl Wassgren</i>	
(384a) 25 by 25: Chemical Engineering in the Next 25 Years	244
<i>Clare McCabe, Phillip R. Westmoreland</i>	
(384b) The Future of Chemical Engineering Itself	245
<i>Phillip R. Westmoreland</i>	
(384e) Accelerating Innovation through Academic-Industrial Partnerships	246
<i>William Liechty, Shawn D. Feist</i>	
(384c) Maximizing Uptime, Efficiency, and Safety of Industrial Operations through Early Risk Detection	247
<i>Ankur Pariyani</i>	
(384d) Gaussian Processes for Hybridizing Analytical & Data-Driven Decision-Making	248
<i>Simon Olofsson, Johannes Wiebe, Marc Peter Deisenroth, Ruth Misener</i>	
(405a) Ceria Nanoparticle Dissolution and Stability in Acidic Aqueous Environments	251
<i>Matthew L. Hancock, Robert Yokel, Eric A. Grulke</i>	
(405b) Probing Peptoid-Carbon Nanotube Coatings for Biological Imaging	252
<i>Linda Chio, Markita Landry</i>	
(405c) Synthesis, Characterization, and Interfacial Properties of Lignin Coated Iron Oxide Magnetic Nanoparticles in Aqueous Solutions	253
<i>Frankie Petrie, Mohammad J. Hassan, Esteban E. Ureña-Benavides, Erick S. Vasquez</i>	
(405d) Investigation of Interactions between Magnesium Silicate Particles and Diamond-like Carbon Surface By Atomic Force Microscopy	254
<i>Vipada Dokmai, Varong Pavarajarn</i>	
(405e) Polymer-Metal Composite Nanoparticles Via Vapor Phase Deposition Processes Onto Liquid Substrates.....	255
<i>Mark De Luna, Prathamesh Karandikar, Malancho Gupta</i>	
(405f) Controlling Surface Morphology and Spatial Distribution of Active Nanoinclusions in Functional Coatings Via Air-Controlled Electropray Process	256
<i>Mounica Jyothi Divvela, Yong Lak Joo</i>	
(406i) Role of Computational Modeling in Fluid Catalytic Cracking Design.....	257
<i>Raj Singh</i>	
(406b) Direct Numerical Simulations of Flow Around Assemblies of Non-Spherical Particles and the Investigation of Voidage Effects	258
<i>Johan T. Padding, Sathish K. P. Sanjeevi</i>	
(406c) Detailed Analysis of a Large-Scale Wurster Coating Process.....	259
<i>Thomas Forgber, Martina Trogrlic, Dalibor Jajcevic, Pankaj Doshi, Mary T. Am Ende, Alan Carmody, Johannes G. Khinast, Avik Sarkar</i>	
(406d) MFIX-Exa: A CFD-DEM Code for Exascale Computer Architectures	260
<i>Madhava Syamlal, Jordan Musser, Ann Almgren, John Bell, Christine Hrenya, Thomas Hauser, Peiyuan Liu</i>	
(406e) Simulation As a Tool for Learning from Historical FCC Regenerator Operations.....	261
<i>John Pendergrass, Peter Blaser, Samuel Clark</i>	
(406f) Evaluation of Filtered Two Fluid Models Against Data from an Industrial Scale Fluidized Bed Reactor.....	262
<i>Henri Cloete, Schalk Cloete, Thomas Gurker, Gunter Gronald, Shahriar Amini</i>	
(406g) Finding the Preferred Safe Operating Condition of a Fluidized Bed Incinerator to be Used for the Disposal of Waste Explosives	274
<i>Sunghyun Cho, Hyungtae Cho, Chanho Park, Jinwoo Park, Hyounsoo Kim, Il Moon</i>	
(406h) Three Dimensional CFD Simulation of Two-Phase Flow in Pilot Plant Dryer	275
<i>Hossein Hassanzadeh, Masoud Asadieraghi, Mostafa K. Moraveji, Mahdi Hozhabri Namin, Ali Nabizadeh</i>	
(414a) Coupling a Continuum Granular Segregation Model with a Flow Model Incorporating Granular Rheology	276
<i>Richard M. Lueptow, Hongyi Xiao, Jinhui Yan, Gregory J. Wagner, Julio M. Ottino, Paul B. Umbanhowar</i>	
(414b) Modeling Granular Material Segregation Using a Finite Element Method and Advection-Diffusion-Segregation Equation Multi-Scale Model	277
<i>Yu Liu, Marcial Gonzalez, Carl Wassgren</i>	
(414c) Continuous Powder Blending inside Twin Screw Extruder.....	278
<i>Daniel Mateo-Ortiz, Dana Alhasson, Bei Chen, Sean Garner, William R. Ketterhagen, Nandkishor Nere, Michael C. Dennis</i>	

(414d) Investigation of the Effect of Baffles on Axial Mixing and Impregnation in a Double Cone Blender	279
<i>Yangyang Shen, Aman Rastogi, William G. Borghard, M. Silvina Tomassone</i>	
(414g) Estimation and Explanation of Adhesive Mixing Efficiency Via Energy-Based Stick/Bounce Model	280
<i>Kai Zheng, Rajesh Dave</i>	
(414e) Experimental Study of Particle Density Segregation in Granular Shear Flow	281
<i>Siying Liu, Joseph J. McCarthy</i>	
(414f) Cohesive Particle Segregation and Granular Rheology	282
<i>Siying Liu, Joseph J. McCarthy</i>	
(435a) Solids Metrics for Successful 3D Printing of Energetic Feedstocks	283
<i>Brandon Ennis, Naseem Jibrin, Benjamin Ennis, Michael Winn, Bryan J. Ennis</i>	
(435b) 3D Printing of Metal-Polymer Composite Structures Via Fused Deposition Modeling	284
<i>Trevor Fleck, George Chiu, Emre Gunduz, Steven F. Son, Jeffrey Rhoads</i>	
(435c) Polymer Resin Systems for Precision Direct-Ink-Write Printing of Thermite-Loaded Inks	285
<i>Brian Howell, Eric Bukovsky, Paul Martinez, Matthew Durban, Michael Grapes, Alexandria Golobic, Kyle Sullivan, Alex E. Gash</i>	
(435d) 3D Printing of Thermite Mixtures Using Static Mixing	286
<i>Michael Grapes, Elliot Wainwright, Matthew Durban, Kyle Sullivan, Alex E. Gash</i>	
(435e) Additive Manufacturing of Pyrotechnic Ignition Delays	287
<i>Ian Walters, Lori J. Groven</i>	
(435f) The Role of Particle Size on the Combustion of Boron Carbide/Sodium Periodate Biocidal Formulations	288
<i>Lance Kotter, Lori J. Groven</i>	
(472a) Hydrodechlorination of 1,2-Dichloroethane over Ag-Pd Catalysts Prepared By Controlled Surface Reactions	289
<i>Madelyn R Ball, Eric Stangland, Manos Mavrikakis, James A. Dumesic</i>	
(472b) Science of Shape-Controlled Synthesis of Metallic Nanoparticles	291
<i>Zhifeng Chen, Robert M. Rioux, Ji Woong Chang, Suprita Jharimune, Choumini Balasanthiran</i>	
(472c) Facile Novel Synthesis and Characterization of Gold-Copper Bimetallic Nanoclusters for Applications in Oxidation Catalysis	292
<i>Joseph Brindle, Michael M. Nigra</i>	
(472d) Atomic Layer Deposited Pt-Co Bimetallic Nanoparticles for Selective Hydrogenation	293
<i>Xiaofeng Wang, Yuzi Liu, Xinhua Liang</i>	
(472e) Facile Synthesis of 2D Molybdenum Carbide Nanosheets	294
<i>William P. Mounfield III, Shao-Horn Yang, Yuriy Roman-Leshkov</i>	
(472f) Identification of Optimally Stable Nanoparticle Geometries Via Mathematical Optimization and Density-Functional Theory	295
<i>Natalie M. Isenberg, Zihao Yan, Michael G. Taylor, Christopher L. Hanselman, Giannis Mpourmpakis, Chrysanthos E. Gounaris</i>	
(472g) Niau Single Atom Alloys for the Oxidative Coupling of Methacrolein with Methanol	296
<i>Antonios Trimpalis, Georgios Giannakakis, Junjun Shan, Sufeng Cao, Maria Flytzani-Stephanopoulos, Zhen Qi, Juergen Biener</i>	
(480a) Why and How to Select and Design a Dense Phase Conveying System?	297
<i>Gary Liu</i>	
(480b) Assessment of Effects of Flow Enhancers in Pneumatic Conveying of Cohesive Dairy Powders: CFD-DEM Simulation	298
<i>Akeem Olaleye, Orest Shardt, Gavin Walker, Harry E. A. Van Den Akker</i>	
(480c) Towards Understanding Fly Ash Transport and Deposition in the Human Respiratory System: Effects of Physiological Conditions and Fly Ash Properties	299
<i>Siming You, Zhiyi Yao, Ruiqi Fu, Chi-Hwa Wang</i>	
(480d) Large Eddy Simulation of Particle Laden Flows	300
<i>John A. Thomas, Kevin Smith, Brian Devincotis</i>	
(480e) Strandphase®: The Gentle Pneumatic Conveying Solution	301
<i>Amit K. Gautam, William F Sahrhage III, Joseph Lutz</i>	
(480f) CFD Study of Drag Model on Simulating Bubbling Fluidized Bed of Geldart A Particles	302
<i>Jing Huang, Quan Yuan</i>	
(493a) High Surface Area Silicon Quantum Dots Derived from Porous Silicon for Energetic Materials	303
<i>Philip M. Guerieri, Sarah Adams, Nicholas Piekiet, Matthew Ervin, Wayne A. Churaman, Christopher Morris</i>	
(493b) A Materials Science-Based Approach for the Re-Development of COMP B	304
<i>Hongwei Qiu, Philip Samuels, Erik Wrobel, Aleksander Gandzelko, Victor Stepanov, Rajen B. Patel, Katherine H. Guarini</i>	
(493c) Replacement of Barium Chromate in the Traditional Tungsten Delay	305
<i>Lori J. Groven, Barbara A. Hadrava</i>	
(493d) Combustion of Multi-Stage Ball Milled Ternary B/Al/PTFE Nano-Sale Composites	306
<i>Liyun Feng, Travis R. Sippel</i>	
(493e) Milling of Energetic Crystals with the Labram	307
<i>Lance Kotter, Lori J. Groven</i>	
(564a) The Synthesis and Properties of Cyclic Nitramine Crystals with Metal Particles Inclusions	308
<i>Alexander Vorozhtsov, Georgy Teplov</i>	
(564c) Synthesis and Characterization of CL-20/Oxidant Crystals	309
<i>Clinton Chapman, Lori J. Groven</i>	
(564d) Effect of Liquid Hydrocarbon-Based Process Control Agents on Characteristics of Mechanically Alloyed Al Ti Powders	310
<i>Mehnaz Mursalat, Mirko Schoenitz, Edward Dreizin</i>	
(564e) Ignition and Combustion Mechanisms of Mg-Ca(IO₃)₂ Reactive Nanocomposites	311
<i>Xinhang Liu, Mirko Schoenitz, Edward Dreizin</i>	

(564f) Graphene Oxide-Based Microwave Ignitable Energetic Materials with Thermally Switchable Ignition Characteristics	312
<i>Stuart J. Barkley, Keke Zhu, James B. Michael, Travis R. Sippel</i>	
(578a) A Novel Semiconductor Nanofiber with Superb Charge Conductivity for Energy and Environmental Applications	313
<i>Wallace Woon-Fong Leung</i>	
(578b) Bioinspired Nanomaterials for Environmental Remediation	314
<i>Siddharth V. Patwardhan, Lorraine T Gibson</i>	
(578c) Encapsulation of Nanoscale Hybrid Materials for Innovative CO₂ Capture: NOHMs and MOFs	315
<i>Ming Gao, Wei Yu, Ah-Hyung Alissa Park</i>	
(578d) Nanostructured Au/Organoclay Materials for Methylmercury Adsorption	316
<i>Kae Fink, Shu Yang, Andrea Chica, William P. Johnson, Michael M. Nigra</i>	
(578e) Surface Modification of a Mxene with Silane Coupling Agents	317
<i>Hossein Riazi, Ahmad Arabi Shamsabadi, Babak Anasori, Yury Gogotsi, Masoud Soroush</i>	
(578f) Flame Synthesis of Crumpled Graphene Nanostructures Decorated with Multicomponent Metal Nanoparticles	318
<i>Mohammad Moein Mohammadi, Santosh Srivatsa Gunturi, Shikuan Shao, Raymond Buchner, Mark T. Swihart</i>	
(596a) Modeling of the Flow Dynamics through Incompressible Porous Media in Solid-Liquid Filtration	319
<i>Siyang Zhang, Joseph J. McCarthy</i>	
(596b) Two-Drop Model of Depth Coalescing Filter Performance	320
<i>Seyedeh Neda Mehdizadeh, George G. Chase</i>	
(596c) Cake Filtration of Catalyst Materials	321
<i>Zainab Abd Al- Jaleel, Tulsi Char, William G. Borghard, Nina C. Shapley</i>	
(596d) The Role of Pore Structure and Chemistry on Particle Deposition during Membrane Filtration	322
<i>Mirco Sorci, Corey C. Woodcock, Joel L. Plawsky, Georges Belfort</i>	
(610a) From Batch to Continuous Reactive Crystallization: A Case Study on Beta-Lactam Antibiotics	323
<i>Matthew A. McDonald, Andreas S. Bommaris, Martha A. Grover, Ronald W. Rousseau</i>	
(610b) A New Slurry Reactive Crystallization to Improve Process Robustness and Scalability	324
<i>Lotfi Derdour</i>	
(610c) Crystallization Process Development of Large Size TMP Crystals	325
<i>Qing Lu, Hua Sun, Min Su</i>	
(610d) Polymorph Selection in Continuous Crystallizers in the Presence of Wet Milling	326
<i>Yang Li, Thomas Vetter</i>	
(610e) Polymorph Dynamics of 2-Aminobenzoic Acid System in Continuous Oscillatory Baffled Crystallizer	327
<i>Shivani Kshirsagar, Zoltan K. Nagy</i>	
(610f) In-Situ Optical Imaging and X-Ray Diffraction Techniques to Probe Organic Molecule Thin Film Crystallization	328
<i>Gaurav Giri</i>	
(610g) Imaging Crystallization Using Deep Learning to Quantitatively Track the Polymorphic Transformation of Carbamazepine	329
<i>Zhenguo Gao, Yuanyi Wu, Junbo Gong, Ying Bao, Jingkang Wang, Sohrab Rohani</i>	
(616a) Mechanoactivation, Initiation and Combustion of Aluminum and Copper Oxide Mixtures	330
<i>Aleksandr Dolgoborodov, A. N. Streletskii, B. D. Yankovskii, V. G. Kirilenko, S. Yu. Annan'ev, I. V. Kolbanev, G. A. Vjrob'eva</i>	
(616b) Aluminum-Nickel Fluoride Reactive Materials	334
<i>Siva Kumar Valluri, Daniela Bushiri, Mirko Schoenitz, Edward L. Dreizin</i>	
(616c) Combustion of Fuel-Rich Boron - Metal Fluoride Composites	335
<i>Siva Kumar Valluri, Mirko Schoenitz, Edward Dreizin</i>	
(616d) Thermal and Biocidal Inactivation of Di-Isopropyl Methylphosphonate and Tributylphosphate through Static and Transient Heating	336
<i>Patrick Sanderson, Liyun Feng, James B. Michael, Travis R. Sippel</i>	
(616e) The Characterization of a TNT/Aniline Co-Crystal Solvate: Physicochemical, Explosive Properties and Kinetics of Stability	337
<i>Yong Joon Lee, Nadia Sultana, Zachary Fondren, Daniel Unruh, Amitesh Maiti, Brandon L. Weeks</i>	
(616f) Transition Metal Catalysts for Boron Ignition and Combustion	338
<i>Kerri-Lee A. Chintersingh, Mirko Schoenitz, Edward L. Dreizin</i>	
(617a) Elutriation Comparison of Particle Separation Systems for Chemical Looping Applications	339
<i>Michael Bobek, Steven Rowan, Jingsi Yang, Justin Weber, Ronald W. Breault</i>	
(617b) Numerical Investigation of Scale-up and in-Bed Heat Exchanger on the Hydrodynamic Characteristics of the Fluidized Bed Combustor of Coal Direct Chemical Looping System	340
<i>Dawei Wang, Jianhua Pan, Andrew Tong, Liang-Shih Fan</i>	
(617c) Chemical Looping Combustion from Biomass Derived Syngas Using a Fluidizable Ni-Co-La/γ-Al₂O₃ Oxygen Carrier: CLC Performance and CPFD Modelling	341
<i>Imtiaz Ahmed, Samira Rostom, Hugo De Lasa</i>	
(617d) Modeling of Circulating Fluidized Bed Reactors for the Selective Oxidation of Alkanes By Chemical Looping	342
<i>Luke Neal, Vasudev Pralhad Haribal, Fanxing Li</i>	
(617e) CFD Modeling of a Dual Fluidized-Bed System Using an Eulerian-Lagrangian Approach	343
<i>Hui Liu</i>	

(617f) CFD-DEM with Uncertainty Quantification (UQ) Compared Against Experiments of Horizontal Jets in a Gas-Solid Fluidized Bed	344
<i>Peiyuan Liu, Steven R. Dahl, William Fullmer, Christine M. Hrenya</i>	
(617g) Validation of the Direct Simulation Monte Carlo (DSMC) Method for Simulating Polydisperse Gas-Solid Flows	345
<i>Andrew Hong, Aaron Morris</i>	
(630a) Engineered Electrodes for Energy Storage and Battery Safety	346
<i>Vilas G. Pol</i>	
(630b) Extended Surface Electrocatalyst Development Via Atomic Layer Deposition	347
<i>William McNeary IV, Audrey Linico, Chilan Ngo, Sarah Zaccarine, Jason Zack, Katherine Hurst, Shaun M. Alia, Scott A. Mauger, K. C. Neyerlin, Karen J. Buechler, Will Medlin, Svitlana Pylypenko, Bryan S. Pivovar, Alan W. Weimer</i>	
(630c) Thin Oxide Film Coatings for Improved Lithium Ion Battery Cathodes	348
<i>Amanda Hoskins, Samantha L. Millican, Yan Gao, Xinhua Liang, Alan W. Weimer</i>	
(630d) The Application of Magnesiothermic Reduction of Silica to Produce Porous Silicon for Lithium Ion Batteries	349
<i>Jake Entwistle, Siddharth V. Patwardhan</i>	
(630e) Fluidized-Bed CVD of Si@SiC@C-like Nanoparticle and Its Application As Anode Materials	350
<i>Chunhui Yu, Chenxi Zhang, Zhexi Xiao, Fei Wei</i>	
(630f) Functional Nanomaterials for OIL and Gas Discovery and Recovery Applications	351
<i>Amr Abdel-Fattah, Afnan Mashat, Hassan Alqahtani, Nouf Aljabri, Howard Schmidt</i>	
(631a) CFD Modeling of a Dry Electrostatic Protein Separation Approach	352
<i>Aram Parsa, Solmaz Tabatabaei, Amin R. Rajabzadeh</i>	
(631c) Separation Performance of a Coupled Cyclone with Built-in Circulating Granular Bed Filter(C-CGBF)	353
<i>Sihong Gao, Dandan Zhang, Yiping Fan, Chunxi Lu</i>	
(631d) Numerical Simulation of the Capture of Particles By Dead-End Pores	362
<i>Siyang Zhang, Joseph J. McCarthy</i>	
(656a) In-Line Evaluation of Powder Properties during Mixing Processes Using a Drag Force Flow Sensor	363
<i>Tim Freeman, Jamie Clayton, John Yin, Laura Monington, Markus Klink, Bernd Buecker</i>	
(656b) Revisiting the Measurement of Powder Permeability Under Applied Load	364
<i>Michael Winn, Benjamin Ennis, Bryan J. Ennis</i>	
(656c) Triboelectrification of Insulator Materials in a Humidified Environment	365
<i>Erik M. Jensen, Maria Kezhia D. Rullan, Keith M. Forward</i>	
(656d) Bipolar Charging of Polyethylene Powders: Experimental and Modelling Study	366
<i>Simon Jantac, Ladislav Konopka, Matej Vrzscek, Jaromir Podedic, Juraj Kosek</i>	
(656e) Evaluating Electrostatic Charging of Powders - the Challenges	367
<i>Tim Freeman, Jamie Clayton, John Yin, Rajeev Dattani</i>	
(656f) Powder Permeability As a Measurement Surrogate for Triboelectric Charging	368
<i>Benjamin Ennis, Michael Winn, Naseem Jibrin, Bryan J. Ennis</i>	
(656h) Effect of Intrinsic Materials Properties on the Mechanical and Rheological Behavior of API Agglomeration in Agitated Filter Dryers	369
<i>Yu Jin Shin, Raimundo Ho, Nandkishor K. Nere, Kushal Sinha, Prashant Kumar, Laurie Mlinar, John G. Gaertner, Shailendra Bordawekar, Ahmad Sheikh</i>	
(663a) CO₂ Capture and Transport Behaviors of Porous Polymer Beads Containing Metal-Organic Frameworks (MOFs)	370
<i>Guanhe Rim, Valizadeh Bardiya, Kyriakos Stylianou, Berend Smit, Ah-Hyung Alissa Park</i>	
(663b) Carbon Mineral Sequestration Integrated with the Recovery of Rare Earth Elements from Alkaline Industrial Wastes and Silicate Minerals	371
<i>Chengchuan Zhou, Xiaozhou Zhou, Ah-Hyung Alissa Park</i>	
(663c) Two Dimensional Simulation of Carbon Capture Using Amine-Based Solid Sorbents	372
<i>Farnaz Esmaeili Rad, Hamid Arastoopour, Javad Abbasian</i>	
(663d) Tribocharging of Bidisperse Particles in Fluidized Beds	373
<i>Xiaoyu Liu, Jari Kolehmainen, Ali Ozel, Sankaran Sundaresan</i>	
(663e) Bubble Hydrodynamic Comparison for Geldart Group a and B Materials at Different Fluidization Regimes	374
<i>Shyam Sundaram, Ben Freireich, Reddy Karri</i>	
(663f) Coupled CFD-DEM Simulations for Heat-Exchanger Cleaning	375
<i>Albert Kim, Jung-Hyun Moon, Joshua Lelemia Irvine, Hyeon-Ju Kim, Ho-Saeng Lee</i>	
(663h) Cloudy-Zone Modeling of a Gas-Solid Bubbling Fluidized Bed with Liquid Spray	376
<i>Sihang Tian, Jingyuan Sun, Xiaoliang Fan, Yao Yang, Zhengliang Huang, Jingdai Wang, Yongrong Yang</i>	
(678a) Engineering the Surfaces of Fluorescently-Labeled Polymeric Nanoparticles for Drug Delivery	377
<i>Ami Jo, Rui Zhang, Judy Riffle, Richey M. Davis</i>	
(678b) Optimizing the Surface Property-Activity Relationship of Nanoscale Hydrogel Drug Delivery Systems	378
<i>Angela Wagner, Alex Shearer, Alexandria Lawrence, Bhaargavi Ashok, Nicholas A. Peppas</i>	
(678c) Paramagnetic Cations-Loaded Polydopamine Nanoparticles Cytotoxicity	379
<i>Milena Vega, Celia Nieto, Gema Marcelo, Miguel A. Galan, Eva Martin Del Valle</i>	
(678d) Two-Photon Microscopy for Deep-Tissue Imaging of Dopaminergic Neuromodulation in the Brain	380
<i>Jackson Travis Del Bonis-O'Donnell, Ian McFarlane, Ralph Page, Abraham Beyene, Eric Tindall, Markita Landry</i>	
(678e) Ultrafast Post-Formulation Core Radiolabeling of Biodegradable Nanoparticles for PET Contrast Agents	381
<i>Leon Z. Wang, Tristan L. Lim, Prashanth Padakanti, Hoang D. Lu, Abass Alavi, Robert Mach, Robert K. Prud'Homme</i>	
(678f) Voltage-Sensitive Ultrasound Enhancing Agent: In Vitro and In Vivo analysis	384
<i>Michael Cimorelli, Benjamin Andrien, Kyle Barrett, Aaron T. Fafarman, Andrew Kohut, Brett Angel, Steven P. Wrenn</i>	

(684a) Polymorphic Selection of Biominerals By Anionic Polyelectrolytes	385
<i>Gopichand Mallam, Arkita Chakrabarti, Marina Tsianou</i>	
(684b) Coupling Experimental Results with Molecular Dynamics Simulations to Describe Polymorphism Obtained Using Solution Shearing	386
<i>Stephanie Guthrie, Baoxing Xu, Yuan Gao, Gaurav Giri</i>	
(684c) Investigation of the Polymorphism Phenomenon of the Carotene Lutein	387
<i>Wei Guo, Shijie Xu, Shichao Du, Lina Jia, Yan Wang, Junbo Gong, Xiaoyue Tan</i>	
(684d) A Kinetic Study of Crystallization Process of Imatinib Mesylate with Polymorphic Transformation Phenomenon	388
<i>Mengxing Lin, Sohrab Rohani, Yuanyi Wu</i>	
(684e) Polymorphism of D-Mannitol: Selective Nucleation and Crystal Growth Mechanism	408
<i>Weiyi Su, Chunli Li, Honghai Wang, Jing Fang</i>	
(684f) Can the Solvation Manner Leads to a Nucleation Diversity for Polymorphic System? the Case of D-Mannitol	414
<i>Shiyuan Liu, Junbo Gong</i>	
(714a) Enzyme-Mimetic Luminescent Nanoparticles As Hydrogen Peroxide Biosensors	419
<i>Georgios A. Sotiriou</i>	
(714c) Targeted Single-Walled Carbon Nanotubes for Photothermal Ablation of Breast Cancer Combined with Immunostimulation	420
<i>Patrick McKernan, Rajagopal Ramesh, Linda Thompson, Roger Harrison</i>	
(714d) Effect of Ethanol Solvent on Antimicrobial Efficiency of Magnesium Oxide Nanoparticles	421
<i>Proma Bhattacharya, Sudarsan Neogi</i>	
(714e) Synthesis and Optical Characterization of Gadolinium-Containing Scintillating Nanoparticles to Enable Neural Stimulation	423
<i>Ashley Dickey, Eric Zhang, Stephen H. Fougler, Joseph W. Kolis</i>	
(714f) Synthesis, Characterization and Antibacterial Study of Copper-Nickel Bimetallic and Mixed Metal Oxide Nanocomposite	424
<i>Debashri Paul, Sudarsan Neogi</i>	
(723a) Spatial Confined Capillary Flow and Precisely Controlled Crystallization Via 3D Printed Platform: A Comprehensive View	427
<i>Mingguang Han, Gaohong He, Xiaobin Jiang</i>	
(723b) Polymorph Screening of L-Glutamic Acid By Anti-Solvent Crystallization in Easy-to-Use Microfluidic Device	430
<i>Huanhuan Shi, Xin Huang, Hongxun Hao</i>	
(723e) Thermodynamics of Co-Crystal Systems	431
<i>Dipali Ahuja, Ake Rasmuson</i>	
(737b) Thermodynamic Properties of Paracetamol Impurities and Their Impact on the Crystallisation of Paracetamol from Solution	432
<i>R. R. E. Steendam, Leila Keshavarz, Brian De Souza, Patrick Frawley</i>	
(737c) A Novel Approach into Secondary Nucleation and Crystal Growth, Controlled Particle Size Distribution, Using a Large Single Seed Crystal in Solution Crystallization	433
<i>Mustafa Yousuf, P. J. Frawley, R. R. E. Steendam</i>	
(737d) Crystal Growth Kinetics of Salicylamide Investigated Under Different Crystallisation Processes and Also Environmental Conditions	434
<i>Aisling Lynch, Ake Rasmuson</i>	
(737f) Fast Temperature Cycling via Microwave Heating Enables Enhanced Deracemization	435
<i>Christos Xiouras, Fabio Cameli, G. D. Stefanidis</i>	
(737g) Resolution of Conglomerates Using Preferential Crystallization and Enzymatic Racemization	436
<i>Thiane Carneiro, Shashank Bhandari, Katarzyna Wrzosek, Erik Temmel, Heike Lorenz, Andreas Seidel-Morgenstern</i>	
(737h) Alkaline Crystallization of CaCO₃ in a Direct Air Capture Process	437
<i>Caroline E. Giacomini, Thomas Holm, Luisa Burhenne, Walter Merida</i>	
Author Index	