

North American Mixing Forum 2015

Core Programming Area at the 2015 AIChE Annual Meeting

Salt Lake City, Utah, USA
8-13 November 2015

ISBN: 978-1-5108-1867-5

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© (2015) by AIChE
All rights reserved.

Printed by Curran Associates, Inc. (2016)

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: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

(81a) A New Definition of Impeller Efficiency	1
<i>John A. Thomas, Richard K. Grenville</i>	
(81b) Drawdown of Liquid-Liquid Systems: Comparing Performance of Conventional Stirred Tank and Confined Impeller Stirred Tank	2
<i>Akshay Bhalerao, Alexandra E. Komrakova, Marcio Bezerra Machado, Suzanne Kresta, Fatemeh Safari</i>	
(81c) Characterization of Mixing in the EPA Baffled Flask for Dispersion Effectiveness Testing	4
<i>Bing Wang, Lin Zhao, Robyn Conmy, Michel C. Boufadel, Piero M. Armenante</i>	
(81d) Investigating the Effect of Baffles on CSTR Performance for Liquid Phase Reaction	5
<i>Mohammed K. Al Almesfer, Mohd Danish</i>	
(81e) CFD Analysis in Designing of Mixing Mechanism for a Mechanical Flotation Machine	14
<i>Jiliang Xia, Antti Rinne, Jarmo Lohilahti, Raghav Dube, Toni Mattsson</i>	
(81f) Development, Scale up and Testing of the Nextstep™ – the Most Efficient Mechanism in Mechanical Flotation	29
<i>Keri Caldwell, Yihong Yang, Ken Rahal, Tim Olson, Mads Jespersen, Dariusz Lelinski</i>	
(81g) Design and Characterization of a Scaled-up Millifluidic Groove Mixer	30
<i>Joseph Whittenberg, Vivek Kumar, Keegan Lane, Heeral Patel, Paul J.A. Kenis</i>	
(155b) Scale-up of Solids Suspension - Zwietering or Power per Mass?	31
<i>Thomas Post, Keith Johnson, Ray Jacques</i>	
(155c) Effect of Impeller Submergence on Power Dissipation and Solids Suspension in Mixing Systems Equipped with Pitch-Blade Turbines	32
<i>Yufeng Song, Piero M. Armenante</i>	
(155d) New Correlation for Predicting Cloud Height in a Stirred Tank	33
<i>Robert P. Hesketh, Arthur W. Eichells, Matthew Eisenschmied, Michael Cimorelli, Paulina Kruszewski, David Miller, Samuel Tourroonjian</i>	
(155e) Vortex Generation, Gas Draw Down and Mass Transfer in Agitated Vessels	34
<i>Jason G. Giacomelli, Richard K. Grenville</i>	
(155f) Modeling of Droplet Breakup in a Turbulent Flow	35
<i>Dmitry Eskin</i>	
(155g) A Semi-Empirical Approach to Predict Solids Stabilized Emulsion Size	36
<i>Emir Tsabet, Louis Fradette</i>	
(185a) Mechanistic Study of Water/Solids Settling in a Diluted Bitumen System: Statistical and Image Analysis	37
<i>Nitin Arora, Suzanne Kresta, Samson Ng, Sujit Bhattacharya</i>	
(185b) Mechanistic Model Development of Amine Hydrochloride Salts Production in a Confined Impinging Jet Reactor	40
<i>Alexandra E. Komrakova, Suzanne Kresta, Archie Eaglesham, Don Jones</i>	
(185c) CFD Simulation of Solids Suspension at High Loading	41
<i>Ravindra Aglave, Jinli Feng, Eric E. Janz, Robert Strong, Thomas Eppinger</i>	
(185d) Modelling the Hydrodynamics, Transport and Reactions in Multiphase Microreactors	42
<i>Lu Yang</i>	
(185e) Design of a Pilot-Scale Ebullating-Bed Reactor for Catalyst Testing Aided By CFD and 3D Printing	44
<i>Cláudio P. Fonte, Thierry Danzo, Vania Santos-Moreau</i>	
(185f) Removal of Particulate Fines from Organic Solvents Using Water Droplets As Collector Particles	45
<i>Arun Ramachandran, Shashi Malladi</i>	
(185g) Multiphase Application of 3D Printing for Liquid-Liquid Extractor Design	46
<i>Kent E. Wardle</i>	
(301a) Effect of Impeller Type, Diameter, and Number on Turbulent Blend Time	47
<i>Eric E. Janz</i>	
(301b) The Effect of Viscosity on Stable Vortex Formation in an Unbaffled Stirred Tank	48
<i>Justin Walker, Suraj Deshpande, Kishore K. Kar, Jim Pressler, Wenyu Su, Wenzhao Yang</i>	
(301c) Effective Transitional Flow Blending	49
<i>Eric E. Janz, Kevin J. Myers, Robert Strong, Michael Adams</i>	
(301d) Towards a General Transport Equation for Mean Age Distribution	50
<i>Minye Liu</i>	

(301e) CFD Study for Dispersion of Hydrocarbons Near Flare	51
<i>Mohanrao Rampure, Ramsey Bunama</i>	
(301g) Influence of MESH Refinement Near Walls in HEAT Transfer Predictions in Stirred Tanks	52
<i>José Roberto Nunhez, R. J. Prada</i>	
(301f) Comparison of PIV Measurements with CFD Simulation Results in an in-Line, Slot and Tooth Rotor-Stator Mixer	53
<i>Jung W. Kim, Derrick I. Ko, Karl R. Kevala, Richard V. Calabrese</i>	
(376a) Large Eddy Simulation of CSTR Systems: Comparison to Theory and Experiment	54
<i>Jason G. Giacomelli, John A. Thomas, Richard K. Grenville</i>	
(376b) Computational Fluid Dynamics Simulation of a Pipeline Rotor-Stator Mixer	55
<i>Derrick I. Ko, Jung W. Kim, Benjamin A. Minnick, Ronald Jaimes Prada, Richard V. Calabrese</i>	
(376c) Predicting Baffle Forces Using Both Computational Fluid Dynamics (CFD) and Experimental Techniques for Both Radial and Axial Flow Impellers	56
<i>Richard Kehn, Edward Hensel</i>	
(376d) Modeling Distributed-Parameter Mixing Processes Using Computational Fluid Dynamics and z-Transform	65
<i>De-Wei Yin</i>	
(376e) Solution of the Fokker-Planck Equation Using the Extended Quadrature Method of Moments	66
<i>Ehsan Madadi-Kandjani, Alberto Passalacqua</i>	
(376f) A Quadrature-Based CFD Model for Single-Phase Turbulent Reacting Flows	67
<i>David N. Williams, Ehsan Madadi-Kandjani, Alberto Passalacqua, Rodney O. Fox</i>	
(376g) Applying Evolutionary Algorithms in Optimizing Mixing in Selective Catalytic Reduction Systems Via Computational Fluid Dynamics (CFD)	68
<i>Stewart Bible, Caleb Triece</i>	
(438a) A CFD-DEM Model for Viscous Solid-Liquid Mixing in Stirred Tanks	69
<i>François Bertrand, Bruno Blais, Manon Lassaigne, Louis Fradette, Christoph Goniva</i>	
(438b) Investigating Bubble Size Distribution in Fermentation Reactors with CFD	70
<i>Ravindra Aglave, Thomas Eppinger, Simon Lo</i>	
(438c) CFD Simulations of a Stirred Tank Reactor for Liquid and Gas-Liquid Systems Using Openfoam®	71
<i>Xiaofei Hu, Alberto Passalacqua, Rodney O. Fox</i>	
(438d) Validation of Multiphase Mean Age Theory	72
<i>David C. Russ, R. Eric Berson</i>	
(438e) Numerical Investigation of Bubble Effects on Taylor-Couette Flow Patterns in the Weakly Turbulent Vortex Flow Regime	73
<i>Xi Gao, Bo Kong, R. Dennis Vigil</i>	
(438f) Characterization of Gas Dispersion Behavior in Flotation Cells Using Coupled CFD-PBM and Direct PBM Approaches	74
<i>Manjunath Basavarajappa, Sanja Miskovic</i>	
(438g) CFD Investigation of Gas-Liquid Mass Transfer in a Multiphase Taylor-Couette Reactor	75
<i>Xi Gao, Bo Kong, Mahdi Ramezani, Michael Olsen, R. Dennis Vigil</i>	
(480a) Correlation of Non-Baffled, Angled and Off-Center Agitated Process Vessel Blend Times	76
<i>Bruce Vickroy</i>	
(480b) Experimental Determination of Solids Suspension with Angled Impellers in Pharmaceutical Mixing Vessels	77
<i>Yingxi Tang, Piero M. Armenante</i>	
(480c) Multiphase Bioreactor Simulation with GPUs	78
<i>Christian Witz, Johannes G. Khinast</i>	
(480d) Retreat Curve Impeller Flow and Heat Transfer Characteristics	79
<i>Laura J. Dietsche, Kishore Kar</i>	
(480e) Advances in Gas Sparging Simulation for Bioreactor Modeling to Create Comprehensive “Simulation Design Space”	80
<i>Sravan Kumar Nallamothe, Shitalkumar Joshi, Shailesh Ozarkar</i>	
(550a) Particle Engineering of Cocrystals Using a Solvent-Free Approach By Spray Congealing	81
<i>Íris Duarte, João F. Pinto, Márcio Temtem</i>	
(550b) A Case Study in Tuning API Powder Properties Via Crystallization to Meet Formulation Needs	85
<i>Jeanne Ho, Matthew Haley, Dolapo Olusanmi, Tamar Rosenbaum</i>	
(550c) Improving Dissolution Kinetics of Pharmaceuticals By Fluidized Bed Impregnation	86
<i>Plamen I. Grigorov, Benjamin J. Glasser, Fernando. J Muzzio</i>	
(550d) A Drop-on-Demand Manufacturing System for the Production of Amorphous Drug Products	87
<i>Elçin İçten, Arun Giridhar, Zoltan K. Nagy, Gintaras V. Reklaitis</i>	

Introduction of Advances in Industrial Mixing	88
<i>David S. Dickey</i>	
Improved Correlation for Predicting Just Suspension Speed in Stirred Tanks	89
<i>Richard K. Grenville</i>	
Mixing Processes and Process Validation in the Pharmaceutical Industry	90
<i>Piero M. Armenante</i>	
Heat Transfer in Stirred Tanks - Update	91
<i>José Roberto Nunhez</i>	
Microstructure, Rheology, and Processing of Complex Fluids	92
<i>Patrick T. Spicer, James F. Gilchrist</i>	
Flow Patterns and Mixing - Visualization	93
<i>David S. Dickey</i>	
Advances in Industrial Mixing: We've Come a Long Way!	94
<i>Suzanne M. Kresta</i>	
Author Index	