

# **10th AIChE Southwest Process Technology Conference 2018**

Galveston, Texas, USA  
9 - 10 October 2018

ISBN: 978-1-5108-8234-8

**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](http://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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

## CATALYSIS & REACTION ENGINEERING

<b>(2a) The Future Is Here: Robotic Catalyst Removal</b> .....	1
<i>Christopher R. Jansen, Andrew W. Stoley</i>	
<b>(2b) Methaforming, Novel Zeolite Catalyst That Converts Naphtha and Alcohol to Gasoline at 1/3 the Current Cost</b> .....	15
<i>Stephen Sims</i>	
<b>(2c) New Catalytic Options for Hydrotreating</b> .....	23
<i>Steven F. Zink</i>	
<b>(2d) Mechanism of Production of 3-hydroxypropionic acid (3-HP) in the Shell PDO Process</b> .....	31
<i>Paul Weider</i>	

## ENERGY EFFICIENCY

<b>(3a) Increased Efficiency and Reduced Costs with Electric Process Heating</b> .....	41
<i>David Taylor</i>	
<b>(3b) Advanced Steam System Optimization for Reliable and Efficient Production</b> .....	43
<i>Jim Risko</i>	
<b>(3c) Real Time Energy Management Systems: On-Premise and Cloud-Based Implementation Challenges</b> .....	45
<i>Oscar Santollani</i>	
<b>(3d) Utilizing WirelessHART for Modular Design, Validation, and Deployment</b> .....	47
<i>Mark Nixon</i>	

## PROCESS INTENSIFICATION

<b>(4a) How Active is Too Active? A Catalyst Selection Study</b> .....	49
<i>Dylan Kipp</i>	
<b>(4b) Scaling Down A Purge Bin: A Multiscale Model-Centric Focus on Process Fundamentals</b> .....	51
<i>Justin Federici, Sebastian Chialvo, Bing Du, Sarah Feicht, Steven Haynie, Dave Sandell</i>	
<b>(4c) From Process Understanding to Efficiency Improvement: Optimization to Search Optimum Operating Conditions</b> .....	53
<i>Thomas Eppinger, Leonard Becker, Ravindra Aglave, Chandra Tourani</i>	
<b>(4d) Low Temperature H<sub>2</sub>S Removal from CO with High Activity Sorbent</b> .....	55
<i>Tian Gu, Pankaj S. Gautam</i>	

## DISTILLATION & SEPARATION

<b>(5a) Debottlenecking of a Large Industrial Deethanizer by Gravity Driven Two-Phase Flow Analysis</b> .....	57
<i>Brian Balance, Joe B. Hatfield, J. Antonio Garcia</i>	
<b>(5b) Process Simulation Predicts Corrosive Conditions in HF Alkylation Fractionators</b> .....	59
<i>Barry L. Burr</i>	
<b>(5c) Troubleshooting Styrene Column</b> .....	70
<i>Petr Lenfeld</i>	
<b>(5d) Can Loss of Valve Floats Lead to Premature Flood?</b> .....	76
<i>Matthew Olsson, Henry Z. Kister</i>	
<b>(5e) Tower Entry Safety - Safety in Field Inspections</b> .....	78
<i>Daniel R. Summers</i>	

## PROCESS SAFETY

<b>(6a) The Role of Academia In Process Safety and Safety Engineering</b> .....	80
<i>T. Michael O'Connor</i>	

<b>(6b) Should Chemical Engineers Have More Influence On Safety Than They Do Now?</b> .....	82
<i>Richard E. Engler</i>	
<b>(6c) Achieving Consistent Risk Evaluation Results Preventing</b> .....	83
<i>Stewart Behie</i>	
<b>(6d) Disasters: An Objective Review of Problem-Solving in Bhopal</b> .....	85
<i>Kenneth Bloch</i>	
<b>(6e) Using Bow Ties to Improve Process Safety</b> .....	87
<i>Robin Pitblado</i>	

## **THERMODYNAMICS & PROCESS SIMULATION**

<b>(7a) How Enhanced Reality Simulation Increases Uptime, Increases Productivity and Accelerates Operator Onboarding</b> .....	89
<i>Christian McDermott</i>	
<b>(7b) Unified Evaluation of Complex J-T Induced Thermal, Flow and Phase Dynamics for Capacity Increase of Offshore Flare System</b> .....	91
<i>Dewayne Anderson</i>	
<b>(7c) Reduced Order Models (ROMs) for Simulation Democratization and Digital Twins</b> .....	93
<i>Anchal Jatale</i>	
<b>(7d) Optimize Overhead Refinery Operations with Ionic Modeling</b> .....	95
<i>Rasika Nimkar</i>	
<b>(7e) Online Optimization of Cooling Water System in a District Cooling Plant</b> .....	97
<i>David Hill</i>	

## **MEET THE INDUSTRY POSTER RECEPTION**

<b>(8e) Causes and Mitigation Plan for Glycol Losses for A Natural Gas Dehydration Plant</b> .....	99
<i>Md Emdadul Haque, Qiang Xu, Srinivas Palanki</i>	
<b>(8i) Controllability Studies for CO2 Post-Combustion Capture Processes with Amines</b> .....	101
<i>Yiling Xu, Qiang Xu</i>	
<b>(8b) Exploiting Au/TiO2 Interface Chemistry with Water for PrOx of CO in Water-gas Shift Streams</b> .....	103
<i>Sravan Kumar Kanchari Bavajigari, Todd Whittaker, Bert D. Chandler, Lars C. Grabow</i>	
<b>(8l) Integrated Scheduling of Refinery Production and Pipeline-based Multi-oil Product Distribution</b> .....	105
<i>Li Yu, Qiang Xu</i>	
<b>(8j) Modeling and Simulation of 1,3 Butadiene Extraction Process at Turndown Capacities</b> .....	107
<i>Namit Tripathi, Srinivas Palanki, Qiang Xu</i>	
<b>(8k) Optimal Design and Operation of DMR Refrigeration System for Natural Gas Liquefaction Process</b> .....	110
<i>Mozammel Mazumder, Qiang Xu, Srinivas Palanki</i>	
<b>(8d) Rational Design of Improved Low-Temperature Diesel Oxidation Catalysts</b> .....	112
<i>Yuying Song, Lars C. Grabow</i>	
<b>(8f) Self-Assembly of Specific Nanostructures on Catalyst Supports Using Reverse Micelles as Nano-Vehicle</b> .....	114
<i>Karishma Piler, Tracy J. Benson</i>	
<b>(8c) Shear Thickening and Normal Stress Differences of Colloid + Polymer Mixtures</b> .....	116
<i>Nayoung Park, Jacinta C. Conrad</i>	
<b>(8h) Simultaneous Front-end Crude Scheduling and Unit Maintenance Management for Inland Refineries</b> .....	118
<i>Honglin Qu, Qiang Xu</i>	
<b>(8m) Study of the Physical Properties of UV-Crosslinked Poly(Vinylmethylsiloxane)</b> .....	120
<i>Debaroty Roy, Shreyas Oak, Julie N. L. Albert</i>	
<b>(8a) Time-resolved In situ Studies of Zeolite Crystal Growth</b> .....	122
<i>Madhuresh K. Choudhary, Manjesh Kumar, Rishabh Jain, Jeffrey D. Rimer</i>	
<b>(8g) Upset-Conscious Scheduling of Cracking Furnace System for Olefin Plants</b> .....	124
<i>Min Chen, Qiang Xu</i>	

## **CHEMICAL PROCESS TECHNOLOGY 1**

<b>(9a) Crude to Chemicals: The Reasons, The Hurdles, and The Approach</b> .....	126
<i>Raghu Narayan</i>	
<b>(9b) Improving Asset Effectiveness through Data Analytics and Predictive Modeling</b> .....	128
<i>Sameer Thorat</i>	
<b>(9c) High Emissivity Coatings: Increasing Production and Efficiency in VCM and Ethylene Furnaces</b> .....	130
<i>John Olver</i>	

## **PETROLEUM REFINING TECHNOLOGY 1**

<b>(10a) The Future of Capital Investments: Where Does the US Fit In?</b> .....	132
<i>Lee Nichols</i>	
<b>(10b) The Big IMO Disruption: Fueling the World's Ships</b> .....	134
<i>Sandeep Sayal</i>	
<b>(10c) Advances in Utilizing Data to Improve Operations</b> .....	136
<i>Tim Olsen</i>	
<b>(10d) Going Digital in Downstream - "From Tired to Wired"</b> .....	138
<i>Chris Harclerode</i>	

## **CHEMICAL PROCESS TECHNOLOGY 2**

<b>(13a) Design Guidelines for Propylene Splitters Efficiencies</b> .....	140
<i>Karl Kolmetz</i>	
<b>(13b) Flameless Oxidation &amp; Gaseous Waste Emission Compliance</b> .....	142
<i>Nick Disanti</i>	
<b>(13c) Predictive Maintenance the First Digitization Success for the Chemical Industry</b> .....	144
<i>Birgit Braun, Michael Dessauer, Mary Beth Seasholtz</i>	

## **PETROLEUM REFINING TECHNOLOGY 2**

<b>(14a) Market Trends Driving North American Refinery Profitability</b> .....	146
<i>Anne Huber</i>	
<b>(14b) Refinery Wide Model Optimization</b> .....	147
<i>Chris Morris, John C Fagley</i>	
<b>(14c) Crude Unit Fouling: What's Normal? Why is it Important?</b> .....	149
<i>Andrew W. Sloley</i>	

**Author Index**