

Crystallization Applications

Recent Publications

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How to Measure Solubility and Metastable Zone

- The Effect of Mixing on the Metastable Zone With and Nucleation Kinetics in the Anti-Solvent Crystallization on Benzoic Acid**
 D. O'Grady, M. Barrett, E. Casey, B. Glennon
 Chemical Engineering Research and Design (2007), 85(7): 945 – 952
- Characterizing the Metastable Zone Width and Solubility Curve Using Lasentec FBRM and PVM**
 P. Barrett, B. Glennon
 Chemical Engineering Research and Design (2002), 80(7): 799 – 805
- Study of the Solid-liquid Solubility in the Piperazine-H₂O-CO₂ System using FBRM and PVM**
 I. Kim, X. Ma, J. Andreassen
 Energy Procedia (2012), 23: 72 – 81
- Monitoring Temperature Effect of the Polymorphic Transformation of Acitretin Using FBRM-Lasentec**
 D. Sathe, K. Sawant, H. Mondkar, T. Naik, M. Deshpande
 Organic Process Research & Development (2010), 14(6): 1373 – 1378

Crystallization Design

- **Control of the Particle Properties of a Drug Substance by Crystallization Engineering and the Effect on Drug Product Formulation**
S. Kim, B. Lotz, M. Lindrud, K. Girard, T. Moore, K. Nagarajan, M. Alvarez, T. Lee, F. Nikfar, M. Davidovich, S. Srivastava, S. Kiang
Organic Process Research & Development (2005), 9(6): 894 – 901
- **Process Development Challenges to Accommodate a Late-Appearing Stable Polymorph: A Case Study on the Polymorphism and Crystallization of a Fast-Track Drug Development Compound**
S. Desikan, R. Parsons Jr., W. Davis, J. Ward, W. Marshall II, P. Toma
Organic Process Research & Development (2005), 9(6): 933 – 942
- **Enhancing Crystalline Properties of a Cardiovascular Active Pharmaceutical Ingredient Using a Process Analytical Technology Based Crystallization Feedback Control Strategy**
A. Saleemi, G. Steele, N. Pedge, A. Freeman, Z. Nagy
International Journal of Pharmaceutics (2012), 430(1-2): 56 – 64
- **Mass-count Plots for Crystal Size Control**
D. Griffin, M. Grover, Y. Kawajiri, R. Rousseau
Chemical Engineering Science (2015), 137: 338 – 351

Seeding Crystallization Processes

- **PAT-Enabled Determination of Design Space for Seeded and Cooling Crystallization**
Z. Yu, P. Chow, R. Tan, W. Ang
Organic Process Research & Development (2013), 17(3): 549 – 556
- **An In-Line Study of Oiling Out and Crystallization**
E. Deneau, G. Steele
Organic Process Research & Development (2005), 9(6): 943 – 950
- **Optimal Seed Recipe Design for Crystal Size Distribution Control for Batch Cooling Crystallization Processes**
E. Aamir, Z. Nagy, C. Rielly
Chemical Engineering Science (2010), 65(11): 3602 – 3614
- **Seeded Batch Cooling Crystallization with Temperature Cycling for the Control of Size Uniformity and Polymorphic Purity of the Sulfathiazole Crystals**
M. Bakar, Z. Nagy, C. Rielly
Organic Process Research & Development (2009), 13(6): 1343 – 1356

Optimizing Crystal Shape

- **Modification Of Crystal Shape through Deep Temperature Cycling**
M. Jiang, X. Zhu, M. Molaro, M. Rasche, H. Zhang, K. Chadwick, D. Raimondo, K. Kim, L. Zhou, Z. Zhu, M. Wong, D. O'Grady, D. Hebrault, J. Tedesco, R. Braatz
Industrial & Engineering Chemistry Research (2014), 53(13): 5325 – 5336
- **Optimization of a Crystallization by Online FBRM Analysis of Needle-Shaped Crystals**
T. Leyssens, C. Baudry, M. Hernandez
Organic Process Research & Development (2011), 15 (2): 413 – 426

- **Control of Crystal Modification and Crystal Shape by Control of Solid-Solid Transitions during Crystallization and Drying: Two Industrial Case Studies**
F. Dufour, B. Stichel, J. Grayson
Organic Process Research & Development (2013), 17(3): 568 – 577
- **Process Intensification through Continuous Spherical Crystallization Using a Two-Stage Mixed Suspension Mixed Product Removal (MSMPR) System**
R. Peña, Z. Nagy
Crystal Growth & Design (2015), 15(9): 4225 – 4236

Monitoring Supersaturation

- **Monitoring and Feedback Control of Supersaturation Using ATR-FTIR to Produce an Active Pharmaceutical Ingredient of a Desired Crystal Size**
V. Liotta, V. Sabesan
Organic Process Research & Development (2004), 8(3): 488 – 494
- **Novel, Calibration-Free Strategies for Supersaturation Control in Anti-Solvent Crystallization Processes**
D. Duffy, M. Barrett, B. Glennon
Crystal Growth & Design (2013), 13(8): 3321 – 3332
- **Evolution and Application of an Automated Platform for the Development of Crystallization Processes**
G. Zhou, A. Moment, S. Young, A. Cote, T. Hu
Organic Process Research & Development (2013), 17(10): 1320 – 1329
- **Supersaturation Tracking for the Development, Optimization and Control of Crystallization Processes**
M. Barrett, M. McNamara, H. Hao, P. Barrett, B. Glennon
Chemical Engineering Research & Design (2010), 88(8): 1108 – 1119

Polymorphic Crystallization

- **The Use of *In Situ* Tools to Monitor the Enantiotropic Transformation of p-Aminobenzoic Acid Polymorphs**
H. Hao, M. Barrett, Y. Hu, W. Su, S. Ferguson, B. Wood, B. Glennon
Organic Process Research & Development (2012), 16(1): 35 – 41
- **Application of *In Situ* FBRM and ATR-FTIR to the Monitoring of the Polymorphic Transformation of d-Mannitol**
B. O'Sullivan, B. Glennon
Organic Process Research & Development (2005), 9(6): 884 – 889
- **Effect of Temperature and Solvent of Solvent-Mediated Polymorph Transformation on ASP3026 Polymorphs and Scale-up**
K. Takeguchi, K. Obitsu, S. Hirasawa, R. Orii, S. Ieda, M. Okada, H. Takiyama
Organic Process Research & Development (2016), 20(5): 970 – 976
- **Investigation into the Cooling Crystallization and Transformations of Carbamazepine Using *In Situ* FBRM and PVM**
W. Liu, H. Wei, J. Zhao, S. Black, C. Sun
Organic Process Research & Development (2013), 17(11): 1406 – 1412

Phase Separation (Oiling Out)

- ***In Situ* Monitoring, Control and Optimization of a Liquid-Liquid Phase Separation Crystallization**
D. Duffy, N. Cremin, M. Napier, S. Robinson, M. Barrett, H. Hao, B. Glennon
Chemical Engineering Science (2012), 77(30): 112 – 121
- **The Role of Diastereomer Impurity in Oiling-Out During the Resolution of trans-4-Methyl-2-piperidine Carboxylic Ethyl Ester Enantiomers by Crystallization**
R. Ren, D. Sun, T. Wei, S. Zhang, J. Gong
Organic Process Research & Development (2014), 18(6): 709 – 716
- ***In Situ* Monitoring of the Impact of Liquid-Liquid Phase Separation on Drug Crystallization by Seeding**
L. Lafferrère, C. Hoff, S. Veessler
Crystal Growth & Design (2004), 4(6): 1175 – 1180
- **Solution Crystallization of Vanillin in the Presence of a Liquid-Liquid Phase Separation**
H. Zhao, C. Xie, Z. Xu, Y. Wang, L. Bian, Z. Chen, H. Hao
Industrial & Engineering Chemistry Research (2012), 51(45): 14646 – 14652

Managing Impurities

- **Cyclic Auto-Seeded Polythermal Preferential Crystallization – Effect of Impurity Accumulation**
F. Czapla, D. Polenske, L. Klukas, H. Lorenz, A. Seidel-Morgenstern
Chemical Engineering and Processing: Process Intensification (2010), 49(1): 22 – 28
- **In-Line Analysis of Impurity Effects on Crystallization**
C. Scott, S. Black
Organic Process Research & Development (2005), 9(6): 890 – 893
- **Influence of Impurities of the Crystallization of Dextrose Monohydrate**
A. Markande, A. Nezzal, J. Fitzpatrick, L. Aerts, A. Redl
Journal Crystal Growth (2012), 353(1): 145 – 151
- **Use of Continuous MSMR Crystallization with Integrated Nanofiltration Membrane Recycle for Enhanced Yield and Purity in API Crystallization**
S. Ferguson, F. Ortner, J. Quon, L. Peeva, A. Livingston, B. Trout, A. Myerson
Crystal Growth & Design (2014), 14(2): 617 – 627

Crystallization Scale-Up

- **Crystallization Improvements of a Diastereomeric Kinetic Resolution through Understanding of Secondary Nucleation**
P. Mousaw, K. Saranteas, B. Prytko
Organic Process Research & Development (2008), 12(2): 243 – 248
- **A Novel Crystallization Methodology to Ensure Isolation of the Most Stable Crystal Form**
A. Cote, G. Zhou, M. Stanik
Organic Process Research & Development (2009), 13(6): 1276 – 1283

- **Palbociclib Commercial Manufacturing Process Development Part II: Regioselective Heck Coupling with Polymorph Control for Processability**
M. Maloney, B. Jones, M. Olivier, J. Magano, K. Wang, N. Ide, A. Palm, D. Bill, K. Leeman, K. Sutherland, J. Draper, A. Daly, J. Keane, D. Lynch, M. O'Brien, J. Tuohy
Organic Process Research & Development (2016), 20(7): 1203 – 1216
- **The Role of Meso-Mixing in Anti-Solvent Crystallization Processes**
M. Barrett, D. O'Grady, E. Casey, B. Glennon
Chemical Engineering Science (2011), 66(12): 2523 – 2534

Continuous Crystallization

- **Characterization of the Anti-Solvent Batch, Plug Flow and MSMR Crystallization of Benzoic Acid**
S. Ferguson, G. Morris, H. Hao, M. Barrett, B. Glennon
Chemical Engineering Science (2013), 104(18): 44 – 54
- **Pilot-Scale Continuous Production of LY2886721: Amide Formation and Reactive Crystallization**
C. Polster, K. Cole, C. Burcham, B. Campbell, A. Frederick, M. Hansen, M. Harding, M. Heller, M. Miller, J. Phillips, P. Pollock, N. Zaborenko
Organic Process Research & Development (2014), 18(11): 1295 – 1309
- **In-Situ Monitoring and Characterization of Plug Flow Crystallizers**
S. Ferguson, G. Morris, H. Hao, M. Barrett, B. Glennon
Chemical Engineering Science (2012), 77(30): 105 – 111
- **Modeling Particle Disruption of an Organic Fine Chemical Compound Using Lasentec Focused Beam Reflectance Monitoring (FBRM) in Agitated Suspensions**
E. Kougoulos, A. Jones, M Wood-Kaczmar
Powder Technology (2005), 155(2): 153 – 158