COBBLESTONE

NEW!

COURSE ID 3116

Crystallization: Mastering Seeded Antisolvent Techniques

DIRECTED BY

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3 Hours

ACCREDITED COURSE

- Concept of Crystallization from Solution
- Seeded Crystallization in Practice
- Scale-Up Considerations
- Q&A and Discussion
- Conclusion and Recap

about the course

Crystallization plays a pivotal role in the production of high-quality specialty bulk products. This process will influence particle size, purity, and product yield all while needing to be monitored and controlled to meet a product's specifications.

This 3-hour fully accredited training is tailored for process chemists, chemical engineers, and pharmaceutical engineers. It delves into the critical role of crystallization, focusing specifically on seeded anti-solvent crystallization processes. Participants will explore the challenges encountered in industries such as pharmaceuticals, food, fine chemicals, and cosmetics.

Through immersive case studies and practical demonstrations, attendees will gain a comprehensive understanding of advanced techniques in seeded anti-solvent crystallization. Topics covered include fundamental principles, phase diagrams, and innovative seeding strategies. Emphasis will be placed on mastering supersaturation generation and control, diverse seeding methodologies, and cutting-edge in-situ seed bed formation techniques.

Additionally, participants will tackle the complexities of scaling up processes, overcoming challenges related to local effects and mixing regimes during scale up operation, ensuring safety. By the end of the course, process chemists, chemical engineers, and pharmaceutical engineers will be equipped to navigate seeded anti-solvent crystallization processes effectively, contributing to the efficient and consistent production of large-scale crystallized products with defined physical properties.

Live interaction with the instructor allows for dynamic discussions and clarifications.

For attendance verification and to maximize participation, participants attending the live training are required to use their webcam during the course. Microphones and speakers/headset are encouraged.

who should attend

This course is designed for professionals within the process industries of pharmaceutical, food, fine chemical, and cosmetics.

These professionals include, but are not limited to:

- Chemist
- Materials Science
- Other roles responsible for ensuring the successful development of organic compounds
- Engineers
- Project Management

The course is valuable for individuals with varying levels of experience, making it beneficial for both seasoned experts and newcomers in these industries.

learning objectives

Upon completion of this course, you will be able to:

- Identify and define the fundamental principles underlying anti-solvent crystallization and its significance across various industries, including pharmaceuticals and fine chemicals.
- Explain the thermodynamics of crystallization, solubility, and supersaturation dynamics, along with mechanisms of nucleation and crystal growth, enabling effective control of the crystallization process.
- Utilize a variety of seeding techniques, apply criteria for selecting seed crystals, emphasizing the importance of seed size distribution and seed form for final Critical Quality Attributes (CQA) control.
- Apply the anti-solvent crystallization process with proficiency, including the principle of anti-solvent addition, solvent selection, solubility profiles (typical vs synergistic), and manipulation of temperature, solvent activities and mixing to achieve desired crystallization outcomes.
- Analyze real-world case studies and applications of anti-solvent crystallization in pharmaceutical manufacturing, agrochemical production, and beyond, identifying challenges and implementing effective solutions in practical scenarios.
- Examine recent advancements and emerging trends in anti-solvent crystallization, enabling you to anticipate and adapt to potential developments in the field.

course outline

Review of Learning Objectives

- Introduction to Seeded Anti-Solvent Crystallization
- Overview of crystallization techniques and their importance
- Introduction to anti-solvent crystallization and its relevance
- Basic principles of seeded crystallization
- Importance of controlling crystal size and morphology

Exploring Fundamentals

- Thermodynamics of crystallization: basic principles
- Solubility and supersaturation: key concepts
- Nucleation and growth mechanisms: understanding the process
- Factors influencing crystal growth and morphology

Seeding Techniques Unveiled

- Overview of various seeding methods and their applications
- Significance of seed size and distribution in influencing crystallization outcomes
- Techniques for seed preparation and characterization
- Seed supply strategy for GMP scale-up

Navigating the Anti-Solvent Crystallization Process

- Principle behind anti-solvent addition and its implications
- Solvent selection, solubility profiles and phase diagram
- Mixing strategies for controlling supersaturation to achieve desired outcomes
- Techniques for monitoring and controlling crystal growth

Case Studies and Practical Applications

- How to deal with a synergistic solubility profile
- How to isolate a large molecule prone to Liquid-Liquid Phase Separation (i.e. oiling out)
- How to avoid (or preserve) a solvate during processing

Scale-up and Future Directions

- Identifying and troubleshooting scale-up challenges
- Integration with other process technologies for enhanced efficiency

Interactive Q&A and Discussion (20 minutes)

- Open forum for participant inquiries and discussions
- Recapitulating key learnings and takeaways from the session

Question and Answer Session

Assessment Opportunity

course instructor

Moussa Boukerche is a highly experienced crystallization scientist with a Ph.D in Chemical Engineering (France). He has over 25 years of expertise in industrial crystallization process development and solid form control. He has worked for renowned companies like Eli Lilly (USA), Abbvie (USA), Pfizer (UK), Aughinish Alumina (Ireland), and SANOFI (France). After leaving AbbVie (USA), Moussa founded Moussa Boukerche Consulting LLC, a consulting company specializing in industrial crystallization. He is also the founder of InCryst Ltd (Innovative Crystallization www.incryst.com), a crystallization company focused on delivering innovative solutions in the field of crystallization process development and solid form screening. Moussa continues to provide guidance and training on crystallization fundamentals, offering valuable insights to pharmaceutical, fine chemical, cosmetic, agro and food companies seeking process design, development and optimization.

Accreditations

International Accreditors for Continuing Education and Training (IACET)

Cobblestone has been approved as a CEU Accreditor by IACET and awards CEUs for participation in qualified courses. Cobblestone has demonstrated that it complies with the ANSI/IACET Standards and is authorized to offer IACET CEUs for its programs. CEUs will be awarded for participation in Cobblestone's courses at the rate of .1 CEU per contact hour upon successful completion of the entire course and 70% accuracy in the required Learners' Assessment. A minimum score of 80% is required for all courses within the Cobblestone Certification Program. This course offers a total of 3 contact hours, or .3 CEUs.

For further information, visit www.iacet.org

AIC- American Institute of Chemists

Cobblestone is committed to enhancing the ongoing professional development of Cost Engineering professionals and other stakeholders through appropriate learning activities and programs. Many Cobblestone courses offer training that may be helpful in meeting the AACE continuing education requirements for recertification as a Certified Chemist, Certified Chemical Engineer, or Chemical Technician.

For more information about AIC, visit: www.theaic.org