



Precision Crystallization: Theory and Practice of Controlling Crystal Size

Ingo Leubner

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Despite the fact that crystals make up an estimated 80% of chemical and pharmaceutical products, few resources exist that provide practical guidance on achieving precision control of their size and size distribution. Based on a model developed by the author and his colleagues, **Precision Crystallization: Theory and Practice of Controlling Crystal Size** presents scientists and product engineers with the tools to control crystal nucleation, enabling them to ultimately control crystal size and size distribution for batch and continuous crystallizations.

At the cutting edge of crystallization science and technology, this volume presents information never before available. Introducing the *Balanced Nucleation and Growth* (BNG) model, the book demonstrates how the results of the nucleation process are quantitatively related to practical experimental control values such as:

- reaction addition rate
- crystal solubility
- temperature
- residence time (continuous crystallizations)
- the effect of ripening agents (crystal supersizing) during nucleation
- the effect of crystal growth restrainers (crystal nanosizing) during nucleation
- control of renucleation

The author shows how the BNG theory predicts previously unknown phenomena and also how it corrects erroneous perceptions of the importance of reaction volume on the outcome of crystal nucleation. Going above and beyond classical nucleation theories which rely to a large extent on guesswork, the BNG model gives precise guidance to scientists working in a range of critical areas, leading to promising implications for research, quality control, product development, production processes, pilot plant operations, and manufacturing.

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