

### 3 ways to efficiently develop green crystallization processes

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Batch crystallization is still the most widely used purification and form giving method in the specialty and pharmaceutical industry. Typical green crystallization process development targets are: minimization of solvent volume, off-spec batches (with regard to polymorphic form, crystal purity and size), product characteristics variability, active substance loss and batch time reduction thus asset utilization maximization.

This talk highlights several methods and BASF case studies to reach the targets outlined above: e.g. in-silico solvent screening for a new molecule, in-situ process analytical technology (PAT) [1], [2] based process understanding to minimize off-spec batches and efficient implementation of advanced feedback process control methods using “Crystbench” - a highly automated state-of-the-art reaction-crystallization-filtration process R&D laboratory platform.

References:

[1] **2014: The PAT Trend Is Still Bullish.**

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*Organic Process Research & Development, PAT Special Issue Editorial, 2015, 19, 1, 1-2*

[2] **Assessment of recent process analytical technology (PAT) trends: a multiauthor review**

Levente L Simon, Hajnalka Pataki, György Marosi, Fabian Meemken, Konrad Hungerbühler, Alfons Baiker, Srinivas Tummala, Brian Glennon, Martin Kuentz, Gerry Steele, Herman JM Kramer, James W Rydzak, Zengping Chen, Julian Morris, Francois Kjell, Ravendra Singh, Rafiqul Gani, Krist V Gernaey, Marjatta Louhi-Kultanen, John O'Reilly, Niklas Sandler, Osmo Antikainen, Jouko Yliruusi, Patrick Frohberg, Joachim Ulrich, Richard D Braatz, Tom Leysens, Moritz Von Stosch, Rui Oliveira, Reginald BH Tan, Huiquan Wu, Mansoor Khan, Des O'Grady, Anjan Pandey, Remko Westra, Emmanuel Delle-Case, Detlef Pape, Daniele Angelosante, Yannick Maret, Olivier Steiger, Miklós Lenner, Kaoutar Abbou-Oucherif, Zoltan K Nagy, James D Litster, Vamsi Krishna Kamaraju, Min-Sen Chiu

*Organic Process Research & Development, PAT Special Issue, 2015, 19, 1, 3-62*

Interests:

- Conceptual chemical process design with focus on separation technologies
- Crystallization process R&D
- Implementation of Process Analytical Technologies (PAT)