



CrystalBreeder



Crystal16



Crystalline

NEW SOFTWARE OPTIONS FOR FEEDBACK CONTROL

Looking to stay ahead of the game? In an increasingly competitive market companies are under constant pressure to get more new products to market, faster, and with fewer resources. The key to success or even survival for industries lies in effective innovation. The need of having a well-established *feedback control* strategy is more and more explored in the different industries.

Save time with the feedback control option

Simplify crystallization by automating your process

In pharma, 80% of the active ingredients are used in their crystalline form and 40% of all industrial crystallization processes are "cooling crystallization". The *feedback control* functionality of the Crystallization Systems software allows automatic detection of clear and cloud point. The **Crystal16** or **CrystalBreeder** instruments with the *feedback control* functionality enables you to easily detect when the compound is completely dissolved (clear point) and controls crystallization by triggering the next temperature controlled step (cloud point). By making use of the *feedback control* functionality offered by the Crystallization Systems software, experiment time can be reduced dramatically. Increase now your R&D output and productivity to maintain the competitive edge of your company.

Feedback control software options

Design your experiments with automated decision making. Less time to optimise your process; simplify induction time and nucleation rate.

Contact Technobis Crystallization Systems to learn how you can add the Feedback Control Software option to your **Crystal16** or **CrystalBreeder**.



Crystal16



CrystalBreeder

APPLICATION NOTE
FEEDBACK CONTROL

Technobis
CRYSTALLIZATION SYSTEMS

Feedback Control: Save time in a smart and automated way

Case study A: Solubility curves with feedback control

Upon heating a suspension of known composition, the temperature at which all crystals are dissolved marks a point on the solubility line. After a recrystallization step through cooling, the measurement can be repeated. With the **Crystal16**, one can perform 16 solubility measurements at 1 mL scale. Measuring multiple samples simultaneously gives a dataset of saturation temperatures at different concentrations that represent the solubility line. Typical measurements for a full solubility line may take up to 8 hours. By making use of the *feedback control* functionality offered by the Crystallization Systems software, the time can be reduced dramatically to 5 hours.

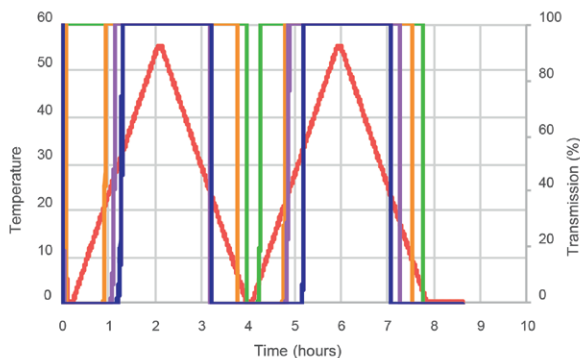
Feedback Control Software

The **Crystal16** and **CrystalBreeder** offer an invaluable tool to automate the control of your crystallization processes in less time and effectively flag significant changes that can impact batch times.

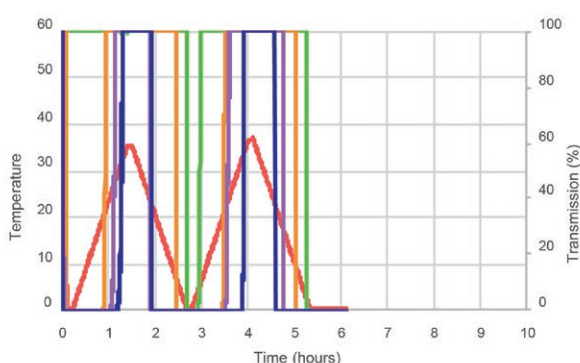
Case study B: Crystallization experiments with feedback control

A benefit of the temperature cyclic measurements is that during the cooling stage, the temperature at which the first crystals appear can be recorded as the cloud point. The collection of cloud points give the metastable zone width (MSZW), which is used to determine the operation range of the process and indicates the tendency towards primary nucleation. Making use of the *feedback control* strategy will help you to reduce significantly the time spent making and optimizing your crystallization process by triggering the next temperature controlled step once first crystals are detected. The experiment time can be significantly reduced by making use of the new software options for *feedback control*. For example, crystallization experiments may take up to 70 hours. By making use of the *feedback control* options offered by the Crystallization Systems software, the time can be reduced dramatically to 15 hours. Growth of single crystals also benefit hugely from the feedback control options. Once the crystal is detected, the next temperature step is triggered to allow growth. *Feedback control* will finally help you reduce the time to market of your product.

Solubility without feedback control

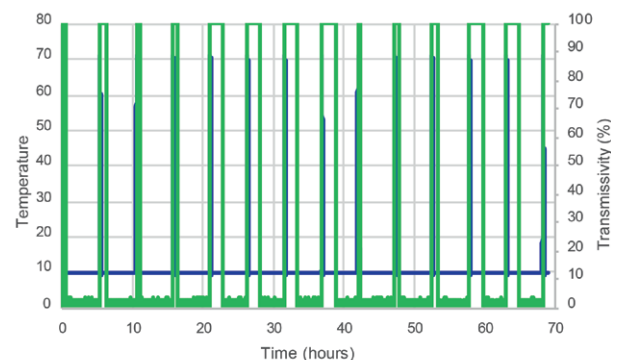


Solubility with feedback control

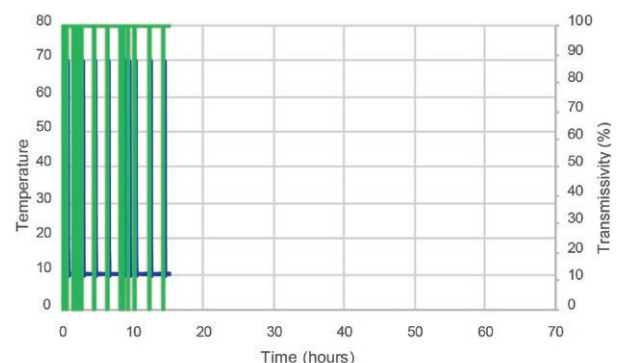


— Temperature Actual [°C] — Reactor 1 Transmission [%] — Reactor 3 Transmission [%]
— Reactor 2 Transmission [%] — Reactor 4 Transmission [%]

Crystallization without feedback control



Crystallization with feedback control



— Temperature
— Transmissivity

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