CrystalSCAN & CrystalEYES

Crystallisation Studies



CrystalSCAN – parallel screening unit



CrystalEYES – monitoring probes

Solubility and metastable zone determination platforms.

From a single probe to eight samples in parallel.

CrystalSCAN

Incorporating 4 or 8 CrystalEYES detectors into a complete multi-sample system



Syringe pump | Multi-sample platform with probes | Software platform

Each CrystalSCAN consists of

- 4 or 8 zone PolyBLOCK reaction block, heated and stirred independently per zone
- Choice of reactors, each with a CrystalEYES turbidity probe in 316 stainless steel or Hastelloy
- Dual-syringe dosing pump for two reagents (more optional)
- PC and WinISO software
- Optional: pH probe, cooling circulator

Customised workstation that uses proprietary 'reflectance' light detection technology (same as CrystalEYES) to give solubility and Metastable Zone Width (MSZW) data for several samples in parallel.

The system will automatically

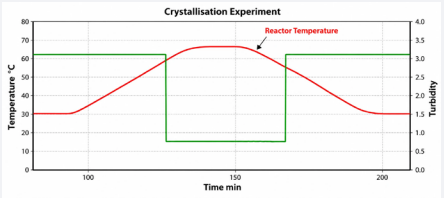
- Heat and cool each sample independently (cooling requires a circulator, available as an option)
- Detect dissolution/crystallisation points
- Complete a MSZW plot

After each heat/cool cycle, CrystalSCAN can add solvent or anti-solvent of choice, diluting each sample independently. This gives solubility/MSZW data over a range of concentrations.

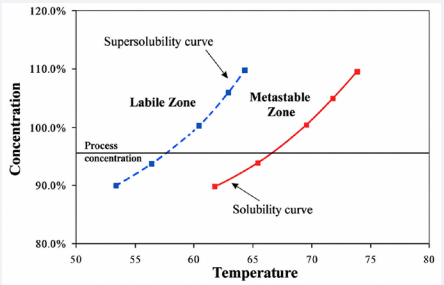
Raw temperature and turbidity data is displayed graphically as the experiment proceeds and sorted on-line to produce MSZW plots automatically, in real time. The data can also be exported to Excel for off-line analysis.

Each sample is stirred by a suspended impeller that does not damage crystals. Temperatures are separately monitored and controlled and each sample is individually diluted. A dual-syringe pump is standard, allowing two different liquids for dilution.

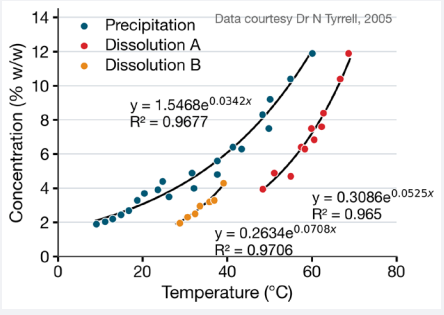
Heat, cool and dilute; repeat



Solubility and MSZW per sample



Polymorph detection – sulphate salt in 85% ethanol (UCB Pharma, 2005)



From Screening to Development

Process screening



Low volume test tubes

Samples up to 2 mL in 5 mL flat-base test tubes with push-on sealing caps (agitation with magnetic fleas).



Custom vials

Working volume 5 to 20 mL, plus top condensing section. Mechanical stirring using the turbidity probe as a stirrer shaft.



Agitation

For sample sizes above 5 mL, suspended impellers are used, giving reliable mixing without breaking crystals.



Sample dilution

Precision syringe pumps with multiple outlets and auto-refill capability allow independent dilution of samples in steps. Several pumps can be controlled.

Process development



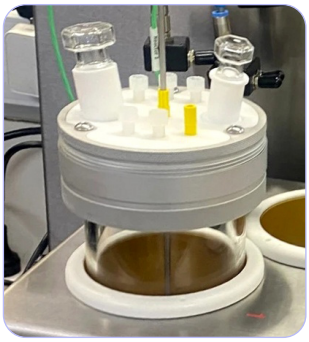
Up to 120 mL

Mechanically stirred. Available for the 4 and 8 reactor block versions.



pH and other sensors

CrystalSCAN can be expanded to include measurement and control of pH as well as other detection methodologies (FBRM, spectroscopy etc.).



Up to 500 mL

Mechanically stirred, PTFE lid. Available for the 4 reactor version only.

CrystalEYES

Records the solubility and super solubility as your solution is heated and cooled.

CrystalEYES includes

- Turbidity and temperature probes chosen specifically for your application
- Near-infrared reflectance probes
- Electronics and PC with data handling software
- Optional pH monitoring

Normally clients supply their own reactors or vials and arrange sample heating and cooling, though H.E.L can also supply these as an extension to CrystalEYES.

Choose

- The probe size required for your application – from 2 mL samples in 5 mL test tubes to vessels over 10 L
- The probe material best suited to your chemistry – 316 stainless steel or Hastelloy

Data handling

- Real-time data display and capture on the PC and software supplied
- Data automatically saved to a CSV file
- One-click export to Excel for analysis

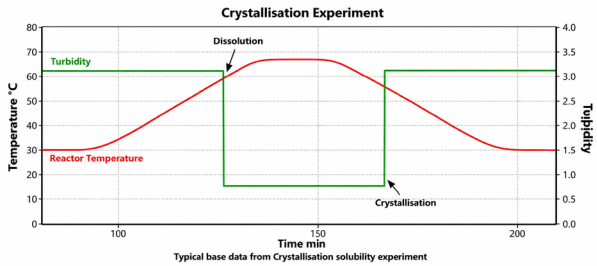
Detection methodology

H.E.L's proprietary 'turbidity' sensing systems use a light source which is reflected by a 'mirror' immersed in the sample. Changes in the signal accurately and reliably correspond with the appearance and disappearance of solids.

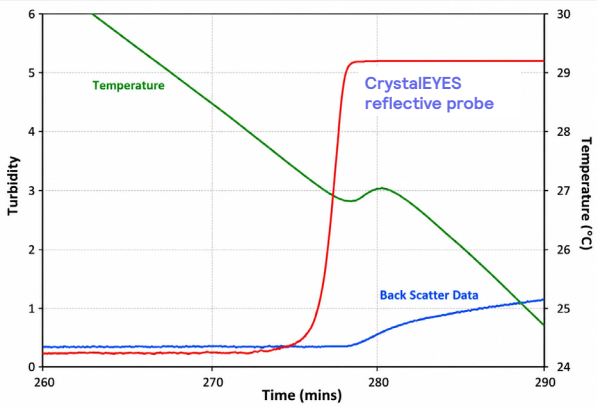
The reflectance technique, suitably optimised, gives earlier and more reliable detection of solids – more sensitive than the human eye or standard turbidity.



Typical changes as the sample is heated and cooled: the solubility and super solubility points.



The reflective probe detects crystallisation more sensitively than standard back-scatter turbidity.



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