



# Solubility and Metastable zone determination platforms

**HEAL**  
better chemistry – faster

# CrystaEYES

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

## CrystaEYES includes:

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

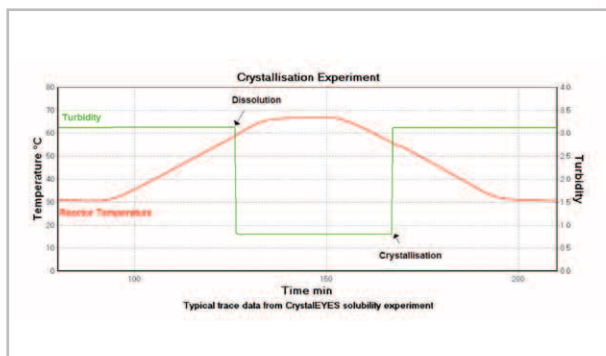
Normally clients supply their own reactors/vials and arrange sample heating/cooling, though HEL can also supply these as an extension to CrystaEYES.

## Choose:

- | The probe size required for your application
- | The probe material best suited for your chemistry
- | Red or near infrared light source

## Data handling:

- | Real time data display and capture on PC and software supplied
- | The data is automatically saved to a data file
- | The data is readily exported to Excel for analysis



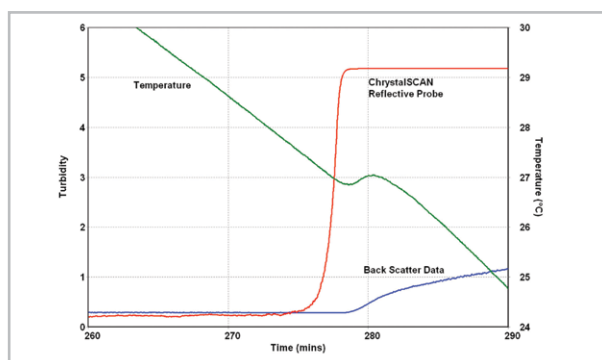
Typical changes to indicate solubility and super solubility points, as sample is heated and cooled

## Detection Methodology

HEL'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.

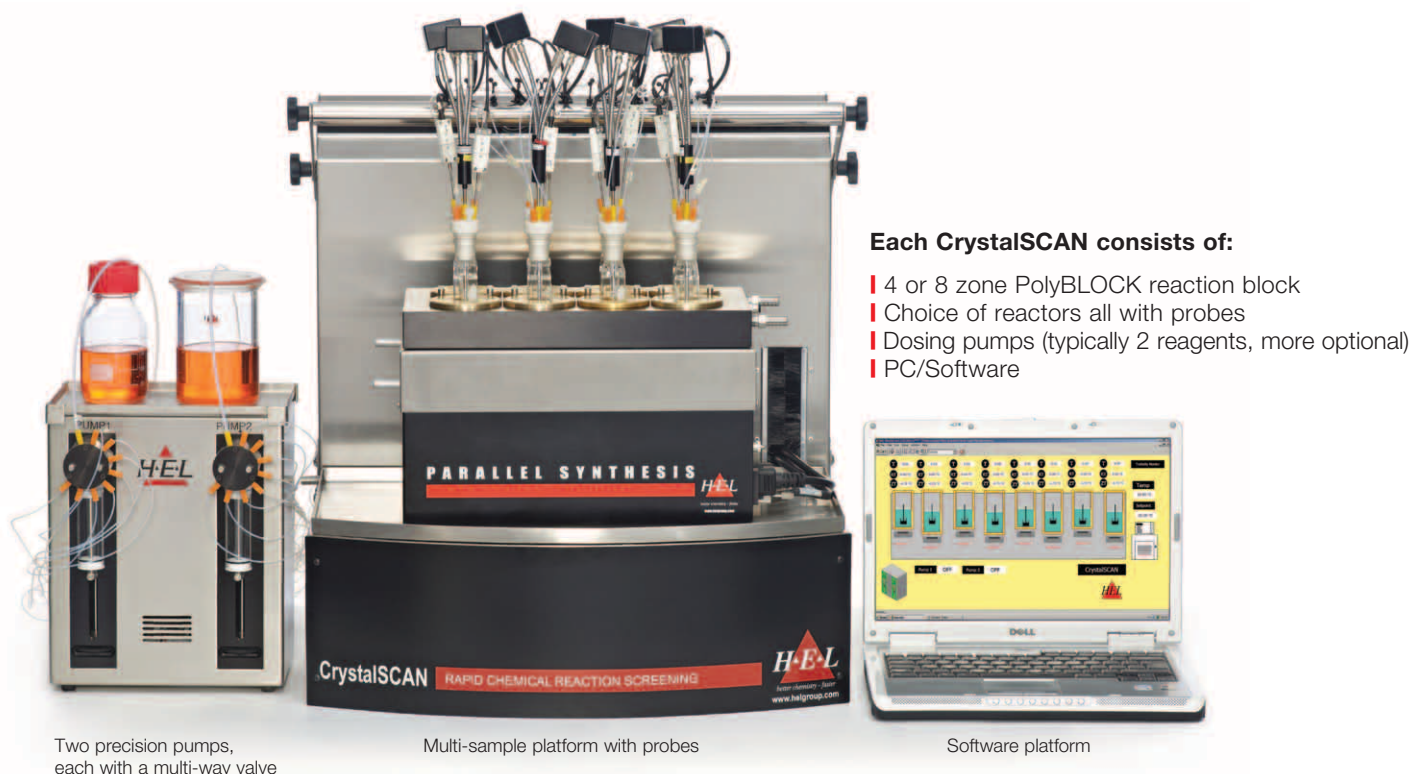
The reflectance technique, suitably optimised, gives earlier and more reliable detection of solids – more sensitive than the human eye or standard turbidity.



Data shows how CrystaEYES reflective probe detects crystallisation more sensitively than standard turbidity (back scatter)

# CrystalSCAN

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



## Each CrystalSCAN consists of:

- | 4 or 8 zone PolyBLOCK reaction block
- | Choice of reactors all with probes
- | Dosing pumps (typically 2 reagents, more optional)
- | PC/Software

Two precision pumps, each with a multi-way valve

Multi-sample platform with probes

Software platform

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

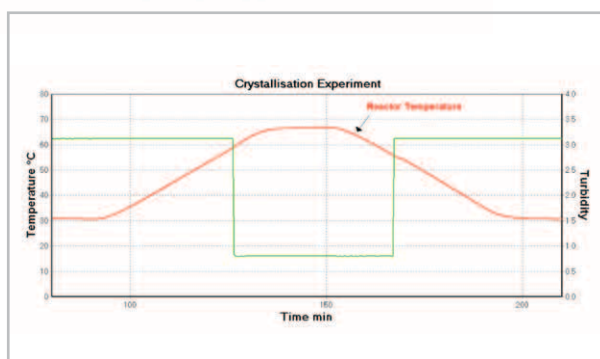
The system will automatically:

- | Heat/cool each sample independently
- | Detect dissolution/crystallisation points
- | Complete a MSZW plot

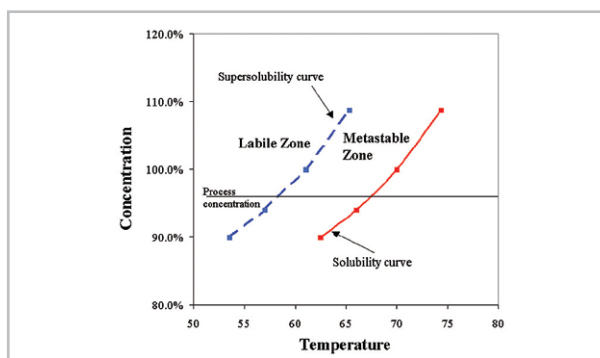
After each heat/cool cycle, CrystalSCAN can add solvent/anti-solvent of choice, diluting each sample (independently). This gives solubility/MSZW data over a range of concentrations.

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

Each sample is stirred and, except for 1ml vials, mixing uses stirrer paddles that do not damage crystals. Temperatures are separately monitored and controlled and each sample is individually diluted. A dual syringe pump is standard and allows up to 2 different liquids for dilution but this can be changed.



Each sample is heated and cooled, as shown here, before being diluted. Then the cycle is repeated, at a new concentration



To generate this type of plot, for each sample, the CrystalSCAN provides solubility and super solubility (or MSZW) in 4 to 8 stirred samples, over a range of concentrations

## Process Screening



### LOW VOLUME DISPOSABLE VIALS

Test samples below 2ml, using standard vials with push-on sealing caps (agitation with magnetic fleas).



### CUSTOM VIALS

Test samples down to 5ml with a working volume of around 20ml, plus top condensing section. Mechanical stirring using the turbidity probe as a stirrer shaft.

## Process Development



Sample sizes up to 100ml, mechanically stirred. Available for the 4 and 8 reactor block version.



Sample sizes up to 350ml, mechanically stirred. Available for the 4 reactor version only.



## AGITATION

For sample sizes above 5ml, suspended mechanical stirrers 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.

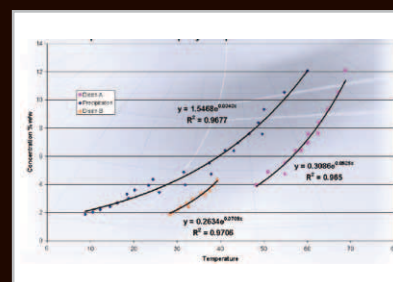


## pH & OTHER SENSORS

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

## POLYMORPH DETECTION

Solubility changes can reveal different polymorphs. Here is an example of a sulphate salt in 85% ethanol studied by UCB Pharma using CrystalSCAN. (Courtesy Dr N Tyrrell, 2005)



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