

## **On-Line Determination of Solution Supersaturation of Fast Precipitating Systems via SR ATR FTIR Spectroscopy**

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Beamline(s): **U2B**

This recently started 2-year-project is directed to the science underpinning the batch manufacture of organic specialty chemical products, notably pharmaceuticals. This particular study aims to apply SR ATR FTIR spectroscopy to an examination of the crystallization kinetics associated with fast precipitating reactions.

The experimental system comprising an AXIOM Dipper-210 ATR immersion probe connected to the NICOLET MAGNA FTIR spectrometer at beamline U2B is linked to a 400 ml computer controlled batch reactor. This enables *in situ* internal reflection measurements using synchrotron infrared radiation to monitor precipitation and crystallization processes from solution.

Preliminary experiments have been directed towards system calibration and bench marking tests against existing lab instrumentation. The path of the synchrotron infrared beam as going through the spectrometer was optimized to meet the ATR requirements. First measurements included optimizing instrumental settings for the ATR mode of operation, noise measurements of different regions of the mid-IR spectrum of interest, comparing global to synchrotron source.

Calibration measurements for aqueous citric acid solutions were carried out as well as on-line monitoring of crystallization of citric acid from water. Also monitored were cooling crystallization runs for L-Glutamic acid from water.