Equipment Name: Mettler Toledo Differential scanning calorimeter (DSC)	**Category: C. Particle Characterisation in and ex-situ** **Institute: University of Leeds** **Location: Institute of Particle Science and Engineering, University of Leeds, LS2 9JT,UK** **Contact Details of Technology Expert:** **Name, Prof. Yulong Ding** **Phone, +44 (0)113 3432747** **E-mail y.ding@leeds.ac.uk**

Short technology description/Overview:

The Mettler Toledo DSC is a powerful thermal analysis (TA) instrument. It can be used to measure thermal quantities such as heat of fusion and specific heat capacity and can also observe thermal processes of a wide range of substances (anything with solid or liquid phase in the operating temperature range) over a wide range of temperatures (40-700dC). The system measures the difference in heat flux between an empty reference pan and a sample pan. Calibration with reference samples allows an accurate heat flux to be measured for general samples.

Applications for nanomaterials characterisation (pristine and in situ in biofluids):

DSC is often used to check sample purity and confirm compositional analysis.

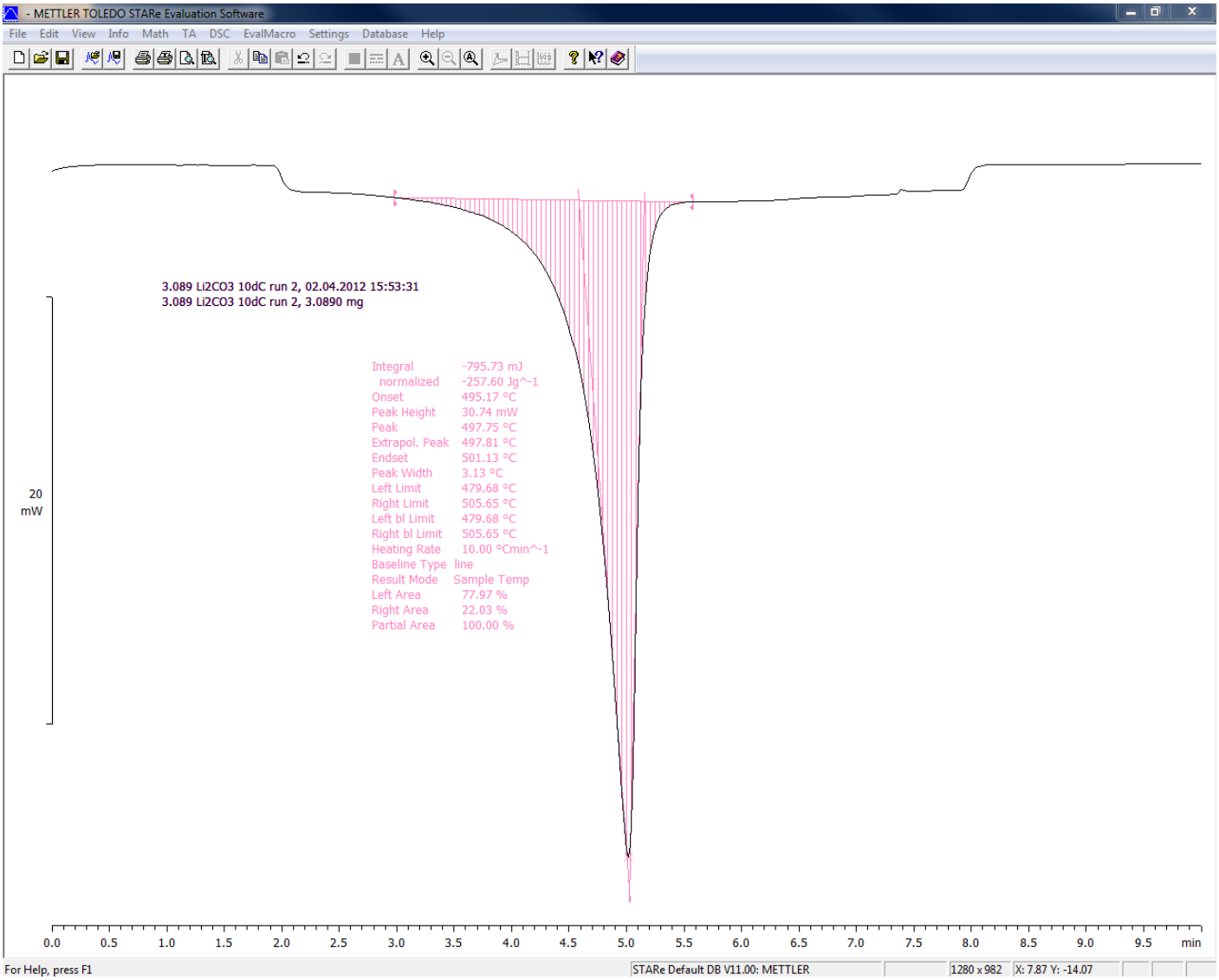
The stability of proteins and folding/unfolding information in the presence of nanoparticles can also be measured with DSC experiments.

Main Features (Equipment Capabilities):

- Temperature range: 40-700dC
- Substances: Anything with a liquid or solid phase in the temperature range, e.g. thermoplastics, thermosets, elastomers, adhesives, foodstuffs, pharmaceuticals, organic solvents, molten salts

Typical Samples & Images:

Below image shows analysis of heat of fusion of a lithium carbonate salt. Sample contained in aluminium pan. Baseline subtraction was performed by first running the sample pan empty along with the empty reference (curve 1) and then with 3.089mg of salt in the sample pan (curve 2). The curve seen on the screen is the result of curve2 – curve1.



Any further Information: Heat of fusion in this example = 258J/g. Value is negative on the screenshot as exothermic is up on the scale.