

TA Instruments - A division of Waters Corporation



Instruments & Techniques for Physical Properties Characterisation of Materials

- **Microcalorimetry**
 - ITC
 - DSC
 - Isothermal Calorimetry
 - Solution Calorimetry
- **Specialised Mechanical Testing Solutions**
 - Solutions for Biomaterials, Medical Devices and Engineered materials
- **Rheology**
 - Flow, Creep and Oscillation (dynamic measurements). Optimising viscosity in formulations and in delivery
- **Thermal Analysis**
 - DSC / MDSC
 - TGA
 - DVS
 - DMA
 - Hyphenated techniques, e.g. DSC-Raman, TGA-FTIR, TGA-MS, TGA-GCMS
- **Thermo Physical Properties**
 - Heat transport properties, i.e. conductivity and diffusivity
- **Rubber Testing**
 - Optimising processing and material properties of Polymers and rubber based materials

KEY MICROCALORIMETRY Applications

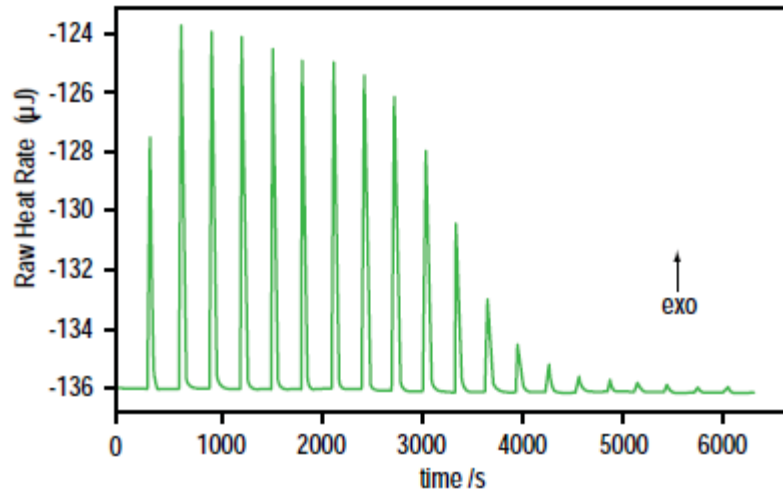
- Molecular Interactions:
Proteins, receptors, drugs, nucleic acids, lipids, metals, surfaces
- Pharmaceutical formulation development
- Protein Chemistry / Engineering
- Structural Biology
- Structure-Based Drug Design
- Antibody Quality and Process Control
- Enzyme Kinetics
- Compatibility Studies

ISOTHERMAL MICROCALORIMETRY – Medical/Biology Related Applications

- Microbial growth
- Microorganism detection in blood
- Use as a bioassay (effect of drugs on living cells)
Excipient/API compatibility
- Long term storage stability
- Effects of moisture and organic vapours on drugs
- Drug dissolution
- Polymorphism
- Amorphous/Crystalline content

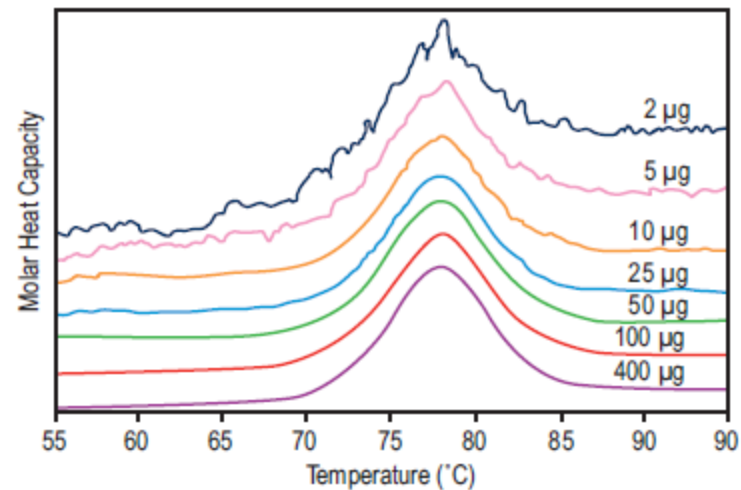
Key tools for Biopolymer characterisation

ITC (Isothermal Titration Calorimetry)



- Binding affinities typically 10^3 - 10^9 M⁻¹
- Stoichiometry
- Thermodynamics
- Label free samples
- Available in 1ml and 190µl cells
- Semi or fully automated systems available with 96 well plate format

DSC (Differential Scanning Calorimetry)



- Thermal Stability
- Heat capacity
- Pressure Perturbation capability as standard
- 0.30ml capillary cells
- Auto sampler with 96 well plate format

Scanning Microcalorimeters



Discovery DSC

MC DSC

Nano DSC



Diffusion-bonded Sensor
50-Sample Autosampler
Sample Size: up to 20mg
Scan Rate: 0.1 – 100°C/min



3 – samples
1 – reference
Sample Flexibility
≤ 1ml sample Vol.
Scan Rate: 0 - 2°C/min



1 – sample
1 – reference
In-solution sample
300μl active cell Vol.
Scan Rate: 0.001 - 2°C/min
Automated sample handling

Isothermal Microcalorimeters

