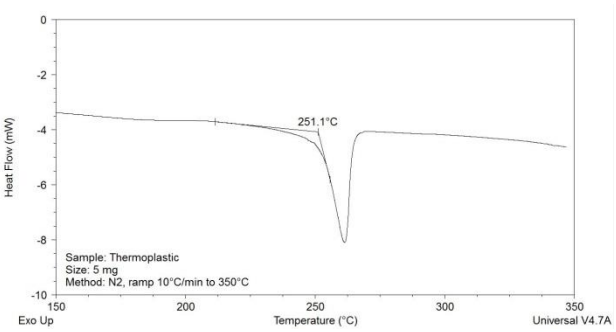
Thermal analysis - DSC and TGA

Analytical Services

Thermal analysis is a group of techniques in which the physical property of a material is measured as a function of temperature while the material is exposed to a controlled temperature program.

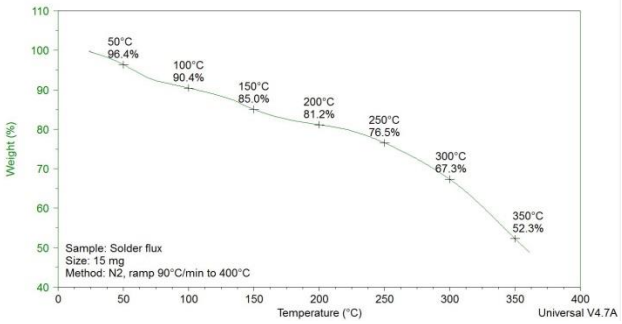
Differential scanning calorimetry (DSC) is the most popular thermal analysis. It is a technique in which the heat flow rate difference into a material and a reference is measured as a function of temperature while the material is exposed to a controlled temperature program. DSC is commonly used to measure glass transition temperature, melting and crystallization temperature, heat capacity, degree of cure and kinetic reaction.

C2MI DSC has several attractive features: advanced Tzero technology (better sensitivity, resolution and stability of the baseline than conventional DSC) and modulated temperature DSC (MDSC) mode (allows direct measurement of heat capacity and separation of complex transitions). Also, it has an autosampler (50-position), a cooling system and a photocalorimeter accessory for the characterization of photocuring materials by UV/Visible light (250-650 nm).



Melting temperature (onset) for a thermoplastic

Thermogravimetric analysis (TGA) is another popular thermal analysis. It is a technique in which the change in mass (gain or loss) of a material is measured as a function of temperature while the material is exposed to a controlled temperature program. TGA is commonly used for thermal stability, kinetic and corrosion studies, compositional analysis and simulation of industrial processes.



Mass loss curve for a solder flux in an inert

C2MI TGA has interesting features: high sensitivity thermobalance, hi-resolution mode (improves separation of successive occurring events) and modulated temperature TGA (MTGA) mode (ideal for material decomposition studies). The TGA does not allow the identification of volatile organic compounds outgassed during the material heating. C2MI TD-GC/MS allows this type of analysis.