National Center for
Composite Materials

Thermal Testing Lab

Lab Facilities

NTU
INNOVATE AND LEAD

www.ntu.edu.pk/nccm

Thermal Characterisation Lab

Differential Scanning Calorimeter

Dilatometer

Dynamic Mechanical Analyser

Thermo-Mechanical Analyser

Thermo-gravimetric Analyser

Guarded hotplate

Rheometer

Differential Scanning Calorimeter

DSC 250, TA instruments-USA

- DSC measures endothermic and exothermic transitions (including Tg, Tm, curing, etc.) as a function of temperature

- Used to characterize polymers, pharmaceuticals, foods biologicals, organic chemicals and inorganics

Test Method

ASTM E1269-05, EN-EN 728, ISO22768,

ASTM D1519-95, ASTM D3418-03, ISO11357-4

ISO11357-3

Dilatometer

DIL 2010 STD, Orton-USA

- Measures reversible and irreversible changes in length during heating and cooling
- Identifies reactions that cause contraction or expansion
- Determining the dimensional change of materials

Test Method

ASTM E-228, C-372

Dynamic Mechanical Analyser

DMA, TA Instruments-USA

DMA measures the mechanical properties of materials as a function of time, temperature, and frequency.

Modes of Deformation

- Dual/Single Cantilever
- 3-Point Bend
- Tension
- Shear
- Compression

Thermo-Mechanical Analyser

TMA, TA Instruments-USA

- It measures sample displacement (growth, shrinkage, movement, etc.) as a function of temperature, time and applied force.
- TMA can be used to find a variety of thermal and mechanical properties.

Test Method

ASTM D696, ASTM D3386, ASTM D3418,

ASTM D3895, ASTM D4591, ASTM E1356,

ASTM E1131, ASTM E1545, ASTM E1641,

ASTM E831, ISO 11357, ISO 11358, ISO 11359

Thermo-gravimetric Analyser

TGA, Netzsche-Germany

The TGA tells about:

- Thermal/oxidative stability of Materials
- Estimated Lifetime of a Product
- Decomposition Kinetics of Materials
- Moisture and Volatiles Content of Materials
- Composition of Multi-component Systems

Sample weight

10-20mg for most applications

50-100mg for measuring volatiles

Test method

ASTM E1131, ISO 11358

Guarded hotplate

DTC 300, TA Instruments-USA

A research grade instrument for the direct determination of thermal conductivity of a wide range of low-to-medium thermal conductivity materials, including solid, liquid, paste, powder, thin film by using guarded heat flow method

Sample size

Typical sample size is 50mm (2”)

Test Method

ASTM E1530

Temperature Range

-20°C up to 300°C.

Rheometer

AR 1500, TA Instruments-USA

- Used to measure the way in which a liquid, suspension or slurry flows in response to applied forces
- Measures the rheology of the fluid
- Peltier Plate Temperature Systems

Test Method

ASTM D3835-16 for Polymers

Temperature Range

-40°C to 200°C