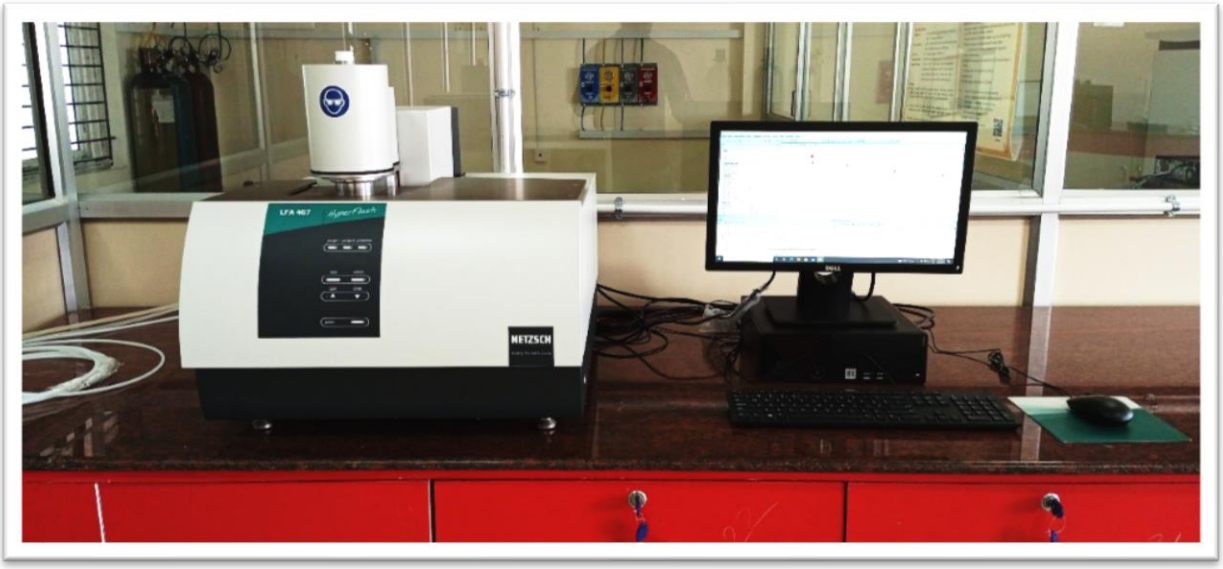
Laser Flash Analyser (LFA) -Thermal Diffusivity & Thermal Conductivity Measurement

Principle

The laser or light flash method is used for measurement of the Thermal Diffusivity of a variety of different materials. Thermal diffusivity (a with the unit mm^2/s) is a material-specific property for characterizing unsteady heat conduction. This value describes how quickly a material reacts to a change in temperature.



The front surface of a plane-parallel sample is heated by a light pulse and the resulting temperature rise at the sample's rear face is recorded as a function of time.

The Light Flash (LFA) technique is a fast, non-destructive, non-contact, and absolute method for determining these thermophysical properties, including specific heat. This data can then be used for:

- Complete set of thermophysical properties such as thermal diffusivity, specific heat capacity (cp), and thermal conductivity (λ) as input data for numerical simulations.
- Material optimization according to the desired thermal performance.

Instrument Specifications:

Sample temperature range:	Room Temperature to 500°C
Thermal diffusivity range:	0.01 to 2000 mm^2/s
Thermal conductivity range:	0.1 to 4000 W/(m*K)

Heating rate (max.):	50 K/min
Xenon flash lamp:	Pulse energy: up to 10 Joules/pulse (variable), software-controlled Pulse width: 10 to 1500 µs
IR Detector:	Infrared InSb for the temperature range of RT to 500°C, MCT: -100°C ... 500°C
Atmosphere:	Inert, oxidizing, static, and dynamic (Ar, N2, Air)
Repeatability for well-defined samples:	Thermal diffusivity: ±2% Specific heat: ±3%
Accuracy for well-defined samples:	Thermal diffusivity: ±2% Specific heat: ±5%

Sample dimension:

- Solids/ Thin films: 10x10 mm in size for square & 10 mm in diameter for round samples, with 1.5-2.5mm thickness.
- Low viscous Liquid & Waxes samples: ~2 ml

Sample holders:

- For round and square solid samples (1cm diameter, 1x1 cm square)
- For liquids, pastes, resins, powders

General Instructions:

The instrument is capable of characterizing a wide variety of materials, including polymers, ceramics, carbons, graphite, composites, glasses, metals, and alloys.

- Samples must be dry, moisture-free, free of oil and grease.
- Compact powder samples should be used.
- Sample diameter is fixed (1cm) and thickness should be (0.15 to 0.5 cm), and for square samples size should be 1x1cm and thickness should be (0.15 to 0.5 cm)
- The melting point of the sample should be known

The Samples will be rejected if the above instructions are not followed by the users.

Details of LFA

Brand	**NETZSCH**
Model	LFA 467 HyperFlash
Sponsored Agency	DST- PURSE program (Phase -2)