

THERMAL ANALYSIS

Thermal diffusivity and conductivity analyser

NETZSCH LFA 447 NanoFlash

The NETZSCH LFA 447 NanoFlash is useful to measure two thermal properties of a material: thermal diffusivity and conductivity.

It is an instrument that can be applied for different types of material, such as ceramics, metals, composites and multilayer systems.

The advantages of this technology are the variety of materials that can be analysed, the easy preparation of samples, the testing speed and the high accuracy of the results.

The test can be carried out at room temperature (25 °C) and up to 300 °C.

The NETZSCH LFA 447 NanoFlash is based on laser flash technology. During a measurement, the lower surface of a sample with planar and parallel faces is initially heated by a short pulse of light energy (flash).

The change in temperature resulting on the upper face of the sample is then measured by an infra-red detector.

From the recorded temperature-time curve, which describes the thermal evolution of the sample, characteristic time intervals are calculated to determine the thermal diffusivity.

The thermal conductivity of the material to be analysed can be determined if its specific heat capacity and density are known.

Applications

- Measure of thermal properties in function of temperature
- Change of thermal properties in function of reaction time
- Evaluation of thermal barrier effect of a material or coating
- Evaluation of thermal conductivity ability of a material or coating

Specifications

- Temperature range
RT to 300°C
- Thermal diffusivity range
0.01 mm²/s to 1000 mm²/s
- Thermal conductivity range
0.1 W/(m·K) to 2000 W/(m·K)
- Repeatability
Thermal diffusivity: ± 2%
Specific heat: ± 3%
- Accuracy
Thermal diffusivity: ± 36%
Specific heat: ± 5%
- Flash source
Xenon Flash Lamp,
wavelength: 150nm to 2000 nm
Pulse Energy: up to ≈10 Joules
- Sensor type
IR detector (InSb) with integrated
dewar for LN₂ cooling

Samples

Standard sample size:
disc up to 25.4 mm diameter,
or 6 mm / 8 mm / 10 mm / 12.7 mm square,
up to 3 mm thick.

In addition, several sample holders are available
to characterize different material forms:

- Bulk material
- Thin sheet for in-plane measurements
- Liquid with low viscosity
- Multilayers samples
- Powders

