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ULVAC SOLUTIONS

AC Method Thermal Diffusivity Measurement System

LaserPIT

Thermal conductivity evaluations in-plane direction of various kinds of films

◆ General Description

The LaserPIT measures the thermal diffusivity of thin sheet materials in plane direction by scanning laser heating AC method (Angstrom method).
For high thermal conductivity films, I can also measure sub-micron thin films.

◆ Features

1. Accurate measurement of thermal diffusivity of a wide variety of sheet materials from diamond to polymer.
2. Applicable to a wide variety of materials, including stand-alone sheet, film, wire, fiber and other materials from 3 to 500 μm.
3. Measurement of the thermal conductivity of 100 to 1000 nm thick film deposited on a test substrate by the differential method.
4. LaserPIT has realized:
   ① Simple operation for measurement
   ② Control, measurement and analysis with exclusive software
   ③ Houses all optical, control, measurement system in one compact bench-top module.

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AC Method Thermal Diffusivity Measurement System
LaserPIT

◆ Constitution

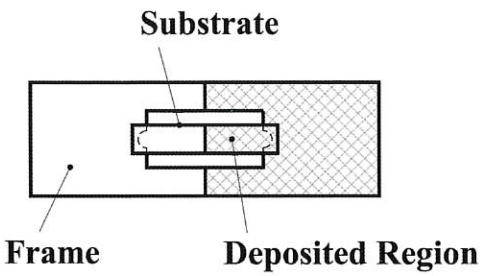
1. LaserPIT main unit
2. Turbo-molecular pump
3. Personal computer and exclusive software
4. Vacuum coating system(option)

◆ Specifications

1. AC power: Laser diode
   (wavelength 690 nm, output 30 mW)
2. Irradiating position: ± 3000 μm, in steps of 1 μm
3. Frequency: 0.2 to 10 Hz
4. Thermal diffusivity measurement accuracy: ± 5 %
   (thermal diffusivity of a stand-alone sheet sample)
5. Sample size: 30 mmL, 2.5 to 5 mmW
   3 to 500 μmt (stand-alone sheet sample)
   100 to 1000 nmt (thin film on substrate)
6. Thermocouple: E type thermocouple (0.1 mm dia.)
7. Atmosphere: In vacuum (below 0.02 Pa)
8. Temperature range: Room temperature (R type),
   Room temperature to 200℃ (M2 type)
9. Interface: RS232C
10. Power requirement: AC 100 V, 15 A
11. External dimensions: 350 mmW x 500 mmD x 330 mmH
    *excluding projection portions

Measurement method of thermal conductivity of thin film (differential method)

The thermal conductivity of a thin film deposited on a special glass test substrate can be found by measuring the thermal diffusivity of the deposited area and a non-deposited area on the same side of the test substrate. Knowing the thickness of the substrate and that of the thin film enables the thermal conductivity of the thin film to be derived using the volume specific capacity of the glass substrate as a reference.



◆ Applications

1. Measurement of thermal diffusivity/thermal conductivity of highly conductive thin sheet materials (thickness less than 500 μm), such as CVD diamond, aluminum nitride and others.
2. Measurement of thermal diffusivity/thermal conductivity of several kinds of metal thin sheet materials (thickness less than 5μm), such as Copper, Nickel, and stainless.
3. Measurement of thermal diffusivity/thermal conductivity of materials with low thermal conductivity (thickness less than 500 μm), such as glass, resin material and others.
4. Measurement of thermal diffusivity/thermal conductivity of anisotropic highly conductive graphite sheet (thickness less than 100 μm), polyimide and polymer film like PET (thickness less than 5 μm).
5. Measurement of thermal conductivity of thin nitride aluminum film, thin oxide aluminum film (thickness 100 to 300 nm) deposited on a glass substrate (thickness 30 μm).
6. Measurement of thermal conductivity of thin DLC film (thickness less than 1μm) deposited on a glass substrate (thickness 30 μm).
7. Measurement of thermal conductivity of thin organic pigment film (thickness 100 to 300 nm) deposited on a PET substrate (thickness 0.1 mm).
8. Evaluation of a variety of sputtering target material.

※Specification and appearance are subject to change without notice for performance improvement.

Agent

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