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Scanning Thermal Probe Micro-image

STPM-1000

2 dimensional distribution of Seebeck coefficient and thermal conductivity measurement system by thermal probe

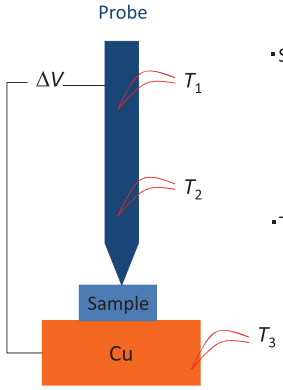
◆ General Description

STPM-1000 is used for evaluating Seebeck coefficient and thermal conductivity simultaneously. Simple evaluation of thermoelectric materials is possible by simultaneous evaluations of seebeck coefficient and thermal conductivity. The thermal conductivity distribution evaluation of functionally graded materials, multilayer substrates and organic materials is also possible. STPM-1000 is expected to use materials evaluation as a basic tool.

◆ Features

1. Capable of evaluating Seebeck coefficient and thermal conductivity simultaneously.
   Capable of simple evaluation of 2 dimensional distribution of thermoelectric property.
2. 20 μm resolution
   Capable of detecting the change of composition and structure in micro range.
3. High speed distribution measurement
   Capable of evaluating homogeneity and defect.

◆ Measurement principle



- Seebeck coefficient

  Calculate from voltage difference (ΔV) and temperature difference (ΔT) between temperature at contact point T_{cp} and T_3. (Tcp is calculated from $T_1$and T_2.)

- Thermal conductivity

  Calculate from T_1 - T_2.

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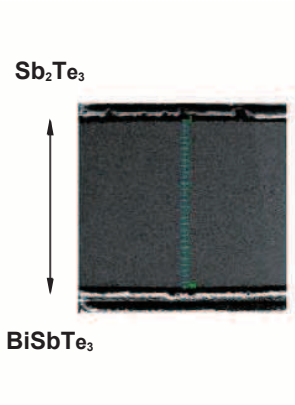
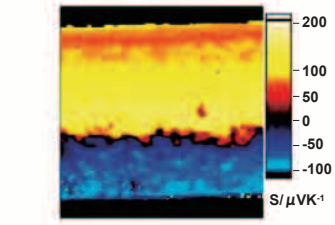
STPM-1000

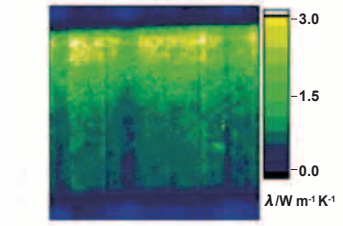
◆ Measurement examples

Seebeck coefficient and thermal conductivity distribution and composition dependence of Seebeck coefficient and thermal conductivity of $(Bi_{1-x}Sb_x)_2Te_3$ (0.5<x<1)

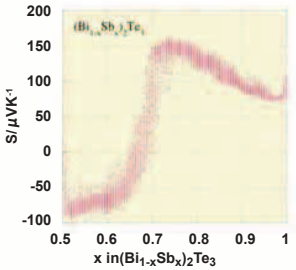




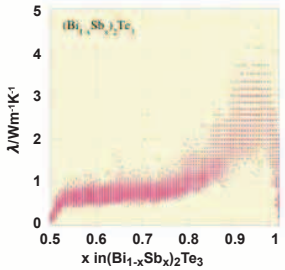
Seebeck coefficient distribution



Thermal conductivity distribution



Composition dependence of Seebeck coefficient



Composition dependence of thermal conductivity

◆ Specifications

Measurement temperature	RT + 5ºC
Maximum sample size	Square 20 mm × Thickness 5 mm
Accuracy of Seebeck coefficient	± 10 % (by single bulk sample with thickness 1mm)
Accuracy of thermal conductivity	± 50 % (by single bulk sample with thickness 1mm)
Measurement time at one point	less than 10 s.
Local resolution	20 μm
Resolution of position control	1 μm
Sample moving distance	x-axis 50 mm, y-axis 50 mm, z-axis 10 mm

※Thermal conductivity of unknown sample can be estimated by reference sample of known thermal conductivity and comparison calibration.

◆ Applications

1. Simple performance evaluation of thermoelectric materials
2. Thermal property distribution evaluation of functionally graded materials
3. Homogeneity evaluation of inorganic materials, polymer materials and crystalline materials
4. Defect assessment of practical materials (Print substrate, multilayer substrate etc.)

◆ Utility

Power supply	AC 100V 15 A (excluding PC)
External dimensions	W510 × D650 × t460 (mm)
Weight	Approx. 70kg
Space requirement	Approx. W1200 × D900 (mm) for table

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

Agent

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