

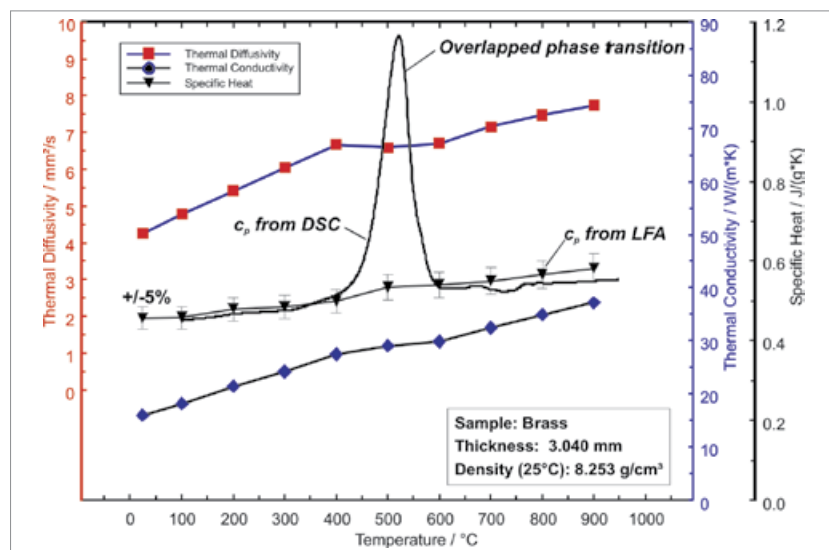
APPLICATION SHEET

METALS – METALLURGY

COPPER ALLOY

Copper and copper alloys are essential for a broad range of applications, e.g. for the electronic and electrical industry (leadframes, electrical connectors, power distribution in heavy-duty installations), for automotive (bearing bushes for powertrains and brakes, high-performance heat exchangers for oil coolers, air conditioners). For optimizing of the manufacturing processes and for the later application of the copper alloys, knowledge

of the thermophysical properties is necessary. The thermal diffusivity and specific heat were measured using the LFA 457 from room temperature up to 1000°C. The thermal conductivity was calculated by multiplying the measured properties with the room temperature-bulk density. Additional DSC measurements were carried out to compare the specific heat results using different measurement methods.



Instrument

LFA 457 MicroFlash®

Test Conditions

Temperature range	RT ... 1000°C
Sample holder	12.7 mm diameter
Sample thickness	3.040 mm
Sample surface preparation	graphite
c_p from LFA, standard	pure copper

Results

The thermophysical properties increase with temperature. Between 500°C and 600°C, a step in the thermal diffusivity was detected. In the same temperature range, an overlapping endothermic effect is visible (c_p from DSC) due to the phase transition. The differences in the specific heat, measured with different methods (LFA and DSC), are quite small (<5%). The thermal conductivity continuously increases. The example clearly demonstrates that the LFA 457 can analyze the thermal diffusivity, specific heat and thermal conductivity of metal alloys without any problems.