

THERMOPHYSICAL PROPERTIES OF SOLID AND LIQUID INCONEL 718 ALLOY

H. Hosaeus¹, A. Seifert¹, B. Wilthan¹, G. Pottlacher¹, and E. Kaschnitz²

¹Institut für Experimentalphysik, Technische Universität Graz,
Petersgasse 16, A - 8010 Graz, Austria

²Österreichisches Gießerei-Institut, Parkstraße 21, A - 8700 Leoben, Austria

Wire shaped alloy samples are resistively volume heated as part of a fast capacitor discharge circuit. Time resolved measurements with sub- μ s resolution of current through the specimen were made with a pearson probe, voltage drop across the specimen was determined with knife-edge contacts and ohmic voltage dividers. Radiance temperature of the sample was measured with a pyrometer and volume expansion of the wire with a fast acting CCD-camera. These measurements allow the calculation of specific heat and the mutual dependencies between enthalpy, electrical resistivity, temperature, and density of the alloy in the solid and liquid phase. Thermal conductivity as well as thermal diffusivity is estimated from resistivity data using the Wiedeman-Franz-law at the end of the solid phase and at the beginning of the liquid phase.

High speed measurements are compared to results of quasistatic measurements of specific heat obtained by differential - scanning - calorimetry (NETZSCH DSC 404) The results are presented and compared with results of other research groups.

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