

Investigation of Selected Thermophysical Properties of NIST Standard Reference Material 1155A

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The National Institute of Standards and Technology (NIST) provides a multitude of Standard Reference Materials (SRM). These SRMs are widely used as calibration standards as well as a helping tool to develop new measurement methods. In order to take advantage of such a material for calibration purposes or development, it is therefore of great importance to possess accurate data of SRM's properties, including respective uncertainties. At Graz University of Technology, we are in the process of studying a selection of thermophysical properties of the NIST SRM stainless steel 1155a (Cr18 Ni12 Mo2). One focus will be on obtaining relevant data on temperature-dependent surface tension. At our institute, we are utilizing an electromagnetic levitation (EML) apparatus to obtain such data, taking advantage of the oscillating drop (OD) method. Furthermore, we are interested in measuring temperature-dependent density data utilizing the same EML apparatus as for surface tension measurements. If we are able to obtain wire-shaped samples of the material, we will perform measurements utilizing our ohmic pulse-heating apparatus. This would allow us to study another variety of thermophysical properties like thermal expansion, enthalpy, thermal diffusivity, and thermal conductivity in the liquid phase. Additionally, we are investigating specific heat capacity of the material by means of a commercial differential scanning calorimeter (DSC) NETZSCH 404 C Pegasus in the range from room temperature up to about 1400 °C. With the intention of producing reliable literature data, all obtained data shall be provided with uncertainty considerations by means of the Guide to the Expression of Uncertainty in Measurement (GUM).