

MICROGRAVITY SCIENCES AND PROCESSES SYMPOSIUM (A2)
Fluid and Materials Sciences (2)

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THE THERMOLAB PROJECT - THERMOPHYSICAL PROPERTY MEASUREMENTS IN AN
ELECTROMAGNETIC LEVITATION DEVICE UNDER REDUCED GRAVITY CONDITIONS**Abstract**

Thermophysical properties of metallic alloys in the liquid phase are needed in many areas of industrial processing ranging from casting technologies to gas atomization production of metallic powders. The measurement of these properties in conventional thermoanalytic equipment is complicated by the ubiquitous presence of container wall reactions which adversely affect the outcome of such measurements. To overcome these problems containerless processing techniques based on electromagnetic (EML) or electrostatic (ESL) levitation have been considered. Microgravity conditions are needed to fully exploit the potential of these processing techniques such as the absence of turbulence for viscosity measurements and of shape distortion resulting in ideal spherical specimen for quantitative non-contact inductive calorimetry in an EML device. The ThermoLab project as part of the ESA MAP programme is concerned with the application of an EML device under reduced gravity conditions for the measurement of thermophysical properties of industrial alloys in the liquid phase. An overview is given the project including results obtained in the ground based support programme and in a series of experiments performed on board parabolic flights for the measurement of the surface tension and the viscosity. In addition to the experimental programme ThermoLab is also concerned with the modelling of thermophysical property measurements in an electromagnetic levitation device to improve and expand its measurement capabilities. The main emphasis of this contribution will be on the device planned for installation on the International Space Station within the near future and the measurements planned on board the ISS.