

Thermophysical Properties Measurement of High-Temperature Liquids under Microgravity Conditions in Controlled Atmospheric Conditions

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Microgravity conditions have advantages of measurement of surface tension and viscosity of metallic liquids by the oscillating drop method with an electromagnetic levitation (EML) device. We are planning measurements of the surface tension and viscosity in the ISS using Materials Science Laboratory-Electromagnetic Levitator (MSL-EML) facilities developed by ESA under controlled oxygen partial pressure conditions. For the measurements, the international collaboration team including our science team will perform with sample shear policies. For the preparation of ISS experiments, we performed the precise observation of surface oscillations of levitated pure metals liquids and also alloys' liquids by on-board flight experiments under controlled oxygen partial pressure conditions. These measurements were also performed with the change of applied RF currents to coils in order to detect the difference of surface oscillation frequency and damping time by the electromagnetic force (EMF). Based on the present results, we discuss about the improvement of the analysis of surface oscillations to obtain the surface tension and the viscosity for precise measurements in the ISS.