

Measurement of Surface Tension of Cu-5Sn-1Zn by an Oscillating Drop Technique

Kirmanj Aziz^{C, S} and Alexander Schmon

Institute of Experimental Physics, Graz University of Technology, Graz, Austria
k.aziz@tugraz.at

Erhard Kaschnitz

Österreichisches Gießerei-Institut, Leoben, Austria

Gernot Pottlacher

Institute of Experimental Physics, Graz University of Technology, Graz, Austria

The oscillating drop technique, a well-established method to measure the surface tension of metallic materials, is used in combination with an electromagnetic levitation device to measure the surface tension of liquid Cu-5Sn-1Zn in the temperature range from the liquidus point up to 1700 K. An electromagnetic levitation device employs an inhomogeneous radio-frequency electromagnetic field inside a levitation coil to heat and position metallic specimens. Induced eddy currents are used to heat the material to the liquid phase and exert a Lorentz force, pushing it towards regions of lower field strength. The oscillation of the levitating specimen is monitored by a high-speed camera with up to 600 fps; the temperature of the specimen is measured by a fast pyrometer operating in the near infrared. As electromagnetic levitation is a container-less and contactless method, the contamination of specimens during measurement is dramatically reduced. Furthermore, the investigation of significantly undercooled liquid metals is possible. Results of measurements of surface tension as a function of temperature of Cu-5Sn-1Zn are presented.

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