

X-ray Investigations of Liquid Bismuth-Copper Alloys

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Z. Naturforsch. **55 a**, 381–389 (2000); received May 29, 1999

Liquid copper, bismuth, and eleven bismuth-copper alloys were investigated at temperatures above the liquidus with X-ray diffraction. The experimental procedure was adjusted to reduce the effects of evaporation. The Faber-Ziman total structure factors $S(Q)$ feature a splitting of the first maximum and negative values for Q around 1 \AA^{-1} in a large concentration range. The results are compared to previous neutron diffraction results by Zaiss and Steeb, to square-well potential model calculations by Gopala Rao and Satpathy and to a simple segregation model. The segregation model reproduces the features qualitatively. Partial structure factors are assessed by fitting both neutron and X-ray scattering results with reverse Monte-Carlo simulation.

Key words: Bismuth; Copper; Liquid Alloys; X-ray Diffraction; Microsegregation.