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A Statistical Mechanical Study of the Thermodynamics of Lithium-Lead Liquid Alloy

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Abstract. Most metals dissolve in one another readily once they are in liquid phase. The solubility of a homogeneous solid phase is governed predominantly by the size factor, electrochemical effect and electron concentration. But these factors cannot be used effectively to explain the alloying behaviours of liquid alloys to a great deal—thus generating manifold interests for the theoreticians. There are large numbers of binary liquid alloys whose thermodynamic properties deviate from the ideal values to a great extent. The large asymmetry observed in the properties of mixing of lithium-lead liquid alloys is discussed here by using Flory's model. On the basis of size factor the concentration dependence of free energy of mixing, activity, heat of mixing and entropy of mixing of Li-Pb alloys is tried to explain. The temperature dependence of interchange energy has been introduced to compute the heat of mixing and entropy of mixing. The results considerably exhibit the anomalous behaviour of Li-Pb liquid alloys.

Keywords. Interchange energy, Free energy of mixing, Activity, Entropy of mixing, Heat of mixing.

[Full Paper]