



Contribution ID: 195

Type: Poster Presentation

The Surface Orientation Dependence of the Pre-Exponential Factors Extracted from the Segregation Profiles of a Cu(111/110) Bi-crystal

Wednesday, 13 July 2011 17:00 (2 hours)

Previous experimental investigations have only shown, without explanation, that the pre-exponential factor (D_0), in the diffusion coefficient of Sb segregating in Cu, is dependent on the surface orientation of a crystal. In this study, the surface concentration of Sb in a Sb doped Cu(111/110) bi-crystal was measured using a method combining AES and linear temperature heating. Segregation parameters, including the D_0 's are extracted from the experimental data of surface concentration versus temperature using the modified Darken model. The difference in the two pre-exponential factors D_0 (Sb in Cu(111)) and D_0 (Sb in Cu(110)) is explained thermodynamically in terms of entropy change ΔS that is calculated, for the first time, for a Cu(111/110) bi-crystal.

**Level (Hons, MSc,
 PhD, other)?**

MSc

**Consider for a student
 award (Yes / No)?**

Yes

**Would you like to
 submit a short paper
 for the Conference
 Proceedings (Yes / No)?**

Yes

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Session Classification: Poster1

Track Classification: Track A - Condensed Matter Physics and Material Science