

is qualitatively explained by the local contraction in the  $c$  plane.

### **X-Ray Photoemission Study of the Liquid Au-Sn Alloy**

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X-ray photoemission spectra of the core and valence states of liquid and solid Au-Sn alloys have been measured. The composition dependence of binding energies of the Au  $4f_{5/2, 7/2}$  peaks suggests that the liquid Sn-rich alloy has a fairly fixed type of local atomic environment around Au atoms different from that in the solid Sn-rich alloy. Estimated composition indicates that the surface is enriched in Sn component on an average.

### **Constitution of the Magnesium-Indium System near the Composition of $Mg_3In$ and Phase Transition of $\beta_1$ Phase**

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Acta Metall., **23** (1975), 691.

The phase diagram of the Mg-In system was re-examined, as there was some uncertainty as to the phase transition of  $\beta_1$  phase in the literature. It was found that the direct transition of  $\beta_1$  to  $\beta'$  phase is prevented by the two phase region in the whole composition range investigated. In addition to this, location of  $Mg_5In_2$  phase ( $\beta_3$  phase) in the diagram was for the first time made clear.  $\beta_3$  phase is stable only below 210°C and decomposes into  $\beta'$  and  $\beta_2$  phases above this temperature. The confirmation of the crystal structure of  $\beta_1$  phase was also done on single crystal electron diffraction patterns.  $Mg_3In$  changes its structure from ordered 12R to disordered f.c.c. through ordered 3R with increasing temperature. The transformation energy associated with the change in the stacking sequence (12R  $\rightarrow$  3R) and that associated with the order-disorder phase change were estimated by specific heat measurements to be  $\sim 120$  cal/mole and  $\sim 340$  cal/mole, respectively.

### **Composition Dependence of the Long-Period Layer Stacking Sequence in the Structure of the Ternary Alloy $Mg_3In_{1-x}Cd_x$**

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The effect of the replacement of some fraction of the indium atoms with cadmium atoms on the structural stability of the long-period layer stacking sequence in  $Mg_3In$  has been studied by means of X-ray and electron diffraction experiments. The observed changes in electron diffraction patterns can be described by Kakinoki's equation and suggests that when the cadmium content is