Pressure-Induced Change in the Long-Period Stacking Sequence of the Close-Packed Layers in Mg_3In(Physics)

is distorted in such a way that spacings of successive (00.2) planes are not the same and a hexagonal network of atoms in these planes is periodically deformed.

Correlative Microdomain Model for Short-Range Ordered Alloy Structures. I. Diffraction Theory

Shinya HASHIMOTO

Acta Crystallographica, **A30** (1974), 792.

A diffraction theory is developed for diffuse scattering from disordered binary alloys with short-range order. It is based on a model of ordered microdomains embedded in a disordered matrix and interference effects between the domains are considered. There is a possibility that the fine structures of diffuse scattering as observed in the cases of Cu_3Au, CuAu and Cu_3Pd alloys result from the introduction of interdomain correlations. From experimental diffuse intensity values one can calculate the statistical distribution of microdomains in antiphase with one another.

Effect of Pressure on the Ordered Structure and Phase Transition of the CuAu Alloy

HIROSHI IWASAKI, Hajime YOSHIDA and Shiro OGAWA

J. Phys. Soc. Japan, **36** (1974), 1037.

Effect of pressure on the CuAu alloy having a long period ordered structure has been studied using mainly a tetrahedral-anvil type press. The alloy was annealed at various temperatures ranging from 350°C to 500°C during application of pressure. After temperature and pressure were reduced to ambient ones, the structure formed in the alloy during compression and retained to atmospheric pressure was studied by a usual X-ray diffraction method. The maximum pressure applied was 70 kbar. It has been observed that pressure increases the order-disorder transition temperature at an initial rate of 1.5 ± 0.2 deg/kbar. The long period of the CuAuII structure formed under compression has been observed to increase with increasing pressure. Under the pressure higher than 50 kbar the CuAuII structure becomes unstable and the only ordered structure formed is CuAuI. The results obtained are discussed by taking into account a distortion of the Fermi surface of the alloy induced by pressure.

Pressure-Induced Change in the Long-Period Stacking Sequence of the Close-Packed Layers in Mg_3In

Hiroshi IWASAKI, Yousuke WATANABE and Shiro OGAWA

J. Appl. Crystallography, **7** (1974), 611.

Samples of the alloy Mg_3In were annealed at 200–250°C in the Bridgman-anvil-type press under pressures between 20 and 100 kbar. After being quenched to ambient pressure and temperature, the crystal structure was studied by X-ray diffraction. The number of close-packed layers in one repeating unit of the alloy

structure is twelve with the stacking sequence $(3\underline{1})_3$ when annealed under the atmospheric pressure, but at 20, 35 and 55 kbar it increases to eighteen with the sequence $(3\underline{1}1\underline{1})_3$, and at 75 and 100 kbar a 24-layered structure with the sequence $(3\underline{1}1\underline{1}1\underline{1})_3$ has been found to form. The pressure-induced change in the layer-stacking sequence in Mg_3In is similar to the change with the decrease in the electron-atom ratio previously observed for the ternary alloys $Mg_3(In_{1-x}, Cd_x)$.

Order-Disorder Transformations of Interstitial Solutes in Transition Metals of IV and V Groups

M. HIRABAYASHI, S. YAMAGUCHI, H. ASANO and K. HIRAGA

Proc. Internat. Symposium on Order-Disorder Transitions in Alloys, 1973 (1974), 266.

This paper attempts to present a survey of the order-disorder transformations in the interstitial alloys of transition metals with hydrogen, deuterium and oxygen. Special attention is given to the formation of interstitial superstructures, stepwise processes of disordering and property changes attributed to order-disorder. Four groups of interstitial alloys are considered; (1) Ti-O, Zr-O, Hf-O, (2) V-O, (3) V-H, V-D and (4) Ta-H, Ta-D. Characteristic features of the phase transformations in each group and each system are presented and discussed in comparison with others.

Order-Disorder Transformation of Oxygen Atoms Dissolved in Zirconium Studied by Neutron Diffraction

M. HIRABAYASHI, S. YAMAGUCHI, T. ARAI, H. ASANO and S. HASHIMOTO

Phys. Stat. Sol. (a), **23** (1974), 331.

Neutron diffraction experiments have been made to reveal the nature of the interstitial order-disorder transformation in the Zr-O system using single crystals. The disordering transition of the alloy with $O/Zr \lesssim 0.3$ occurs below 450°C, while in the composition $O/Zr = 0.3$ to 0.4 the disordering undergoes stepwise in such a way that the stacking sequence of the oxygen-atom layers changes below 600°C and subsequently the ordered distribution in the layers becomes random. A tentative phase diagram is proposed on the basis of the present results.

Angular Correlation of Photons from Positron Annihilation in Copper-Nickel Alloys

Masayuki HASEGAWA, Toshiharu SUZUKI and Makoto HIRABAYASHI

J. Phys. Soc. Japan, **37** (1974), 85.

Angular correlation measurements of radiation from positrons annihilating in copper-nickel alloys have been carried out with crossed-slit geometry using single crystals containing less than 73 at%Ni. The neck radius of the Fermi surface decreases linearly with increasing nickel content, but the neck does not detach from the hexagonal zone face even at the highest nickel content. No marked change in the composition dependence of neck radius is observed at the magnetic