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1. Isothermal Recovery of Electrical Resistivity in Cu immediately after Deformation

   Khoji Matsumoto

2. The Nature of Secondary Defects in Quenched Beta–Brass

   Yukiyoshi Nakane

3. Effect of Helium and Hydrogen Atoms on the Formation of Voids in Quenched Aluminium

   Yumi Morishita

4. Studies of Random Structure by Positron Annihilation

   Takashi Mihara

1. Isothermal Recovery of Electrical Resistivity in Cu immediately after Deformation

Khoji MATSUMOTO

We measured the electric resistance change during recovery of vacancies in copper immediately after deformation. Specimens were elongated by about 10% at various temperatures in the range from –20 to 137°C, and were annealed isothermally at each temperature. The resistivity decreases monotonously in this temperature range except the case of annealing at 115°C. The rate equations modified by our model were used to analyze the experimental results. Comparing the results of calculation with the experimental data, we concluded that the binding energy of a divacancy in Cu is rather larger than 0.1 eV and is close to 0.3 eV.

2. The Nature of Secondary Defects in Quenched Beta-Brass

Yukiyoshi NAKANE

Foils of beta-brass are quenched from various temperatures ranging from 500° to 800° into brine bath kept at −5°C and are examined by transmission electron microscopy. It is revealed that the defects observed in beta-brass distibute with a network and consist of dislocation loops and zigzag dislocations. These defects are considered to be related to the order-disorder transition via vacancy mechanisms. Monte Carlo simulation is performed to examine behaviour of vacancies during ordering. This result shows that almost all vacancies accumulate around antiphase domain boundaries (APB).

3. Effect of Helium and Hydrogen Atoms on the Formation of Voids in Quenched Aluminium

Yumi MORISHITA

Dilute aluminium alloys (Al-Ge, Al-Cu, Al-Ag) and 5-nine aluminium have been quenched in vacuum, helium or hydrogen atmosphere, and the formation of the secondary defects has been examined with an electron microscope. It has been made clear that helium atoms as well as hydrogen ones affect the formation of voids and the promotive effect of helium atoms is smaller than that of hydrogen ones. Using a set of rate equations, the promotive effect of both atoms has been discussed from the differences in solubility, migration energy and binding energy between a vacancy and a void containing a helium or hydrogen atom. It is concluded that the difference may be mainly caused by binding energy. The value of binding energy for a small void formed in helium atmosphere is inferred.

4. Studies of Random Structure by Positron Annihilation

Takashi MIHARA

The structural relaxation in the amorphous $Fe_{40}Ni_{40}P_{14}B_6$ alloy and the defects in electron irradiated germanium have been studied with positron annihilations as a microscopic probe in con-