

A General Treatment of the Distribution of Vacancies to Solute Atoms in a Ternary Solid Solution and its Application to Low Temperature Aging in Al-Cu-Sn Alloys(Metallurgy)

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journal or publication title	Science reports of the Research Institutes, Tohoku University. Ser. A, Physics, chemistry and metallurgy
volume	26
page range	372-372
year	1976
URL	http://hdl.handle.net/10097/27936

independent on temperature, while the latter is independent on strain and dependent on temperature.

The long-range interaction component could be explained by the Ashby's plastic constraint theory. The short-range interaction component could be explained by the image force mechanism.

A General Treatment of the Distribution of Vacancies to Solute Atoms in a Ternary Solid Solution and its Application to Low Temperature Aging in Al-Cu-Sn Alloys

H. KIMURA and R.R. HASIGUTI

Trnas. Japan Inst. Met., **16** (1975), 361.

A general treatment to calculate the concentration of vacancy-solute atom pairs in a ternary dilute solid solution is presented. This treatment is applicable to a wide range of vacancy concentration relative to the concentration of one kind of solute atoms.

The treatment is applied to explain the effect of tin addition on the rates of low temperature aging in Al-Cu alloys. The difference in the activation energy for aging between Al-Cu alloys and an Al-Cu-Sn alloy is analyzed to find the binding energy of a vacancy-tin atom pair to be about 0.3 eV larger than that of a vacancy-copper atom pair. The experimental result that the retardation of aging due to tin addition is appreciable only for tin concentrations larger than the vacancy concentration is also explained satisfactorily.

Kinetics of Precipitation of Carbon in Molybdenum at about 250°C

K. YOSHIOKA and H. KIMURA

Acta Metall., **23** (1975), 1009.

Kinetics of the precipitation of carbon in molybdenum at about 250°C are studied in detail by resistivity measurements. The rate of this precipitation stage is controlled by the diffusion of carbon atoms. The activation energy for carbon diffusion at this temperature range is determined to be 1.2 eV, which is appreciably smaller than the activation energy reported so far for carbon diffusion measured at high temperatures, about 1.7 eV.

Study of the Precipitation of χ -carbide in Tempered Medium and Low Carbon Steels

Yûnoshin IMAI, Tsugio OGURA and Akihisa INOUE

Trans. Iron, Steel Inst. Japan, **15** (1975), 79.

Observations by transmission electron microscopy have been made on quenched and tempered carbon steels containing 0.017%, 0.15% and 0.48% carbon to investigate the precipitation behaviours of χ -carbide in lower carbon steels with