

Superconducting Properties and Microstructure in Dilute Copper Alloys Containing Small Amounts of V₃Ga Particles(Metallurgy)

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MN m^{-2} , which is approximately the maximum flow stress of a pure molybdenum crystal. Aged specimens with less than 10 at. ppm carbon show lower yield and flow stresses than the pure crystal.

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Akihiko NAGATA, Hiroshi HIRAYAMA, Kōshichi NOTO and Osamu IZUMI
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The superconducting properties (T_c and J_c) were investigated by the resistivity measurement, and the structure was observed by a transmission electron microscopy in the dilute copper alloys containing small amounts of V_3Ga particles prepared by quenching from the liquid state and aging. No superconductivity could be observed at 4.2 K in as-quenched and/or in overaged samples. The highest T_{c2} (=12.5 K), T_{c1} (=9.6 K), and J_c (=525 A/cm²) were obtained by aging at 700°C for 96 h and corresponded with the structure of fine V_3Ga precipitates dispersed homogeneously in the copper matrix. Therefore, it is concluded that superconductivity in these alloys results from the superconducting path due to the proximity effect of the superconducting V_3Ga particles.

The Study of Unidirectional Transformation of Copper-Aluminium Eutectoid Alloy Controlled by the Heat Flow

Hideyuki TORIUMI, Seiji TERASAWA and Osamu IZUMI
J. Jap. Inst. Met., **41** (1977), 657.

Cu-Al eutectoid alloy has been transformed unidirectionally to produce aligned pearlitic structure in an electric resistance furnace under the temperature gradient of $\sim 150^\circ\text{C}/\text{cm}$ and with the translation velocity from 0.28 to 5 mm/hr.

At lower translation velocities, well-aligned pearlite parallel to the heat flow direction was produced. However, at higher velocities, a "zigzag" or "herringbone" structure was produced. The relationship between translation velocity (R) and interlamellar spacing (λ) was determined. At low velocities a growth law of $R \lambda^{3.7} = \text{const.}$ existed. As the growth velocity increased, the exponent in the growth law continuously changed from 3.7 to 1.2. The change in R - λ relationship over a wide velocity range was consistent with the theoretical analysis by Carpay.

Superconductivity of Cu-base Dispersion Alloys

Osamu IZUMI, Akihiko NAGATA, Koshichi NOTO and Hiroshi HIRAYAMA
Shindo Gijutsu Kenkyukai Shi (J. Jap. Copper & Brass Res. Assoc.), **16** (1977), 41.

Pure copper is not a superconductor even at the millidegree temperature range. However, it is known that a small amount of some superconducting elements such as Nb or Pb added to copper makes this alloy a superconductor. The superconductivity of this alloy is said to result from a proximity effect of superconducting