and 60 h respectively. The phase equilibria were studied by x-ray powder diffraction, metallography, magnetic susceptibility, and electrical resistivity measurements. In addition to three isothermal sections for Cu-rich alloys, [87Kum] determined isothermal contours on the solidus surface. Two isothermal sections for Cu-rich alloys at 1000 and 700 °C are redrawn from the results of [87Kum] in Fig. 1 and 2.

The solubility of both Fe and P increases with increasing temperature. At a given temperature, Fe reduces the solubility of P; P in turn reduces the solubility of Fe. The maximum solubility of Fe_2P in Cu is 0.55, 0.52, 0.40, 0.26, and 0.14 mol% at 1000, 950, 900, 800, and 700 °C respectively [87Kum]. Such data are useful in developing alloy compositions that have a combination of good mechanical strength (derived from a fine distribution of Fe_2P precipitates) and good electrical conductivity (arising from least solute content in the Cu matrix phase).

Cited References

87Kum: A.V. Kumanin, A.K. Nikolaev, and N.I. Revina, "Phase Diagrams and Properties of Copper-Rich Cu-Fe-P Alloys," *Izv. Akad. Nauk SSSR, Metally* (6), 178-182 (1987) in Russian; TR: *Russ. Metall.* (6) 182-185 (1987). (Experimental; #)

88Rag: V. Raghavan, "The Cu-Fe-P (Copper-Iron-Phosphorus) System," *Phase Diagrams of Ternary Iron Alloys. Part 3,* Indian Institute of Metals, Calcutta, 68-73 (1988). (Review; #)

# Indicates presence of a phase diagram.

Fe-In-P (Iron-Indium-Phosphorus)

V. Raghavan

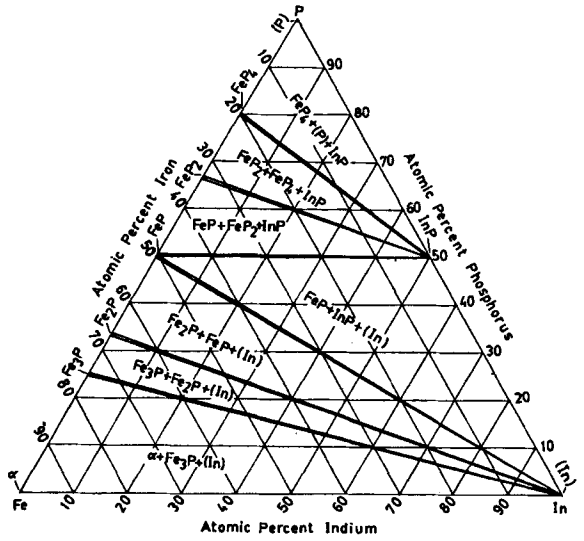

Fig. 1 Fe-In-P isothermal section at ~25 °C [90And].

The review by [88Rag] was limited to the solubility data of Fe in InP. [90And] determined an isothermal section for this system at room temperature.

Update

[90And] used hydrogen-reduced Fe, high-purity In, semiconductor grade InP, and P of 99.9% purity as starting materials. Thirteen mixtures were heated in evacuated silica tubes at 900 °C for several weeks. After annealing, the samples were either quenched in water or slowly cooled to room temperature. The phase equilibria on quenched and slowly cooled samples were studied by x-ray powder diffraction and DTA techniques. The isothermal section of [90And] at ~25 °C is redrawn in Fig. 1. (In) forms tie lines with the iron phosphides Fe_3P, Fe_2P, and FeP. InP forms tie lines with FeP, FeP_2, and FeP_4. No ternary compounds were found.

Samples quenched from 900 °C indicated that the isothermal section at 900 °C is similar to that at room temperature, except that FeP_4 is not present at 900 °C. This was confirmed by DTA experiments, which showed two thermal effects during heating due to the melting of In and the decomposition of FeP_4.

Cited References

88Rag: V. Raghavan, "The Fe-In-P System," *Phase Diagrams of Ternary Iron Alloys. Part 3,* Indian Institute of Metals, Calcutta, 84 (1988). (Review)

90And: M. Andersson-Soderberg, "Solid Phase Equilibria in the Fe-In-P System," *J. Less-Common Met., 159,* L13-L16 (1990). (Experimental; #)

# Indicates presence of a phase diagram.