Fe-In-S (Iron-Indium-Sulfur)

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[88Rag] reviewed the limited structural data on this system. [79Rus] and [81All] have determined a pseudobinary section along the FeS-In₂S₃ join.

Update

In the In-S binary system, α In₂S₃ (denoted β In₂S₃ in [88Rag]) is a low-temperature ordered superstructure of a spinel subcell, with a bct unit cell. β In₂S₃, stable between 414 and 750 °C, has the spinel structure with $a = 1.0780$ nm [80Lik]. The lattice parameters of the tetragonal superstruc-

ture are related through $a' = a\sqrt{2}$ and $c = 3a$ [80Lik]. γ In₂S₃, stable between 750 °C and the melting point 1090 °C, has hexagonal symmetry.

[79Rus] and [81All] have determined a pseudobinary section for this system along the FeS-In₂S₃ join. Metallography, x-ray powder diffraction, and DTA measurements were used. This section is redrawn in Fig. 1. FeIn₂S₄ melts congruently at 1125 °C. Up to 55 mol% of FeS dissolves in β In₂S₃ and the composition FeIn₂S₄ at 50 mol% FeS is actually a solid solution based on the spinel structure of β In₂S₃ [79Rus, 81All]. The lattice parameter of β In₂S₃ decreases linearly from ~1.070 nm at In₂S₃ to ~1.050 nm at FeIn₂S₄ [79Rus]. Recently, [92Wom] investigated the single-phase spinel region using Mössbauer spectroscopy.

Cited References

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# Indicates presence of a phase diagram.

Fig. 1 FeS-In₂S₃ pseudobinary section [79Rus].