

Fe-S-Sb (Iron-Sulfur-Antimony)

V. Raghavan

[88Rag] reviewed the experimental data on this system. The evaluated data were presented as: (i) a liquidus projection for the entire composition range; (ii) isothermal sections at 700, 540, and 450 °C; and (iii) a reaction scheme from the solidification range down to 275 °C.

Update

Recently, [89All] investigated two pseudobinary sections of this system, that lie along the FeS-Sb and FeS-Fe₃Sb₂(β) joins. The FeS-Sb section is confirmed to be pseudobinary with a monotectic reaction followed by eutectic solidification. However, the monotectic temperature and the composition of the monotectic liquid given by [89All] vary widely from those reviewed by [88Rag]. [89All] makes no mention of the works of [51Lan] and [71Bar], which form the basis of the review by [88Rag].

[89All] reported the FeS-Fe₃Sb₂(β) section to be pseudobinary with a eutectic reaction at 775 °C, as compared to the previously reported value of 910 °C [88Rag]. Moreover, [89All] found that the eutectic reaction is preceded by a peritectic reac-

tion that yields the ternary compound Fe₄Sb₂S (FeS-Fe₃Sb₂). No structural data on the new compound was reported by [89All]. Neither the existence of this compound nor the peritectic reaction has been reported in earlier work.

Pending further work to clarify the above discrepancies, no change to the evaluated data of [88Rag] is suggested.

Cited References

- 51Lan:** W. Lange and H. Schlegel, "Equilibrium Diagrams of the Systems Fe-Sb-S and Co-Sb-S," *Z. Metallkd.*, 42(9), 257-268 (1951) in German. (Experimental; #)
- 71Bar:** P.B. Barton, Jr., "The Fe-Sb-S System," *Econ. Geol.*, 66(1), 121-132 (1971). (Experimental; #)
- 88Rag:** V. Raghavan, "The Fe-S-Sb System," *Phase Diagrams of Ternary Iron Alloys. Part 2*, Indian Institute of Metals, Calcutta, 253-266 (1988). (Review; #)
- 89All:** M.R. Allazov and G.T. Gulieva, "The FeS-Sb and FeS-Fe₃Sb₂ Sections of the Fe-Sb-S Ternary System," *Zh. Neorg. Khim.*, 34(10), 2664-2667 (1989) in Russian; TR: *Russ. J. Inorganic Chem.*, 34(10), 1523-1524 (1989). (Experimental; #)

Indicates the presence of a phase diagram.

Fe-S-Sc (Iron-Sulfur-Scandium)

V. Raghavan

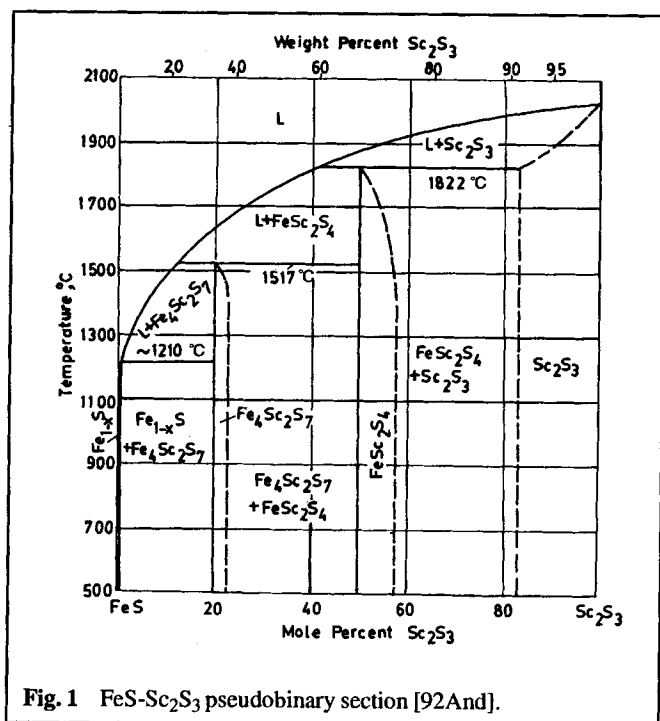


Fig. 1 FeS-Sc₂S₃ pseudobinary section [92And].

[88Rag] reviewed the limited data on crystal structures and S and Sc solubility in molten iron. Recently, [92And] determined a pseudobinary section for this system along the FeS-Sc₂S₃ join.

Update

Employing metallography, DTA, and x-ray powder diffraction measurements, [92And] determined a pseudobinary section for this system along the FeS-Sc₂S₃ line. This is redrawn in Fig. 1. About 15 mol% of Fe_{1-x}S dissolves in Sc₂S₃, whereas only 0.5 mol% of Sc₂S₃ dissolves in Fe_{1-x}S. FeSc₂S₄ with the spinel structure forms peritectically at 1822 °C and has a homogeneity range on the Sc₂S₃-rich side up to 58 mol% Sc₂S₃. This homogeneity range includes a ternary compound Fe_{0.85}Sc_{2.10}S₄ reported earlier by [79Tom]. At 1517 °C, another ternary phase Fe₄Sc₂S₇, a cubic structure of the NaCl-type [79Tom, 92And], forms peritectically from liquid and FeSc₂S₄. This phase has a homogeneity range from 20 to 23 mol% of Sc₂S₃. A third peritectic reaction occurs close to the melting point of Fe_{1-x}S.