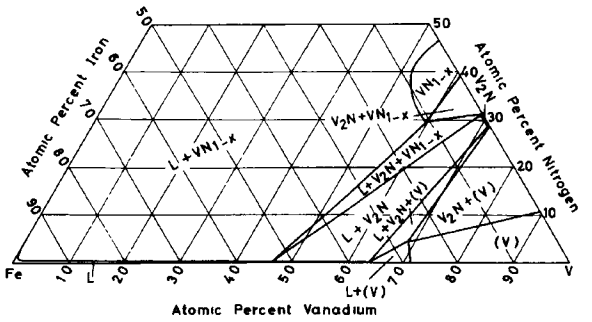

Fig. 1 Fe-N-V computed isothermal section at 1600 °C in atomic percent.

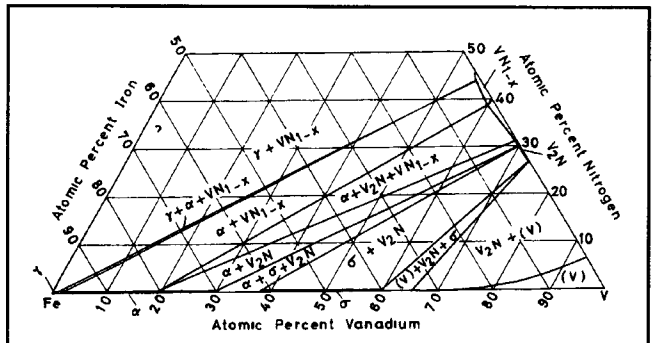

Fig. 2 Fe-N-V computed isothermal section at 1000 °C in atomic percent.

Based on the thermodynamic analysis, the solubility product of VN in austenite (γ) and ferrite (α) are given by [91Oht2]:

$$\log[(\text{wt.\%V})^{\gamma}(\text{wt.\%N})^{\gamma}] = -7600/T(\text{K}) - 10.34 + 1.8 \ln T + 7.2 \times 10^{-5} T$$

$$\log[(\text{wt.\%V})^{\gamma}(\text{wt.\%N})^{\gamma}] = -12\,500/T(\text{K}) + 6.63 - 0.056 \ln T + 4.7 \times 10^{-6} T$$

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87Mor: Z. Morita, T. Tanaka, and T. Yanai, "Equilibria of Nitride Forming Reactions in Liquid Iron Alloys," *Metall. Trans. B, 18*(1), 195-202 (1987). (Experimental)

87Rag: V. Raghavan, "The Fe-N-V System," *Phase Diagrams of Ternary Iron Alloys: Part 1*, ASM International, Metals Park, OH, 211-216 (1987). (Review; #)

87Wad: H. Wada, "Nitrogen Solubility and Precipitation of Nitride in Austenitic Fe-V Alloys," *Trans. Iron Steel Inst. Jpn., 27*(8), 649-657 (1987). (Experimental)

91Fri: K. Frisk, "A Thermodynamic Evaluation of the Cr-N, Fe-N, Mo-N and Cr-Mo-N Systems," *Calphad, 15*(1), 79-106 (1991). (Review; #)

91Hua: W. Huang, "A Thermodynamic Evaluation of the Fe-V-C System," *Z. Metallkd., 82*(5), 391-401 (1991). (Review; #)

91Oht1: H. Ohtani and M. Hillert, "A Thermodynamic Assessment of the V-N System," *Calphad, 15*(1), 11-24 (1991). (Review; #)

91Oht1: H. Ohtani and M. Hillert, "A Thermodynamic Assessment of the Fe-N-V System," *Calphad, 15*(1), 25-39 (1991). (Review; #)

#Indicates presence of a phase diagram.

Fe-Ti-V (Iron-Titanium-Vanadium)

V. Raghavan

The review of the experimental Fe-Ti-V data by [87Rag] included: (1) a tentative liquidus surface; (2) a reaction scheme; and (3) isothermal sections at 1000, 800, and 25 °C.

Update

[87Pri] investigated alloys along the isoconcentration lines of 50 and 33.3 at.% Ti, respectively. The results essentially confirm the reviewed results of [87Rag]: (1) the solubility of V in FeTi is small; (2) up to 30 at.% V dissolves in Fe_2Ti along the isoconcentration line of 33.3 at.% Ti; and (3) there are no ternary compounds in this system.

The lattice parameter variation as a function of V content up to 40 at.% along the 33.3 at.% Ti line, determined by [87Pri], is shown in Fig. 1 for samples annealed at 1200 °C. The solubility limit of V in Fe_2Ti is ~30 at.% in samples annealed at 1200 °C.

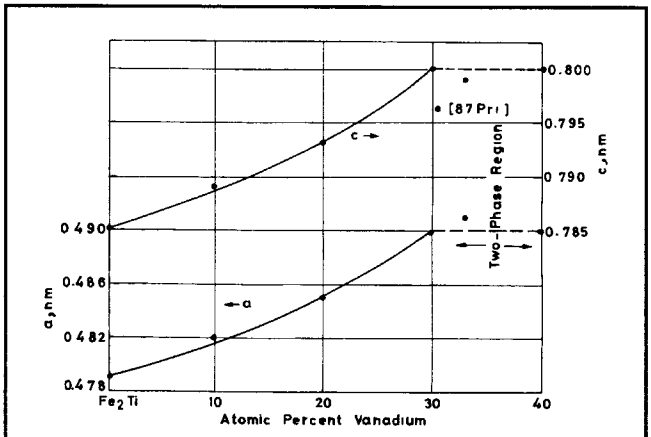

Fig. 1 Lattice parameter of Fe_2Ti as a function of dissolved vanadium.

[88Har] computed the $\gamma/(\gamma + \alpha)$ and $(\gamma + \alpha)/\alpha$ phase boundaries near the Fe corner at 1250, 1150, 1050, and 950 °C and found them to be linear.

Cited References

87Pri: S.B. Prima and L.A. Tret'yachenko, "Area of Homogeneity of Laves Phase in the Ti-V-Fe Ternary System," *Poroshk. Metall.*, *26*(5), 76-77 (1987) in Russian; TR: *Sov. Powder Metall. Met. Ceram.*, *26*(5), 414-415 (1987). (Experimental)

87Rag: V. Raghavan, "The Fe-Ti-V System," *Phase Diagrams of Ternary Iron Alloys: Part 1*, ASM International, Metals Park, OH, 73-84 (1987). (Review; #)

88Har: K.C. Hari Kumar and V. Raghavan, "FCC-BCC Equilibrium in Ternary Iron Alloys," *J. Alloy Phase Diagrams*, *4*(1), 53-71 (1988). (Review)

#Indicates presence of a phase diagram.