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Cr-Fe-Mo-N-Ni (Chromium-Iron-Molybdenum-Nitrogen-Nickel)

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[1992Fri] presented a thermodynamic description of this quinary system, comparing the computed results with the experimental data of [1987Her] and [1977Wad].

Computed Quinary Phase Equilibria

[1992Fri] combined descriptions of the lower order systems from the literature with a new assessment of the Fe-Mo-N system and a concurrent assessment of the Cr-Fe-N-Ni quaternary system by [1991Fri] (reviewed by [1996Rag]). The metal contents measured by [1987Her] of the face-centered cubic γ phase, body-centered cubic α and the ε nitride were compared with the computed values. The agreement was satisfactory, except for a higher computed Mo content in γ and ε phases. The computed solubility of nitrogen in liquid Cr-Fe-Mn-Ni alloys showed satisfactory agreement with the experimental data of [1977Wad]. As compared to large increase in nitrogen with increasing Cr content in the melt, the effect of Mo on nitrogen solubility was small.

In Fig. 1, the computed phase boundaries of the γ phase in equilibrium with α, ε, and (Cr,Mo)N are shown as a function of Cr and N for 10 and 20 wt.% Ni with or without 5 wt.% Mo. At low Cr contents, the nitride phase is (Cr,Mo)N. At higher Cr levels, ε nitride is stable. Mo moves all phase boundaries to lower Cr contents.

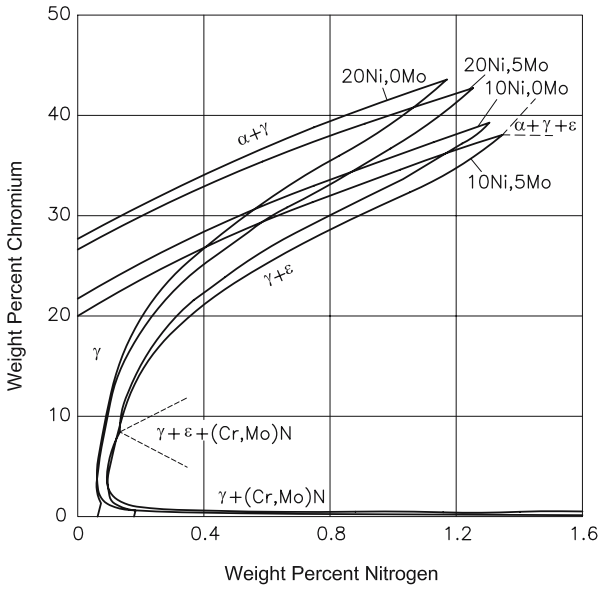

Fig. 1 Cr-Fe-Mo-N-Ni computed partial isothermal sections at 1000 °C [1992Fri]

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