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Co-Fe (Cobalt-Iron)

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The Co-Fe phase diagram in [Massalski2] was redrawn from [1984Nis]. This phase diagram was updated by the same group of authors [2002Ohn] by means of lattice parameter measurements and thermodynamic analysis. Figure 1 shows the result obtained by [2002Ohn]. Table 1 shows the Co-Fe crystal structure data.

Table 1 Co-Fe crystal structure data

Phase	Composition, at.% Fe	Pearson symbol	Space group	Strukturbericht designation	Prototype
(αCo, γFe)	0-100	*cF*4	$Fm\bar{3}m$	*A*1	Cu
(δFe)	83-100	*cI*2	$Im\bar{3}m$	*A*2	W
(αFe)	23-100	*cI*2	$Im\bar{3}m$	*A*2	W
(εCo)	0-2	*hP*2	$P6_3/mmc$	*A*3	Mg
α′	25-90	*cP*2	$Pm\bar{3}m$	*B*2	CsCl

[2006Ust] constructed the Co-Fe phase diagram as shown in Fig. 2 based on the x-ray diffraction phase analysis and transmission electron microscopy. Because of violation of phase rules, this phase diagram cannot be accepted as an equilibrium diagram. However, the observation of a martensitic transformation from (αFe) to (αFe)′ is a new feature not reported earlier, and further investigations may be needed.

References

1984Nis: T. Nishizawa and K. Ishida, The Co-Fe (Cobalt-Iron) System, *Bull. Alloy Phase Diagrams*, 1984, **5**(3), p 250-259

2002Ohn: I. Ohnuma, H. Enoki, O. Ikeda, R. Kainuma, H. Ohtani, B. Sundman, and K. Ishida, Phase Equilibria in the Fe-Co Binary System, *Acta Mater.*, 2002, **50**, p 379-393

2006Ust: Y. Ustinovshikov and B. Pushkarev, Ordering and Phase Separation in Alloys of the Fe-Co System, *J. Alloys Compd.*, 2006, **424**, p 145-151

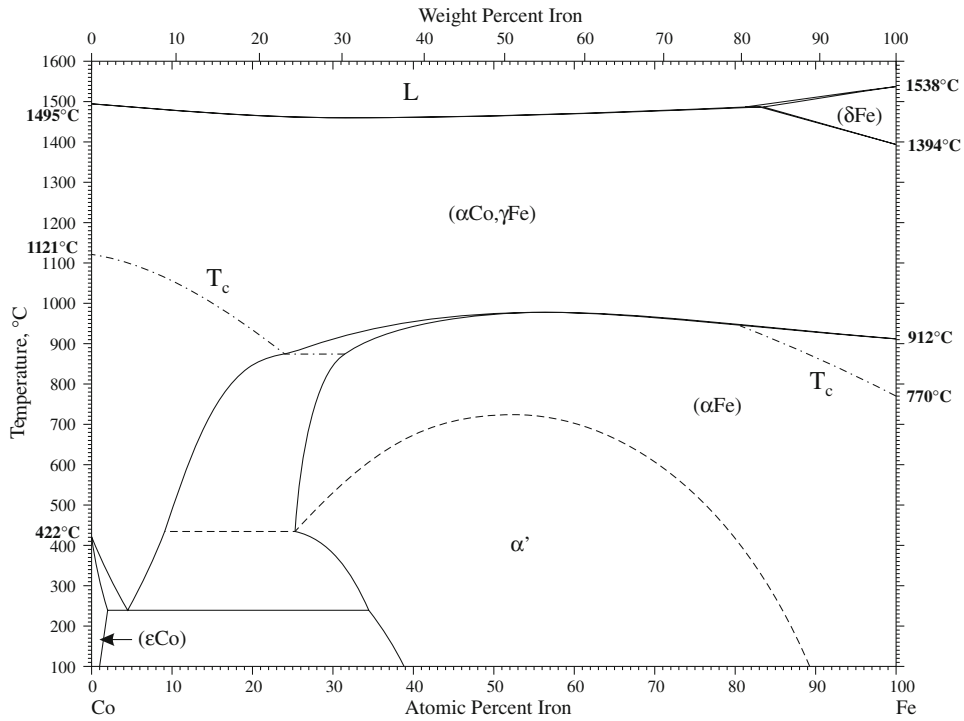

Fig. 1 Co-Fe phase diagram [2002Ohn]

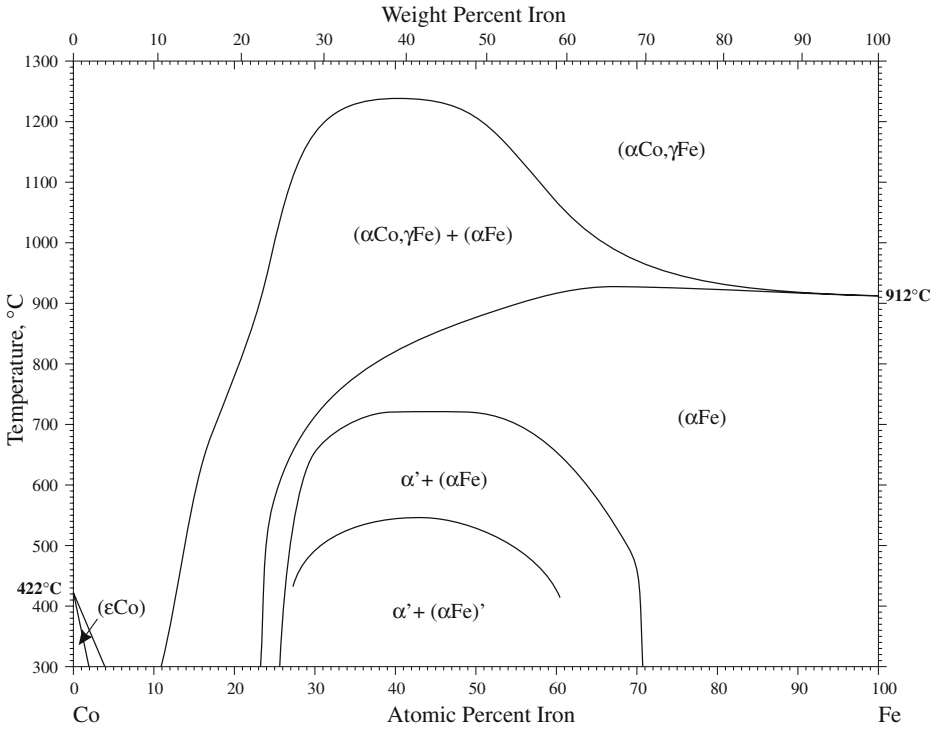

Fig. 2 Co-Fe phase diagram proposed by [2006Ust] (not an equilibrium phase diagram)