

Al-Cr-Fe-Zn (Aluminum-Chromium-Iron-Zinc)

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Previously, a schematic perspective view of the liquid domain near the Zn apex at 450 °C was presented by [2003Rag] from the results of [2002Tan]. [2004Reu] investigated this quaternary system and carried out a thermodynamic assessment. In view of the several unresolved problems, the new results do not add much to our understanding of the phase equilibria of this system.

Binary and Ternary Systems

For brief descriptions of the six binary and the four ternary subsystems, see the appropriate updates in [2003Rag].

Quaternary Phase Equilibria

[2004Reu] immersed solid Cr in Al baths at 780 °C for one week to allow the formation of Al-Cr intermetallic compounds. Zinc was then deposited from the vapor phase and diffused in, to determine the Zn solubility in Al-Cr compounds and to enable the formation of Al-Cr-Zn ternary phases. In the second set of experiments, solid Cr was immersed in Al-containing Zn

bath. The phase equilibria were studied with electron microscopy, energy dispersive spectroscopy, and x-ray diffraction.

The schematic perspective view of the liquid domain near the Zn apex at 460 °C constructed by [2004Reu] (not shown here) is similar to that reviewed by [2003Rag] from the results of [2002Tan]. An isothermal section at 460 °C calculated by [2004Reu] at a constant Cr content of 0.2 wt.% is shown in Fig. 1. More investigations are needed for a full understanding of this complex quaternary system.

References

- 2002Tan:** N.Y. Tang, Y.H. Liu, and K. Zhang, Development of Higher Order Phase Diagrams for Practical Applications in Galvanizing, *44th Mechanical Working and Steel Processing Conf. Proc.*, vol. 40, Iron and Steel Society (Warrendale, PA), 2002, p 815-821
- 2003Rag:** V. Raghavan, Al-Cr-Fe-Zn (Aluminum-Chromium-Iron-Zinc), *J. Phase Equilib.*, 2003, **24**(6), p 566-567
- 2004Reu:** G. Reumont, R. Fourmentin, P. Perrot, J. Foct, B. Gay, and S. Claessens, Thermodynamic Assessment of the Fe-Zn-Al-Cr System at 460 °C, *Revue Metallurgie-CIT*, 2004, **101**(10), p 823-830

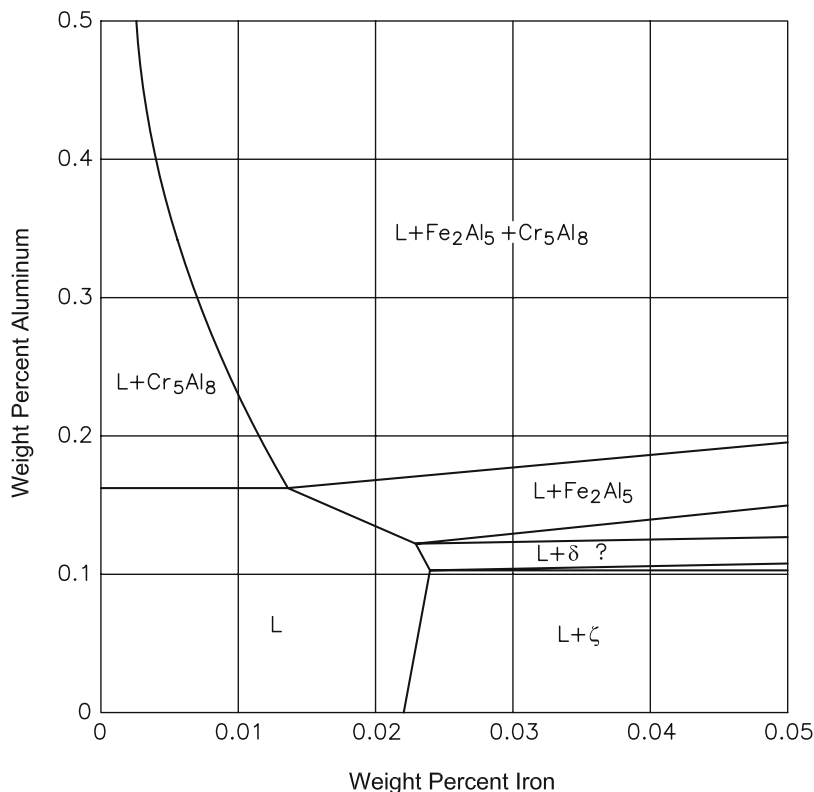


Fig. 1 Al-Cr-Fe-Zn isothermal section at 460 °C and at 0.2 wt.% Cr [2004Reu]