

C-Fe-Mo-V (Carbon-Iron-Molybdenum-Vanadium)

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During the course of their search for the lowest melting composition in the C-Cr-Fe-Mo-V quinary system, [1997Du] computed a partial reaction sequence for the liquid-solid equilibria of this quaternary system.

Binary Systems

For the six binary systems of C-Fe, C-Mo, C-V, Fe-Mo, Fe-V, and Mo-V, [1997Du] computed the minimum melting temperatures (where they exist) and compared them with the literature data.

Ternary Systems

[1997Du] computed the minimum melting temperatures from published assessments for C-Fe-Mo, C-Fe-V, and C-Mo-V systems and compared them with the available experimental data. No minimum melting temperature exists for the Fe-Mo-V ternary system.

Quaternary Phase Equilibria

Employing Thermo-Calc software in conjunction with the SGTE database, [1997Du] computed the phase equilibria and plotted projections of the univariant liquidus lines, with the V content of the liquid on the x-axis and temperature on the y-axis, as shown in Fig. 1. When no univariant liquidus line lies below the five-phase invariant plane (indicated by a horizontal broken line passing through a dot in Fig. 1), the dot corresponds to the minimum-melting liquid composition and temperature. This point is *E* in Fig. 1 and is at 1063 °C with ~ 0.45 wt.% V in liquid. The corresponding overall composition of the alloy was not given by [1997Du]. A partial reaction sequence written by [1997Du] is given in Fig. 2. The five-phase invariant reactions are indicated in bold italics. Equilibria between all solid phases resulting from the five-phase invariant reactions are omitted in Fig. 2.

[1997Du] extended the calculations to the C-Cr-Fe-Mo-V quinary system and found no minimum-melting eutectic composition in the five-component system other than that given above for the C-Fe-Mo-V subsystem.

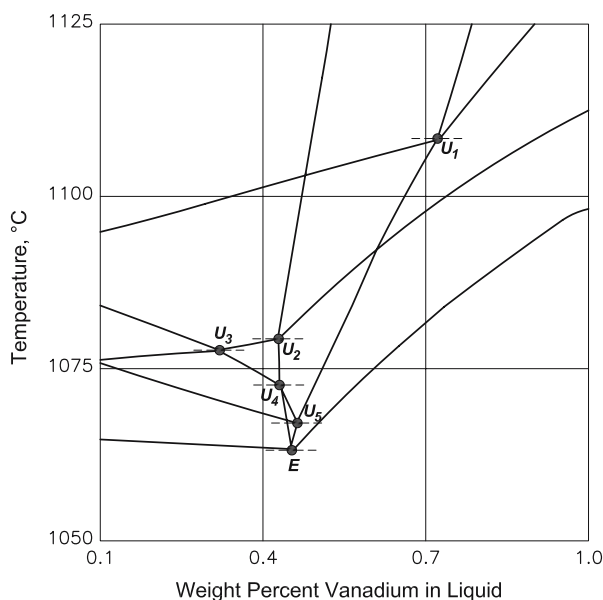


Fig. 1 C-Fe-Mo-V projections of the univariant liquidus lines as a function of temperature and wt.% V in liquid [1997Du]

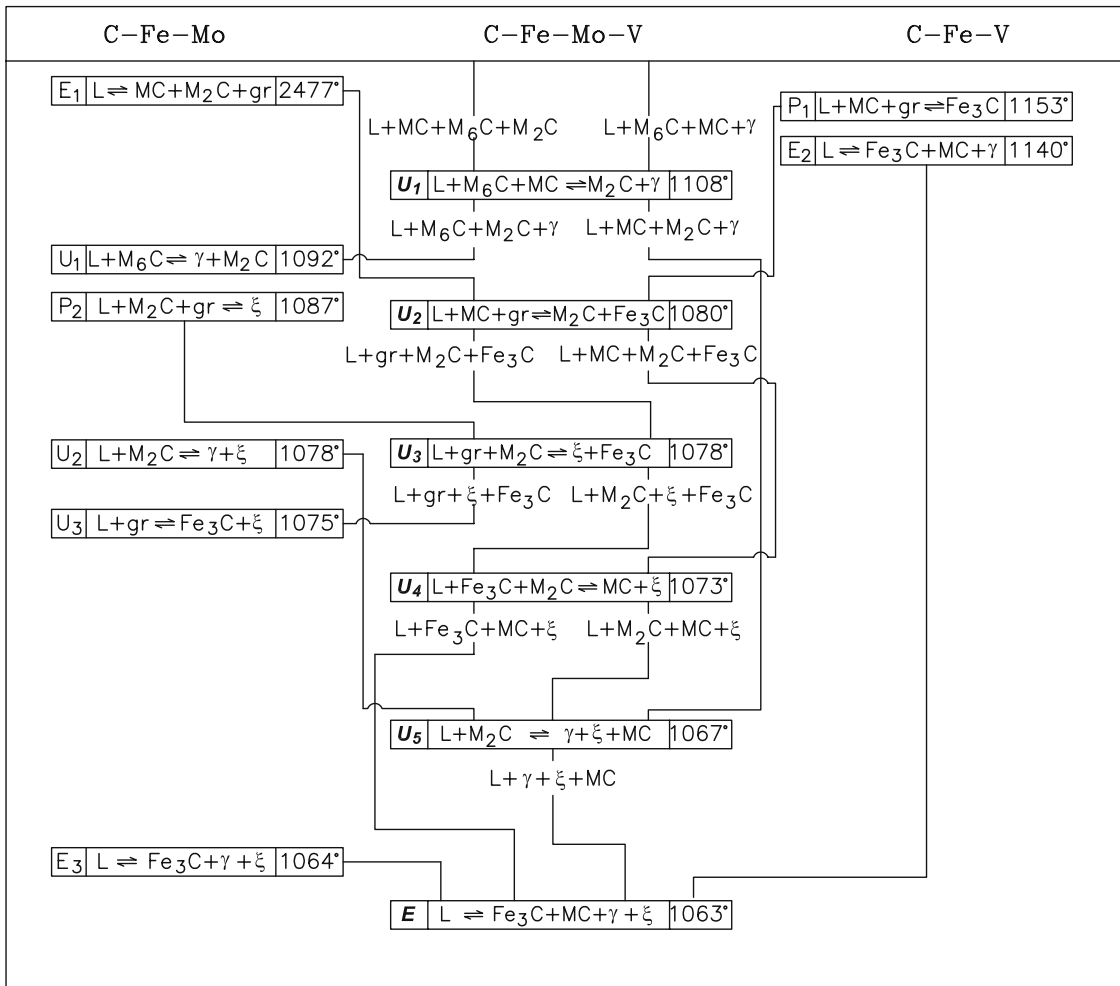


Fig. 2 C-Fe-Mo-V computed partial sequence of liquid-solid reactions [1997Du]

Reference

- 1997Du: H. Du and J.E. Morral, Prediction of the Lowest Melting point Eutectic in the Fe-Cr-Mo-V-C System, *J. Alloys Compd.*, 1997, **247**, p 122-127