The liquid metastable miscibility gap in Cu-based systems

Some Cu-based alloys, like Cu–Co, Cu–Fe and Cu–Co–Fe, display a liquid metastable miscibility gap. When the melt is undercooled below a certain temperature depending on the alloy composition, they present a separation in two liquid phases, followed by coagulation before dendritic solidification. In order to predict the phase equilibria and the mechanisms of microstructure formation, a determination of the metastable monotectics in the phase diagrams is essential. This paper focuses on the up-to-date findings on the Cu–Co, Cu–Fe and Cu–Co–Fe metastable miscibility gap in the liquid phase. Furthermore, the knowledge on the phase equilibria in the three systems is extended by presenting new results obtained by differential scanning calorimetry (DSC) and comparing them with the calculated phase diagrams.

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