Comments and Addenda

Comments

Al-Be (Aluminum-Beryllium) System

Wouldn't it help phase diagram users to have an enlarged insert of the (αBe) $\rightleftarrows$ (βBe) transformation in the Be systems? In Vol. 4, No. 1, for example, for the Al-Be system, it is stated (in Table 1, p 50) that the type of transformation is unknown, but surely it must be either metatectic ($\beta \rightarrow \alpha$ + L) or peritectic (L + $\beta \rightarrow \alpha$). My suggestion would be to indicate these two alternatives by an enlarged dotted line insert sketch (see Fig. 1). Such a sketch, even if not supported by quantitative data, would serve very well as an indicator of what can happen to impurity segregation in commercially pure Be on cooling from the melt and might even stimulate some research to resolve the type of transformation involved.

Above remarks by
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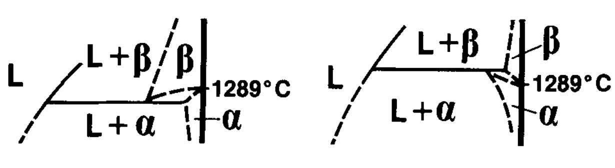
Fig. 1 $\alpha \rightleftarrows \beta$ **Transformation in the Al-Be System**



Editor's comment: Do the users of phase diagrams among our readers feel that this speculation is worth noting in each system?

Reply to Editor's Corner

In response to the question in the "Editor's Corner" in Vol. 4, No. 1, the binary phase diagram showing a "homogeneous series of solid solutions formed by components A and B and also a compound AB miscible with either component" is a contradiction in terms. Systems with continuous series of solid solutions and complete liquid miscibility between the components have only one possible heterogeneous equilibrium, that between the liquid phase and the solid solution phase. Given a continuous series of solid solutions between A and B, no binary alloy can undergo a congruent transformation to a compound phase AB. If a compound phase were formed, it could not be miscible with both components. The solid solutions based on the A component, s_1, are then distinct from the solid solutions based on the B component, s_2. A third phase, the compound AB, would separate s_1 from s_2, implying the presence of the two-phase regions $s_1 + AB$ and $s_2 + AB$. In tracking from A to B, the sequence of phase regions would be $s_1/s_1 + AB/AB/s_2 + AB/s_2$. This sequence contradicts the hypothesis of continuous series of solid solutions between A and B, the equilibrium liquid $\rightleftharpoons s$, and would also require the inclusion of invariant reactions involving the liquid phase.

The congruent transformation, liquid = AB at point C, is not possible. Congruent transformations in isobaric sections of binary phase diagrams occur at temperature extremums where the tangents to the liquidus and solidus curves are horizontal and both curves kiss at the temperature extremum.

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We invite your comments on these or any other topics.
—*Editor*

Addenda

The Al-Be (Aluminum-Beryllium) System

Figure 1 on page 52 of Vol. 4, No. 1 (mislabelled Fig. 2) did not show the (βBe) solidus, or the (Al) or (αBe) solvi. The (Al) solvus extends from 0.3 at.% Be at 644 °C to a vanishingly small Be content at 600 °C. The (βBe) solidus and the (αBe) solvus should be added as heavy vertical lines at 100% Be, between 1289 and 1254 °C and between 644 and 600 °C, respectively; the same corrections should be made to the atomic percent tear-out on page 99 and the weight percent tear-out on page 100 (see Fig. 2, Al-Be Phase Diagram).

Recent Literature

The "Recent Literature" citation in Vol. 1, No. 1, page 7 and Vol. 3, No. 4, page 461 listed as Al-As-Ga 79-32-1102 should be listed under Al-Ga.