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Al-Cr-Nb-Ti (Aluminum-Chromium-Niobium-Titanium)

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The information on this system is limited to a vertical section computed by [2002Kau].

Binary Systems

For brief descriptions of the Al-Cr, Al-Ti, and Cr-Ti phase diagrams, see the Al-Cr-Ti update in this issue. The Al-Nb-Ti update gives descriptions of the Al-Nb and Nb-Ti diagrams. The Cr-Nb phase diagram [1993Oka] depicts one intermediate phase, Cr_2Nb, with two crystal modifications with the transition temperature of ~1600 °C. The high-temperature form βCr_2Nb is a *C*14-type hexagonal Laves phase; αCr_2Nb is a *C*15-type cubic phase.

Ternary Systems

Updates of the Al-Cr-Ti and Al-Nb-Ti systems appear in this issue. Computed isothermal sections of the Al-Cr-Nb system at 1700, 1600, 1300, and 1000 °C were given by [2002Kau]. Computed sections of the Cr-Nb-Ti system at 1800, 1600, 1500, and 1300 °C were also given by [2002Kau].

Quaternary Phase Equilibria

A vertical section was computed for this quaternary system by [2002Kau], constrained by the conditions that (wt.% Cr/wt.% Al) = 4 and (wt.% Ti/wt.% Cr) = 3. This section is redrawn in Fig. 1 as a function of Nb content. The composition of any quaternary alloy can be derived for a given Nb content. For example, at 70.0 wt.% Nb, the alloy contains 1.76 wt.% Al, 7.06 wt.% Cr, and 21.18 wt.% Ti.

[1995Qin] determined the shift in the $(\alpha Ti)/[(\alpha Ti) + \gamma]$, $[(\alpha Ti) + \gamma]/\gamma$, $\alpha_2/(\alpha_2 + \gamma)$, and $(\alpha_2 + \gamma)/\gamma$ phase boundaries of the Al-Ti binary system, with the addition of 2 at.% Nb + 2 at.% Cr. The boundaries shift by approximately 2 at.% toward the Ti-rich end.

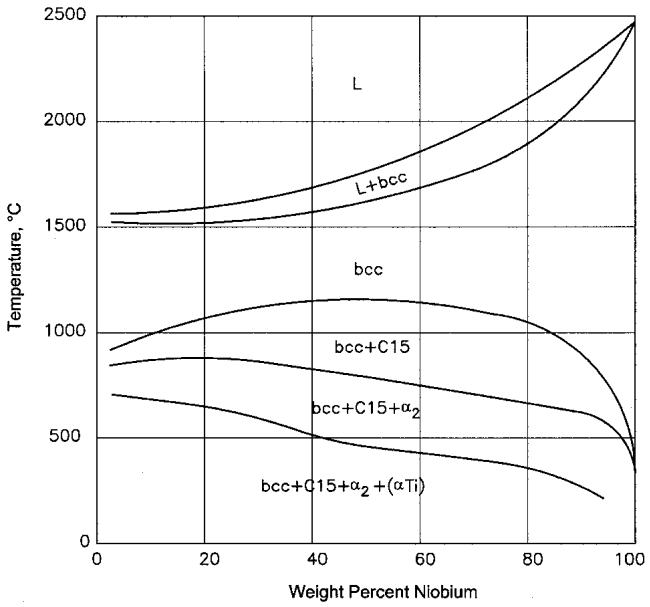

Fig. 1 Al-Cr-Nb-Ti computed vertical section, constrained by the conditions that (wt.% Cr/wt.% Al) = 4 and (wt.% Ti/wt.% Cr) = 3 [2002Kau]

References

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