

Al-Ti-Y (Aluminum-Titanium-Yttrium)

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A partial isothermal section at 1000 °C was determined for this system by [1995Yan].

Binary Systems

An update of the Al-Ti phase diagram appears in this issue. The Al-Y phase diagram [1989Gsc] depicts five compounds of fixed stoichiometry: YAl_3 (above 645 °C, BaPb₃-type rhombohedral; below 645 °C, Ni₃Sn-type hexagonal), YAl_2 (MgCu₂-type cubic), YAl (CrB-type orthorhombic), Y_3Al_2 (Zr₃Al₂-type tetragonal), and Y_2Al (Co₂Si-type orthorhombic). There are no intermediate phases in the Ti-Y phase diagram. The mutual solid solubility between Ti and Y is limited.

Ternary Isothermal Section

With starting metals of >99.8% purity, [1995Yan] melted alloy compositions, which were annealed at 1000 °C

for 150 h. The phase equilibria were studied by metallography, electron probe microanalysis, and the diffusion-couple technique. The partial isothermal section at 1000 °C by [1995Yan] is redrawn in Fig. 1 to agree with the accepted binary data. Ternary phases based on YAl_2 and Y_3Al_2 dissolve up to about 20 and 15 at.% Ti, respectively. Their range expands into the ternary region from the fixed composition of the binary compound (Fig. 1). $TiAl$ (γ) and $TiAl_2$ dissolve 1.25 and 4.2 at.% Y, respectively.

References

- 1989Gsc:** K.A. Gschneidner, Jr. and F.W. Calderwood, The Al-Y (Aluminum-Yttrium) System, *Bull. Alloy Phase Diagrams*, Vol 10 (No. 1), 1989, p 44-47
- 1995Yan:** Z. Yang, L. Ren, F. Zhang, R. Zhou, and Z. Yu, Re-determination of 1000 °C Partial Isothermal Section of the Ti-Al-Y Ternary System, *J. Univ. Sci. Technol. Beijing*, Vol 17 (No. 6), 1995, p 512-516 (in Chinese)

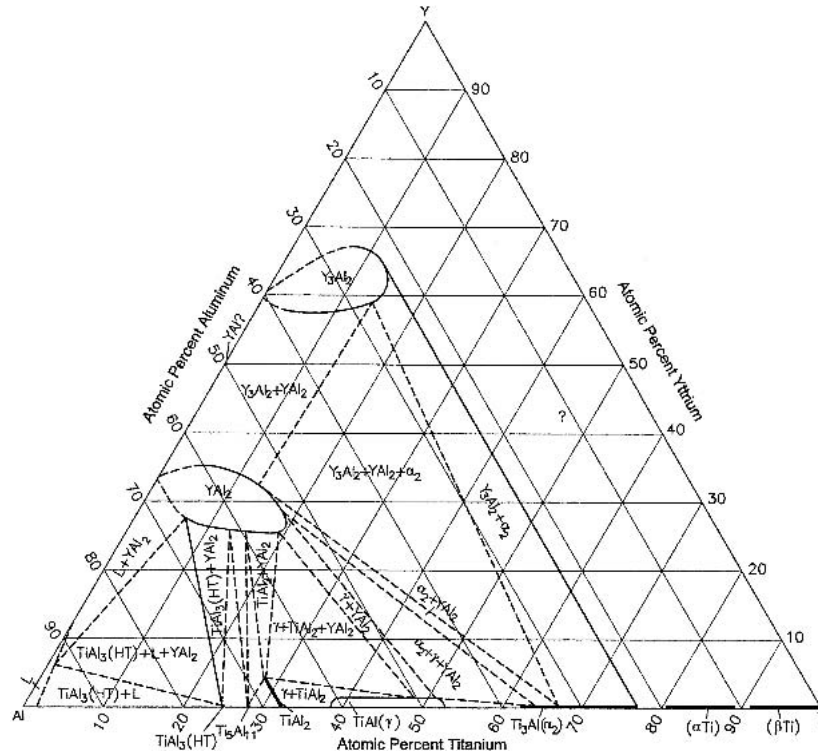


Fig. 1 Al-Ti-Y partial isothermal section at 1000 °C [1995Yan]