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# Al-Sb-Ti (Aluminum-Antimony-Titanium)

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[1997Kim] determined partial isothermal sections for this system at 1300 and 1100 °C.

## Binary Systems

The Al-Sb phase diagram [Massalski2] depicts the congruently-melting compound AlSb (*B*3-type cubic) at the midcomposition. An update on the Al-Ti system appears in this issue. A schematic partial Sb-Ti phase diagram [Massalski2] depicts seven intermediate compounds: $TiSb_2$ ($CuAl_2$-type tetragonal), TiSb (NiAs-type hexagonal), $Ti_6Sb_5$ (orthorhombic), $Ti_5Sb_3$ (orthorhombic), $Ti_{2.5}Sb$ ($BiTi_2$-type tetragonal), $Ti_3Sb$ ($Cr_3Si$-type cubic), and $Ti_4Sb$ ($Ni_3Sn$-type hexagonal). Not all of these appear to be established as equilibrium phases.

## Ternary Isothermal Sections

With starting metals of 99.99% Al, 99.99% Sb, and 99.8% Ti, [1997Kim] prepared seven alloy compositions, which were given a final anneal at 1300 °C for 16 h or at 1100 °C for 1 week. The phase equilibria were studied by x-ray diffraction, electron probe microanalysis and differential thermal analysis. The partial isothermal sections constructed by [1997Kim] at 1300 and 1100 °C are redrawn in Fig. 1. A ternary compound τ (denoted ϕ by [1997Kim]) was found to be stable up to 1500 °C, with a homogeneity range of 11.0-17.1 at.% Al, 19.2-25.5 at.% Sb, and 63.0-65.4 at.% Ti. It has the $D8_m$, $W_5Si_3$-type tetragonal structure, with $a$ = 1.0447 to 1.0484 nm and $c$ = 0.5239 to 0.5275 nm [1997Kim]. It forms tie-lines with $Ti_3Sb$, (βTi), (αTi), and TiAl (γ) at 1300 °C and with $Ti_3Sb$, (βTi), $\alpha_2$, and TiAl (γ) at 1100 °C.

### References

**1997Kim:** T. Kimura, H. Doi, K. Hashimoto, E. Abe, and Y. Isoda, Phase Equilibria in the TiAl-Rich portion of Ti-Al-Sb System at 1373 and 1573 K, *Nippon Kinzoku Gakkaishi,* (*J. Jap. Inst. Metals*) Vol 61 (No. 5), 1997, p 385-390 (in Japanese)

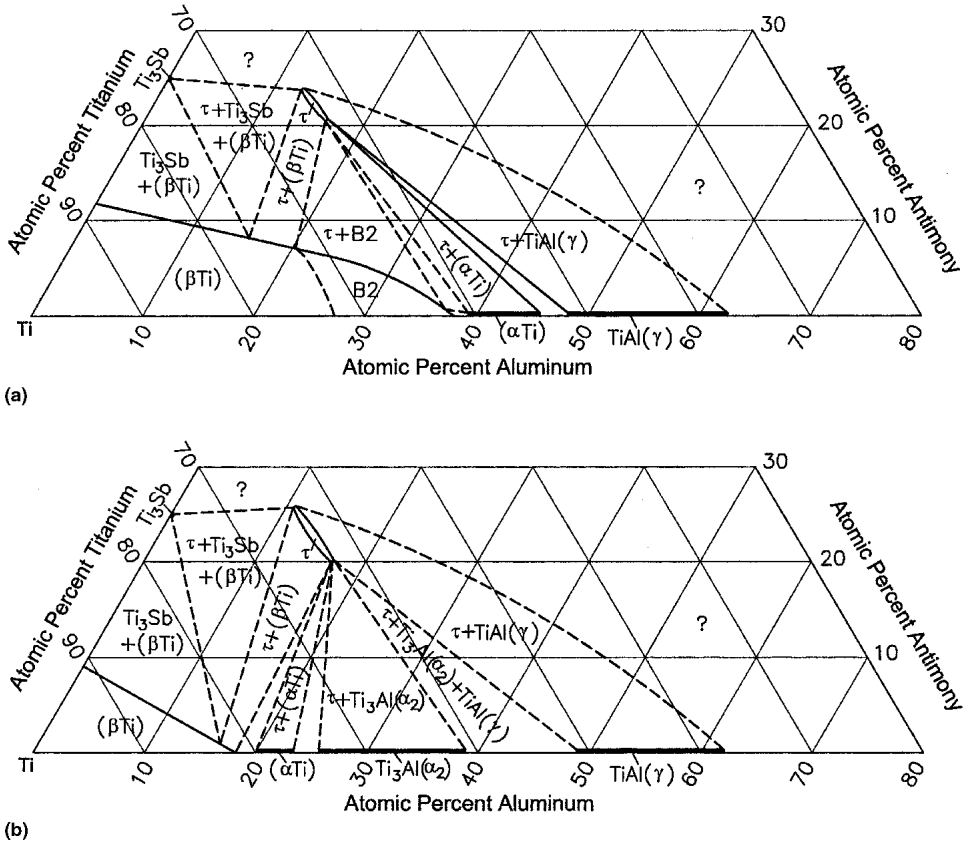


**Fig. 1** Al-Sb-Ti partial isothermal sections at **(a)** 1300 and **(b)** 1100 °C [1997Kim]