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Al-B-Tb (Aluminum-Boron-Terbium)

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[1994Mik] determined an isothermal section at 600 °C for this ternary system, which depicts a ternary compound $TbAlB_{14}$.

Binary Systems

There are two intermediate phases in the Al-B system: AlB_2 (*C*32, AlB_2-type hexagonal) and AlB_{12} (AlB_{12}-type tetragonal). The Al-Tb system [Massalski2] depicts five intermediate phases: $TbAl_3$ ($BaPb_3$-type rhombohedral), $TbAl_2$ (*C*15, $MgCu_2$-type cubic), TbAl (ErAl-type orthorhombic), Tb_3Al_2 (Zr_3Al_2-type tetragonal), and Tb_2Al (*C*23, Co_2Si-type orthorhombic). The B-Tb phase diagram [Massalski2] shows the following compounds: TbB_2 (*C*32, AlB_2-type hexagonal), TbB_4 ($D1_e$, ThB_4-type tetragonal), TbB_6 ($D2_1$, CaB_6-type cubic), TbB_{12} ($D2_f$, UB_{12}-type cubic), and TbB_{66} (cubic).

Ternary Compound

A ternary compound $TbAlB_{14}$ (τ) was synthesized in this system by [1989Kor] by crystallization from an Al-rich melt. It has the $MgAlB_{14}$-type orthorhombic structure [1994Mik].

Ternary Isothermal Section

With starting materials of ≥99.5 mass% purity, [1994Mik] arc-melted or sintered 51 ternary alloys. The alloys were annealed at 600 °C for not less than 500 h and quenched in water. The phase equilibria were studied by X-ray powder diffraction. The isothermal section at 600 °C constructed by [1994Mik] is shown in Fig. 1. The phase equilibria involving AlB_2, AlB_{12}, and TbB_{66} were not determined by [1994Mik].

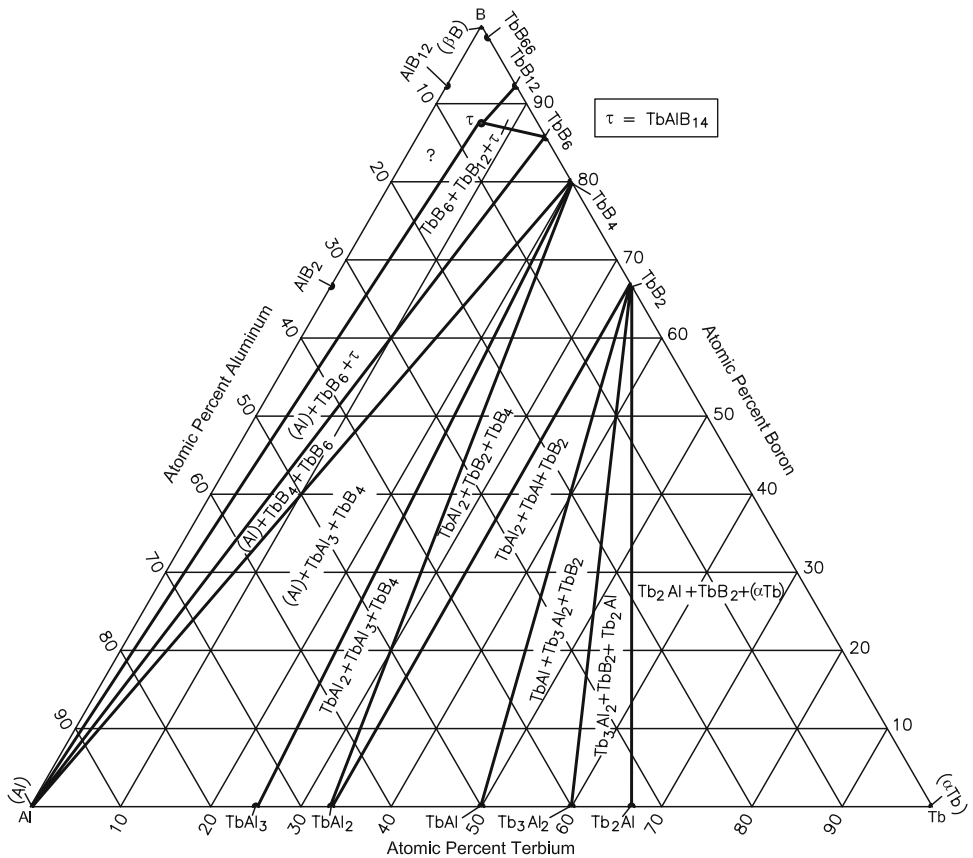

Fig. 1 Al-B-Tb isothermal section at 600 °C [1994Mik]. Thin two-phase regions are omitted

References

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