JPEDAV (2010) 31:43
DOI: 10.1007/s11669-009-9619-6
1547-7037 ©ASM International

Al-Dy-Sb (Aluminum-Dysprosium-Antimony)

V. Raghavan

An isothermal section at 500 °C was recently determined for this ternary system by [2009Zen]. No ternary phases were found.

Binary Systems

The Al-Dy [Massalski2] phase diagram shows the following intermediate phases: $AlDy_2$ (*C*23, Co_2Si-type orthorhombic), Al_2Dy_3 (Zr_3Al_2-type tetragonal), AlDy (ErAl-type orthorhombic), Al_2Dy (*C*15, $MgCu_2$-type cubic), αAl_3Dy ($D0_{24}$, Ni_3Ti-type hexagonal), and βAl_3Dy (stable between 1090 and 1005 °C; $HoAl_3$-type rhombohedral). The Al-Sb phase diagram [Massalski2] depicts the stoichiometric compound AlSb (*B*3, Sphalerite-type cubic). The Dy-Sb phase diagram [Massalski2, 2009Zen] has the following intermediate phases: Dy_5Sb_3 ($D8_8$, Mn_5Si_3-type hexagonal), βDy_4Sb_3, αDy_4Sb_3 ($D7_3$, Th_3P_4-type cubic), DySb (*B*1, NaCl-type cubic), and Dy_2Sb_5 (monoclinic, $P2_1/m$).

Ternary Isothermal Section

With starting metals of 99.9% Al, 99.9% Dy and 99.95% Sb, [2009Zen] arc-melted or induction-melted under Ar atm 21 binary and 55 ternary alloys. The alloys were given a final anneal at 500 °C for 480-960 h and quenched in liquid nitrogen. The phase equilibria were studied with optical and scanning electron metallography and x-ray powder diffraction. The composition and the observed phases for all 76 alloys were listed. The isothermal section constructed by [2009Zen] at 500 °C is shown in Fig. 1. No ternary compound was found. The ternary solubility in the binary compounds was less than 1 at.%. [2009Zen] found that the binary phase αDy_4Sb_3 is not stable at 500 °C.

Reference

2009Zen: L. Zeng, J. He, J. Yan, and W. He, The Phase Equilibria of the Dy-Al-Sb Ternary System at 500 °C, *J. Alloys Compd.*, 2009, **479**, p 173-179

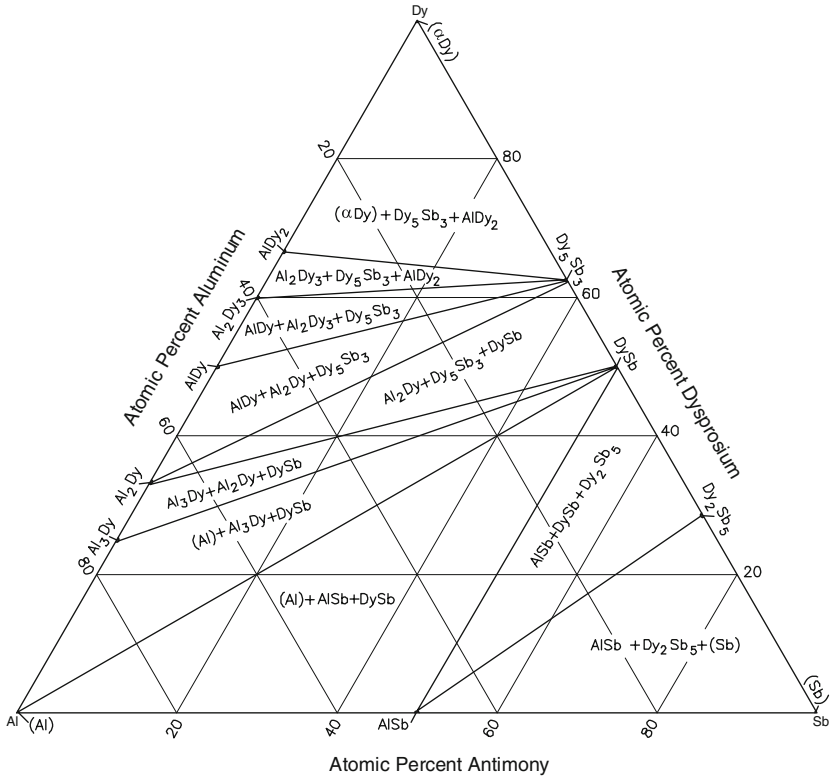

Fig. 1 Al-Dy-Sb isothermal section at 500 °C [2009Zen]. Narrow two-phase regions are omitted