Al-Pr-Zr (Aluminum-Praseodymium-Zirconium)

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Recently, an isothermal section at 500 °C was determined for this ternary system by [2010She], which depicts no ternary compounds.

phase diagram is not known. No intermediate phases were found in this system by [2010She].

Binary Systems

The Al-Pr phase diagram [Massalski2] shows the following intermediate compounds: αAlPr_3 (D_{019} , Ni₃Sn-type hexagonal), βAlPr_3 (L_{12} , AuCu₃-type cubic), AlPr_2 (C_{23} , Co₂Si-type orthorhombic), αAlPr (AlEr-type orthorhombic), βAlPr (CeAl-type orthorhombic), Al_2Pr (C_{15} , MgCu₂-type cubic), Al_3Pr (Ni₃Sn-type hexagonal), Al_4Pr or $\beta\text{Al}_{11}\text{Pr}_3$ (D_{13} , Al₄Ba-type tetragonal), and $\alpha\text{Al}_{11}\text{Pr}_3$ ($\alpha\text{La}_3\text{Al}_{11}$ -type orthorhombic). The Al-Zr phase diagram [Massalski2] depicts the following intermediate phases: Al_3Zr (D_{023} -type tetragonal), Al_2Zr (C_{14} , MgZn₂-type hexagonal), Al_3Zr_2 (Al_3Zr_2 -type orthorhombic), AlZr (B_f , CrB-type orthorhombic), Al_4Zr_5 (Ga_4Ti_5 -type hexagonal), Al_3Zr_4 (Al_3Ir_4 -type hexagonal), Al_2Zr_3 (Al_2Zr_3 -type tetragonal), Al_3Zr_5 (D_{8m} , W_5Si_3 -type tetragonal), AlZr_2 (B_{82} , Ni₂In-type hexagonal), and AlZr_3 (L_{17} , AuCu₃-type cubic). The Pr-Zr

Ternary Isothermal Section

With starting metals of 99.9% Al, 99.95% Pr and 99.95% Zr, [2010She] arc-melted under Ar atm a total of 59 binary and ternary alloys. The alloys were given a final anneal at 500 °C for > 240 h and quenched in liquid nitrogen. The phase equilibria were studied with x-ray powder diffraction and scanning electron microscopy with energy dispersive spectroscopy. The isothermal section at 500 °C constructed by [2010She] is shown in Fig. 1. None of the binary compounds exhibit third-component solubility. No ternary phases were found.

Reference

2010She: J. She, Y. Zhan, C. Li, Y. Du, H. Xu, and Y. He, Phase Equilibria of the Al-Pr-Zr Ternary System at 773 K, *J. Alloys Compd.*, 2010, **503**, p 57-60

Fig. 1 Al-Pr-Zr isothermal section at 500 °C [2010She]. Narrow two-phase regions are omitted