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Al-Co-Sc-Ti (Aluminum-Cobalt-Scandium-Titanium)

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The Al-rich region of this quaternary system was investigated by [2001Buk] at 600 °C and at a constant Al content of 86 at.%. The four-phase equilibrium on this section is (Al) + Co_2Al_9 + $ScAl_3$ + $\alpha TiAl_3$, with no ternary or quaternary phases.

Lower Order Systems

At 86 at.% Al and at 600 °C, the Al-Co, Al-Sc, and Al-Ti binary phase diagrams consist of (Al) + Co_2Al_9 ($D8_d$-type monoclinic), (Al) + $ScAl_3$ ($L1_2$, $AuCu_3$-type cubic), and (Al) + $\alpha TiAl_3$ ($tI32$, $I4/mmm$) respectively, with little solubility of the binary compounds in (Al). The Al-Co-Sc system is reviewed in this issue. The Al-Co-Ti system was reviewed by [2005Rag]. No phase diagram information appears to be available for the Al-Sc-Ti system.

Quaternary Phase Equilibria

With starting metals of 99.999% Al, 99.9% Co, 99.9% Sc, and 99.9% Ti, [2001Buk] melted 16 alloys in an electric arc furnace under Ar atm. The alloys contained a constant 86 at.% Al, with Co, Sc and Ti each varying from 0 to 14 at.%. The alloys were annealed at 600 °C for 1 month and quenched in water. The phase equilibria were studied with optical microscopy, x-ray powder diffraction, and hardness measurements. The isothermal section at 600 °C and at 86 at.% Al constructed by [2001Buk] is shown in Fig. 1. The section is characterized by the four-phase equilibrium of (Al) + Co_2Al_9 + $ScAl_3$ + $\alpha TiAl_3$. No ternary or quaternary phases were found.

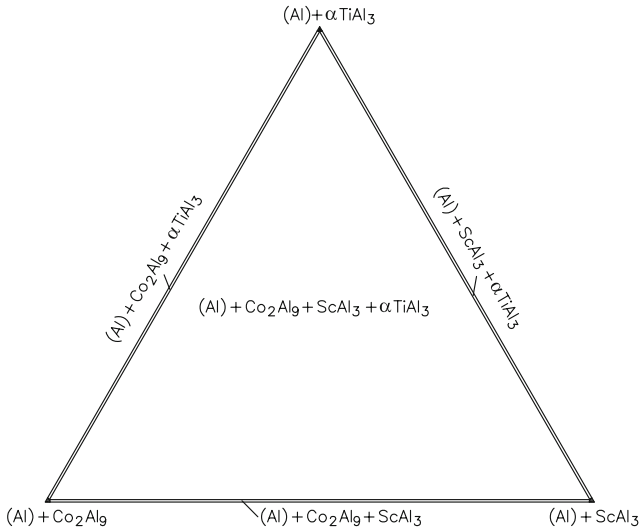

Fig. 1 Al-Co-Sc-Ti isothermal section at 600 °C and at 86 at.% Al [2001Buk]

References

2001Buk: N.G. Bukhanko, E.F. Kazakova, and E.M. Sokolovskaya, An Isothermal Section of the Quaternary System Al-Co-Sc-Ti, *Vestn. Mosk. Univ., Ser. 2, Khimiya*, 2001, **42**(6), p 398-402, in Russian

2005Rag: V. Raghavan, Al-Co-Ti (Aluminum-Cobalt-Titanium), *J. Phase Equilb. Diffus.*, 2005, **26**(2), p 175-177