

Al-B-Rh (Aluminum-Boron-Rhodium)

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Recently, [2006Kim] determined an isothermal section at 1000 °C for Rh-rich alloys of this system. No $E2_1$, Rh_3AlB -type of ternary compound was found.

Binary Systems

There are two intermediate phases in the Al-B system: AlB_2 ($C32$, AlB_2 -type hexagonal) and AlB_{12} (AlB_{12} -type

tetragonal). The Al-Rh phase diagram [2006Kho] (see Fig. 1 under Al-Pd-Rh) depicts the following intermediate phases: Rh_2Al_9 ($D8_d$, Co_2Al_9 -type monoclinic), $Rh_{1-x}Al_3$ (orthorhombic, denoted O_1 or ϵ_{16}), $RhAl_3$ (orthorhombic, denoted O_2 or ϵ_6), $Rh_2Al_5(c)$ (space group $Pm\bar{3}$, cubic), $Rh_2Al_5(h)$ ($D8_{11}$, Co_2Al_5 -type hexagonal), Rh_3Al_7 (monoclinic, denoted V), and $RhAl$ ($B2$, CsCl-type cubic). The tentative B-Rh phase diagram [Massalski2] depicts two compounds: Rh_7B_3 ($D10_2$, Fe_3Th_7 -type hexagonal) and $RhB_{1.1}$ ($B8_1$, NiAs-type hexagonal).

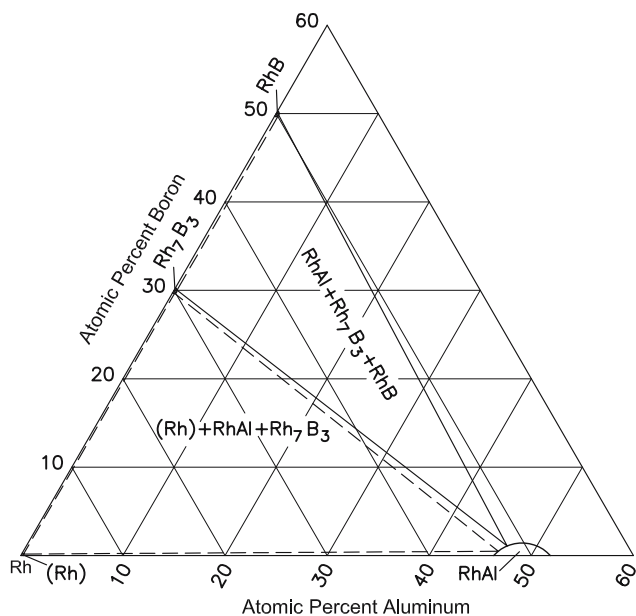


Fig. 1 Al-B-Rh partial isothermal section at 1000 °C [2006Kim]

Ternary Isothermal Section

On the basis of a limited number of experiments, [2006Kim] constructed an isothermal section at 1000 °C for Rh-rich alloys of this system as shown in Fig. 1. Three-phase fields of $(Rh) + RhAl + Rh_7B_3$ and $RhAl + Rh_7B_3 + RhB$ are seen. No $E2_1$ -type ternary compound Rh_3AlB was found.

References

- 2006Kho:** V.G. Khoruzhaya, K.E. Kornienko, P.S. Martsenyuk, and T. Ya. Velikanova, Phase Equilibria in the System Al-Rh, *Poroshk. Metall.*, 2006, (5-6), p 48-56 in Russian; TR: *Powder Metall. Met. Ceram.*, 2006, **45**(5-6), p 251-258
- 2006Kim:** Y. Kimura, K. Iida, F.G. Wei, and Y. Mishima, Phase Equilibria in the T-Al-C (T: Co, Ni, Rh, Ir) and T-Al-B (T: Rh, Ir) Systems for the Design of $E2_1$ - Co_3AlC Based Heat Resistant Alloys, *Intermetallics*, 2006, **14**, p 508-514