substance: boron compounds with group III elements
property: properties of further ternary Al-B compounds

Al_3SiB_{48}

microhardness

H	24.34 GPa	hardness not specified	88B

microstrength

σ	1.4 GPa		88B

microbrittleness

γ	10.8		88B

$Al_{2.1}C_8B_{51}$

preparation [69P]

$B_{51}Al_2C_8$

For the attribution of this compound see **Structure group of $AlB_{10}/C_4AlB_{24\ -26}$**, **$AlB_{10}$** and **boron carbide doped with Al.**

$AlB_{24}C_4$

For $AlB_{24}C_4$ see **boron carbide doped with Al**.

$Al_8B_4C_7$

n-type semiconductor changing to p-type at about 900 K [91K1].

Preparation by hot pressing in [91K1].

electrical conductivity

σ	0.15 $\Omega^{-1}cm^{-1}$	T = 333 K	91K2

Temperature dependence of the electrical conductivity in Fig. 1 [91K2].

thermoelectric power

S	$-50\ \mu V\ K^{-1}$	T = 600 K	91K2
	$+80\ \mu V\ K^{-1}$	T = 1000 K	

Temperature dependence of the Seebeck effect in Fig. 2 [91K2].

Effect of thermal cycling on the thermoelectric power S in Fig. 3 [91K2].

Effect of Fe impurities on the thermoelectric power S in Fig. 4 [91K2].

Effect of porosity on σ and S in [91K2]

$(Mo_xCr_{1-x})AlB$

Single crystal preparation and structure properties [97O].

References:

69P Perotta, A. J., Townes, W. D., Potenza, J. A.: Acta Crystallogr. B 25 (1969) 1223.

88B Berdikov, V.F., Vil`k, Yu., Gurin, V.N.: in: Prog. Cryst. Growth Charact. 16 (1988), Gurin, V.N. ed., Pergamon Press: London, 1988, p. 279.

91K1 Kharlamov, A.I., Loichenko, S.V.: in: Boron-Rich Solids, Proc. 10th Int. Symp. Boron, Borides and Rel. Compounds, Albuquerque, NM 1990 (AIP Conf. Proc. 231), D. Emin, T.L. Aselage, A.C. Switendick, B. Morosin, C.L. Beckel ed., American Institute of Physics: New York, 1991, p. 473.

91K2 Kharlamov, A.I, Loichenko, S.V.: in: Boron-Rich Solids, Proc. 10th Int. Symp. Boron, Borides and Rel. Compounds, Albuquerque, NM 1990 (AIP Conf. Proc. 231), D. Emin, T.L. Aselage, A.C. Switendick, B. Morosin, C.L. Beckel ed., American Institute of Physics: New York, 1991, p. 94.

97O Okada, S., Iizumi, K., Kudaka, K., Kudou, K., Miyamoto, M., Yu, Y., Lundström, T.: J. Solid State Chem. 133 (1997) 36 (Proc. 12th Int. Symp. Boron, Borides and Rel. Compounds, Baden, Austria, 1996).

Fig. 1.

$AlB_{24}C_4$, $Al_8B_4C_7$. Temperature dependence of the electrical conductivity; σT vs. reciprocal temperature [91K2].

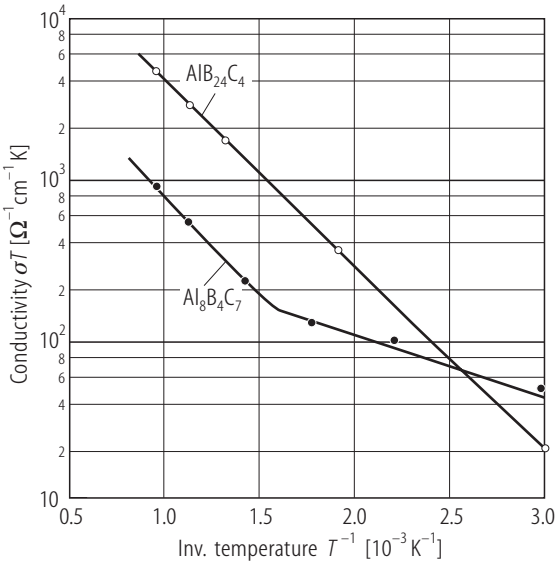

Fig. 2..

$AlB_{24}C_4$, $Al_8B_4C_7$. Temperature dependence of the thermoelectric power [91K2].

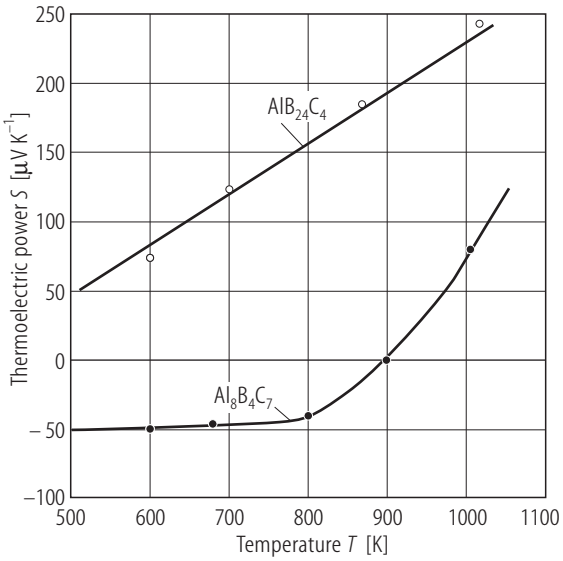

Fig. 3.

$Al_8B_4C_7$. Effect of thermal cycling on the thermoelectric power *S* [91K2]. 1st run: heating (open circles), cooling (full circles); 2nd run: heating (open squares), cooling (full squares); 3rd run (after annealing at 1700 K): heating (open triangles), cooling (full triangles).

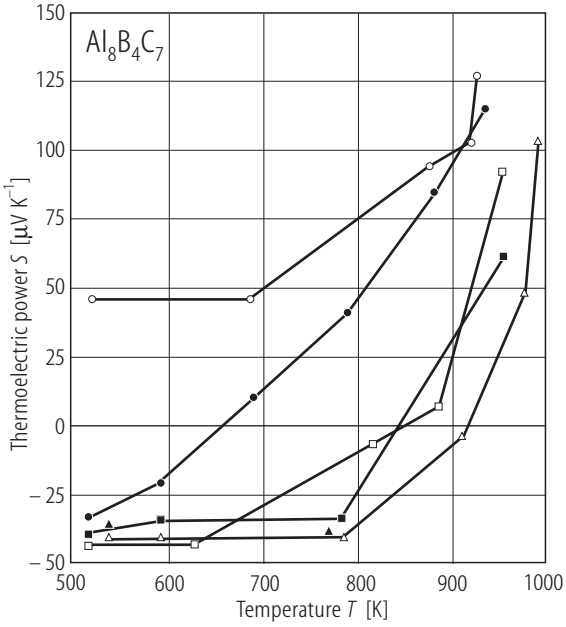

Fig. 4.

$Al_3C_2B_{48}$, $Al_8B_4C_7$. Effect of Fe-doping on the thermoelectric power; *S* vs. Fe content [91K2].