substance: boron compounds with lanthanides
property: properties of lanthanide borides of the type MB_{66}: SmB_{66}

energy gaps and activation energies

E_g	0.80 eV		electr. conductivity, see Fig. 1	81G
	0.63 eV		Seebeck coeff.	86G
E_A	0.15 eV		distance between mobility edge and E_F	86G

electrical conductivity

σ	$1 \cdot 10^{-2}\ \Omega^{-1}cm^{-1}$	T = 300 K		87G

Temperature dependence of conductivity in Fig. 2 [81G, 87G, 86G].

carrier concentration p, Seebeck coefficient S, and Hall mobility μ_H (at T = 300 K)

p	$4 \cdot 10^{15}\ cm^{-3}$	T = 300 K		86G
p	$2.7 \cdot 10^{16}\ cm^{-3}$		derived from Hall effect (see Fig. 3)	81G
S	+ 100 µV K^{-1}			
$\mu_{H,p}$	15 $cm^2/V\ s$			

Hall mobility

$\mu_{H,\,p}$	15 $cm^2V^{-1}\ s^{-1}$	T = 300 K		86G

characteristic parameter

T_0	$2 \cdot 10^7$ K	T = 300 K	parameter in Mott's law of variable range hopping $\sigma \propto \exp\,(T_0/T)^{1/4}$	81G

References:

81G Golikova, O.A., Tadzhiev, A.: J. Less-Common Met. 82 (1981) 169. (Proc. 7th Int. Symp. Boron, Borides and Rel. Compounds, Uppsala, Sweden, 1981).

86G Golikova, O.A., Tadzhiev, A.: J. Non-Cryst. Solids 87 (1986) 64.

87G Golikova, O.A.: Phys. Status Solidi (a) 101 (1987) 277.

Fig. 1.

SmB_{66}. Electrical conductivity and thermoelectric power vs. reciprocal temperature [81G].

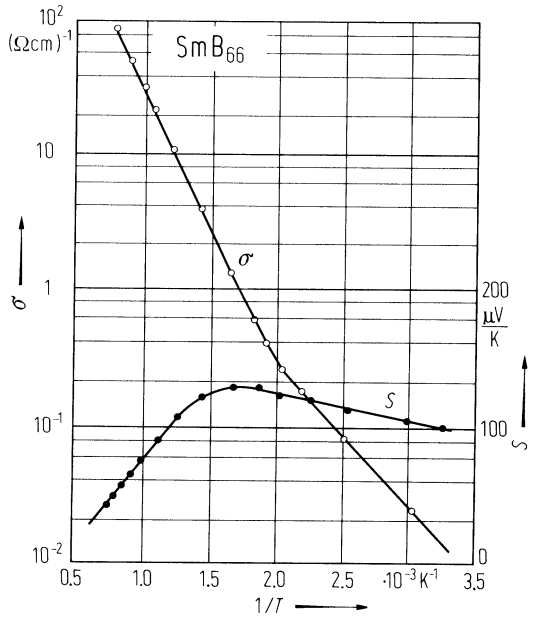

Fig. 2.

SmB_{66}, GdB_{66}, YbB_{66}. Electrical conductivity and carrier concentration (derived from Hall effect) vs. reciprocal temperature [81G].

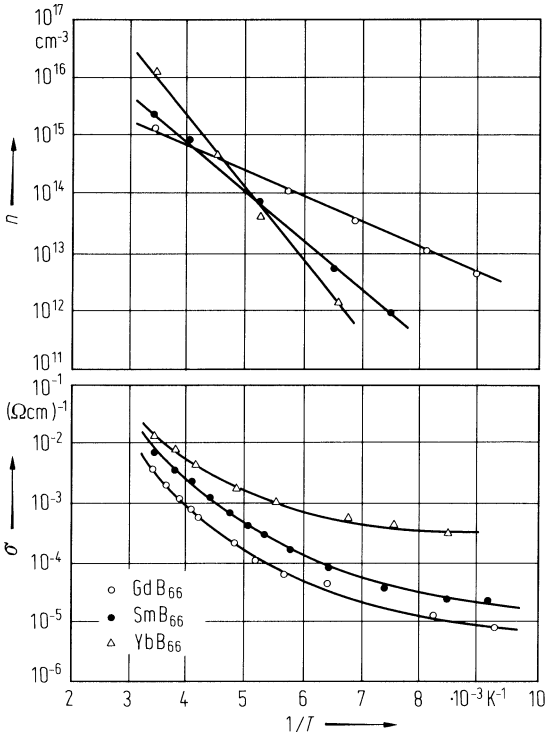

Fig. 3

SmB_{66}, GdB_{66}, $Yb_{B6}6$. Electrical conductivity and thermoelectric power vs. carrier concentration [81G].