substance: chromium sesquioxide (Cr_2O_3)
property: transport: effect of dopants

effect of dopants (polycrystalline samples)

ρ[Ω cm] at 100°C	E_A [eV]	impurity	concentration [at %]		
$3.0 \cdot 10^6$	0.519	undoped	–		74C
$> 1.0 \cdot 10^{11}$	1.466	Ti	1.00	E_A in the range	
$1.3 \cdot 10^8$	0.558		0.01	– 50°C...400°C	
$2.8 \cdot 10^6$	0.519	Nb	1.00		
$2.9 \cdot 10^6$	0.521		0.01		
$9.3 \cdot 10^6$	0.627	Fe	1.00		
$1.3 \cdot 10^6$	0.511		0.01		
$1.8 \cdot 10^2$	0.364	Mg	1.00		
$2.7 \cdot 10^4$	0.444		0.01		
$5.5 \cdot 10^2$	0.460	Ni	1.00		
$1.8 \cdot 10^5$	0.531		0.01		

Li doping: Fig. 1, Mg doping: Fig. 2, Ni doping: Fig. 3. Much larger mobilities have been found for the Mg and Ni doped samples [77C]; furthermore, the mobilities are apparently not activated.

References:

65H Hagel, W. C.: J. Appl. Phys. 36 (1965) 2586.
74C de Cogan, D., Lonergan, G. A.: Solid State Commun. 15 (1974) 1517.
77C de Cogan, D. Lonergan, G. A.: J. Phys. Chem. Solids 38 (1977) 333.

Fig. 1.

Cr_2O_3:Li. Conductivity vs. (reciprocal) temperature for several hot-pressed ceramic samples showing the effect of Li doping [65H]. Measurements on cooling and heating under different atmospheres.

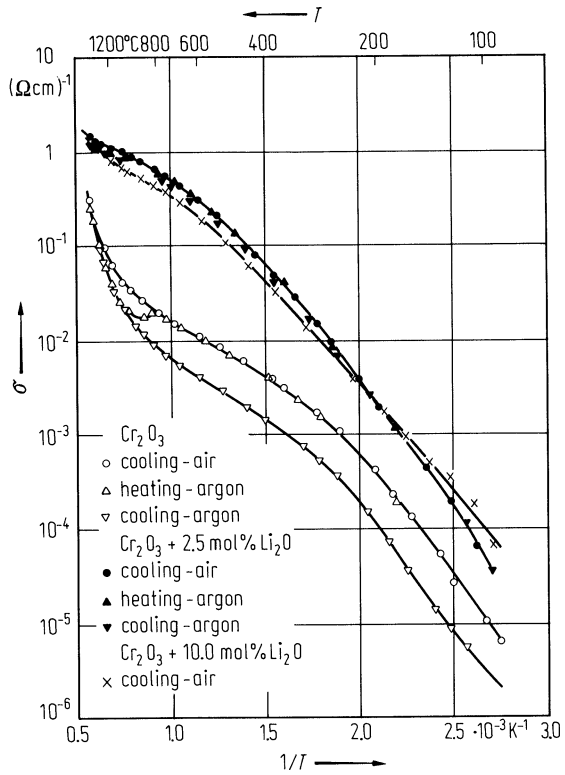

Fig. 2.

Cr_2O_3:Mg. Resistivity and reduced Seebeck coefficient vs. reciprocal temperature [77C]. Mg concentration: 1 at%.

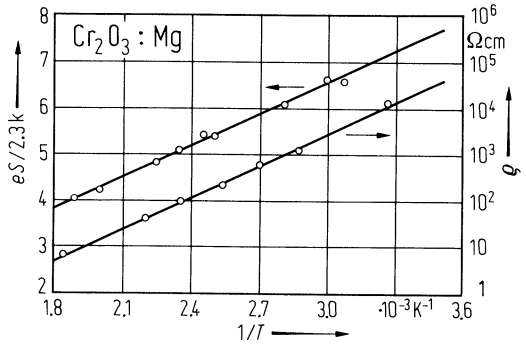

Fig. 3.

Cr_2O_3:Ni. Resistivity and reduced Seebeck coefficient vs. reciprocal temperature [77C]. Ni concentration: 1 at%.