substance: Cr_2S_3
property: crystal structure, physical properties

(The references in the last column refer to all data of this document)

lattice parameters, density

a	5.939 Å	structure: trigonal, $C_{3i}^2 - R\bar{3}$,	57J,
c	16.65 Å	n- or p-type depending	69S,
d	3.77 g cm^{-3}	on preparation;	70V,
		ferrimagnetic, $T < T_C = 120$ K	73B,
		with three magnetic sub-	76B,
		lattices, Curie-Weiss para-	83H
		magnetism, $T > 300$ K,	
		$\Theta_p = -585(3)$ K;	
		$C_A = 2.12(1)$ cm^3 K/g-atom	

resistivity, Hall mobility, electron concentration

ρ	$2.6 \cdot 10^3$ Ω cm	n-type, poly-
μ_H	4 cm^2/V s	crystal
n	$8 \cdot 10^{18}$ cm^{-3}	grown by halogen transport

energy gap

$E_{g,th}$	1.1 eV	$T \approx 275$ K

resistivity, Seebeck coeffficient

ρ	$7 \cdot 10^3$ Ω cm	p-type, single
S	1600 μV K^{-1}	crystal grown under
		3 kbar pressure

energy gap

$E_{g,th}$	0.1 eV

Figures to this document:

resistivity: Fig. 1

carrier concentration, Hall mobility: Fig. 2

magnetoresistance: Fig. 3

magnetic susceptibility: Figs. 3,4

References:

57J Jellinek, F.: Acta Crystallogr. 10 (1957) 620.
69S Sleight, A. W., Bither, T. A.: Inorg. Chem. 8 (1969) 566.
70V Van Bruggen, C. F., Vellinga, M. H., Haas, C.: J. Solid State Chem. 2 (1970) 303.
73B Babot, D., Chevreton, M.: J. Solid State Chem. 8 (1973) 166.
76B Babot, D., Peix, G., Chevreton, M.: J. Phys. (Paris) Colloq. 4 (1976) 111.
83H Handbook of Chemistry and Physics, 64th ed. (ed.: R. C. Weast), CRC Press. Inc. 1983.

Fig. 1.

Cr_2S_3. Electrical resistivity vs. (reciprocal) temperature for three samples of rhombohedral Cr_2S_3 [70V]. Activation energies are indicated. Polycrystalline sample.

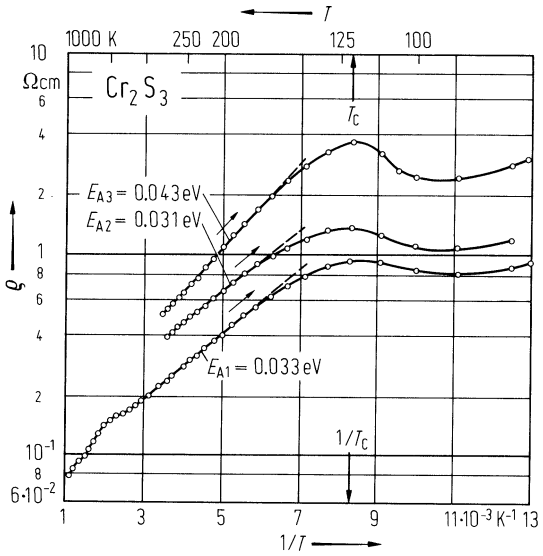

Fig. 2.

Cr_2S_3. Free-carrier concentration and Hall mobility calculated from Hall and resistivity data vs. temperature [70V]. Polycrystalline sample.

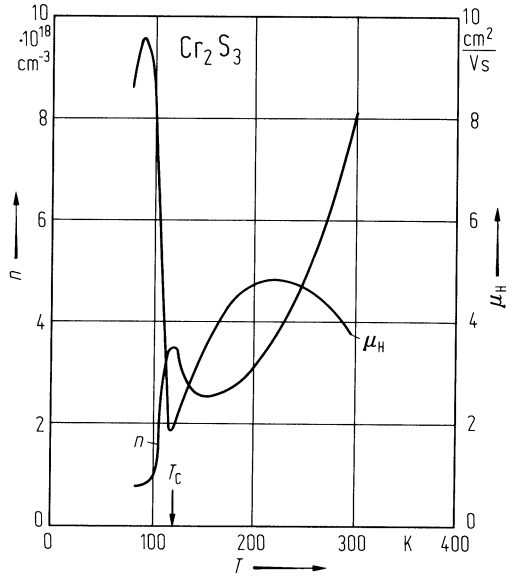

Fig. 3.

Cr_2S_3. Negative transverse magnetoresistance vs. temperature; for comparison the temperature dependence of the reciprocal susceptibility (in CGS-emu) is included [70V]. Polycrystalline sample.

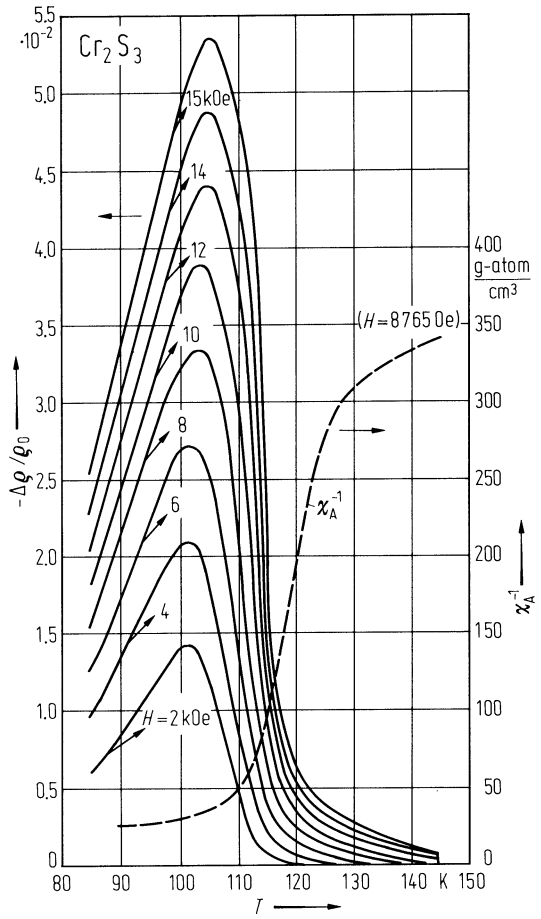

Fig. 4.

Cr_2S_3. Reciprocal magnetic susceptibility per g-atom Cr (in CGS-emu) of rhombohedral Cr_2S_3 vs. temperature [70V]. Polycrystalline sample.