substance: chromium sesquioxide (Cr_2O_3)
property: magnetic properties

Cr_2O_3 is antiferromagnetic. Spin direction along [111] axis of rhombohedral unit cell. Spins are paired antiparallel across shared octahedral face [65C].

Magnetic susceptibility: Fig. 1, magnetic phase diagram: Fig. 2, spin-wave spectrum: Fig. 3, sublattice magnetization: Fig. 4.

At high temperatures Curie-Weiss law is obeyed [39F].

Néel temperature

T_N	308 K	from powder susceptibility	65C
	307 K	from powder susceptibility	78N
	307.3 K	from magnetic phase diagram	77Y
	306.99 K	from heat capacity	77B

Curie-Weiss temperature

Θ_p	550(50) K	from susceptibility	39F
	515(88) K	from spin-wave spectrum	70S

further magnetic parameters

$p_{A,s}$	2.76(3) μ_B	$T \rightarrow 0$ K	saturation magnetic moment per Cr atom	65C
J_1	– 85.7 cm^{-1}	T = 78 K	exchange parameters J_i as defined in [70S]	70S
J_2	– 38.8 cm^{-1}	T = 78 K		
J_3	– 2.7 cm^{-1}	T = 78 K		
dT_N/dX	0.50(5) K $kbar^{-1}$	$\parallel c$		73G
	0.30(5) K $kbar^{-1}$	$\parallel a$		
dT_N/dp	1.50(5) K $kbar^{-1}$			73G

References:

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Fig. 1.

Cr_2O_3. Magnetic susceptibility parallel and perpendicular to the *c* axis vs. temperature (susceptibility relative to a value of $\chi_\perp = 224(4)\cdot 10^{-6}$ cm^3/g at 4.2 K) [56M, 63F]. χ in CGS-emu.

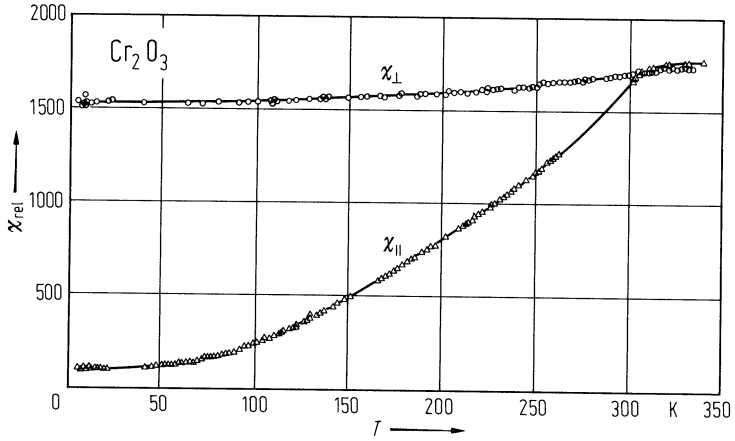

Fig. 2.

Cr_2O_3. Magnetic phase diagram. $H \parallel c$ axis, T_N = 307.3 K [77Y]. AF: antiferromagnetic, P: paramagnetic, SF: spin flop region.

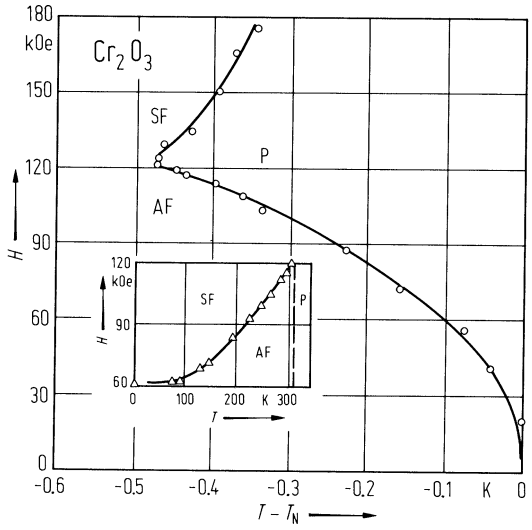

Fig. 3.

Cr_2O_3. Spin wave dispersion at 78 K. A sketch of the Brillouin zone is shown in the upper right hand corner; upper curve relates to the upper scale and lower curve to the lower scale, where appropriate [70S].

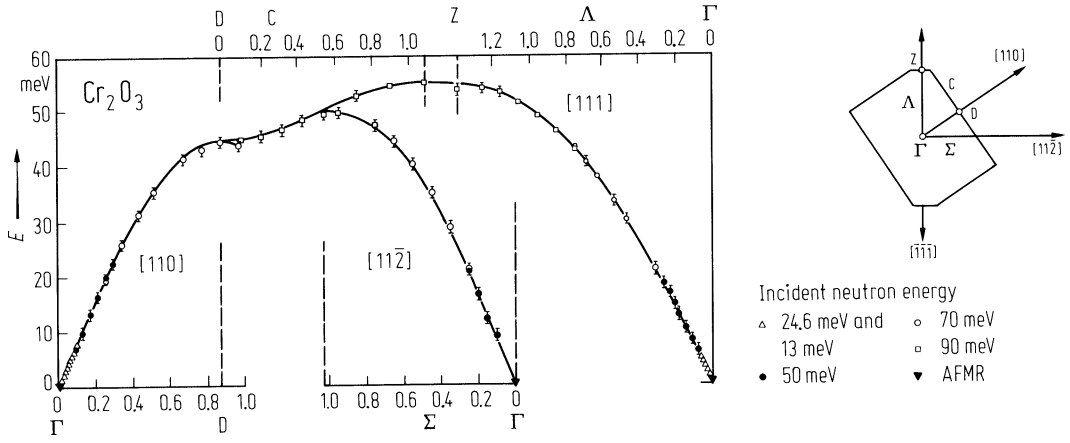

Fig. 4.

Cr_2O_3. Sublattice magnetization ($<S^z>/S = M/M_0$ where M_0 is the saturation magnetization) vs. reduced temperature (T/T_N). Hatched region gives the spread of experimental results from several authors and the solid lines give the results of calculations using Mean Field (M.F.), scaled M.F. and Random Phase Approximation (R.P.A.) methods [70S].