substance: MnO_2
property: magnetic properties

MnO_2 is antiferromagnetic below T_N (92 K [59Y], 92...95 K [69R]) with a spin structure of the proper screw type derived from neutron diffraction studies [59Y]. The spin structure is such that the spins all lie in the (001) plane, but screw along the c axis with a pitch of 7/2 c (Fig. 2). The exchange integrals, defined in Fig. 1, have the values:

exchange integrals

(J_i/k in K)

J_1	– 8.9	71O
J_2	– 5.5	
J_3	1.3	

Powder susceptibility: Fig. 3. The samples all showed Curie-Weiss behaviour above T_N, but Θ_p values are very scattered, 850...1300 K [71O].

References:

59Y Yoshinori, A.: J. Phys. Soc. Jpn. 14 (1959) 807.
69R Rogers, D. B., Shannon, R. D., Sleight, AW., Gillson, J. L.: Inorg. Chem. 8 (1969) 841.
71O Ohama, N., Hamaguchi, Y.: J. Phys. Soc. Jpn. 30 (1971) 1311.

Fig. 1.

MnO_2. Crystal structure and dominant exchange interactions [71O].

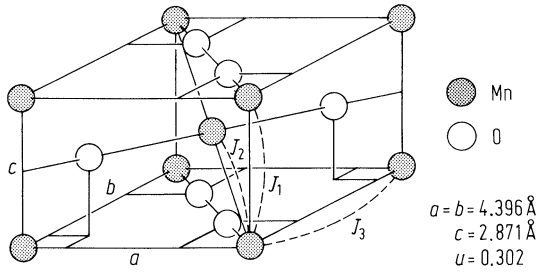

Fig. 2.

MnO_2. (a) the screw-type magnetic structure with a pitch of 7/2, (b) projection on the *c* plane [59Y]. $u_{1,2}$: real unit vectors perpendicular to each other.

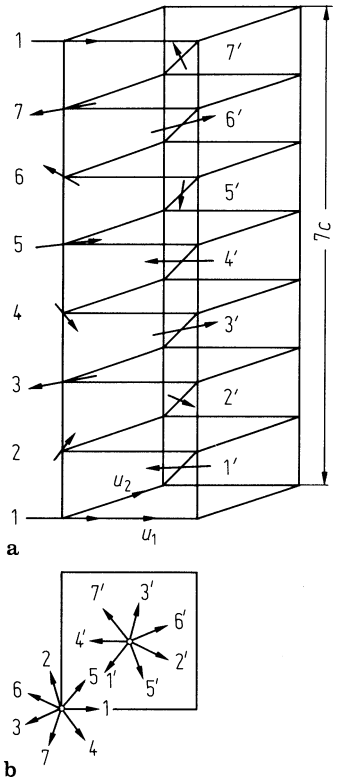

Fig. 3.

MnO_2. Magnetic susceptibility and its inverse vs. temperature for powdered material [71O].