2.2 - ETUDES PAR NEUTRONS

2.2.1 - Structure magnétique

a) *Propriétés magnétiques de l'acétate de manganèse*

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Manganese acetate, $Mn(CH_3COO)_2$, $4H_2O$ is a bidimensional antiferromagnet. It shows a two-dimensional ordering above the Néel temperature T_N = 3.2 K. Below this temperature, the tridimensional ordering consists in an antiferromagnetic packing of ferrimagnetic planes [1]. When an external magnetic field is applied to this compound it becames ferrimagnetic. We studied the behaviour of this salt under influence of an applied magnetic field, in the temperature range 1.6 K to 4.2 K and for field up to 15 Koe.

In zero applied field the magnetic moments of the manganese ions are aligned along the A axis of the magnetic unit cell the magnetic atoms are strongly coupled in the AB plane Two such planes are only linked via hydrogen bonds. We first applied the magnetic field along the B and C axis and we observed an antiferromagnetic to ferrimagnetic transition for fields of some Koe.

The value of these fields gives information about the anisotropic energy with in BC plane. When the field is applied along the A axis we observe that the antiferromagnetic to ferrimagnetic transition occurs for value of the field of some oe. This means that the coupling between plane is very weak in order of 10^{-3} K.

We observe that this metamagnetic transition seems to be of second order, but some uncertainity remains about the homogeneity of the field and therefore some complementary measurements are needed.

It results from this study that the ratio of the interplane to intraplane coupling is very weak in order of 10^{-4} and that we cannot consider this salt like an Heisenberg 2-dimensional compound but almost like an Ising model.

1. P. BURLET, P. BURLET, E.F. BERTAUT, Solid State Comm. 14, 665, 1974