

Magnetic ordering in low-dimensional magnetic materials

Experimental

Darren Goossens

Department of Physics/Research School of Chemistry

goossens@rsc.anu.edu.au, 02 6125 3536

rsc.anu.edu.au/~goossens/projects.html

Objective

To explore the magnetic behaviour in a family of low-dimensional magnetic materials.

Description

The dimensionality of a physical system is a critical parameter in determining its properties. The magnetic order in the family of layered magnetic materials based on MnPS_3 has been shown to change in a very fundamental way with composition, including a spinglass phase in $\text{Fe}_{0.5}\text{Mn}_{0.5}\text{PS}_3$. Key tools for exploring the behaviour include magnetometry, x-ray crystallography and neutron scattering.

This project involves synthesis of one or more samples, collecting a range of types of data and using this information to develop a model of the magnetic behaviour of some materials in the $X\text{PS}_3$ family where X can be Mn, Zn, Fe, Ni, Mg or a mixture of these. Experimental work will be done in various departments at ANU (Research School of Chemistry, Electron Microscopy Unit, Research School of Physics and Engineering) and at UNSW@ADFA.

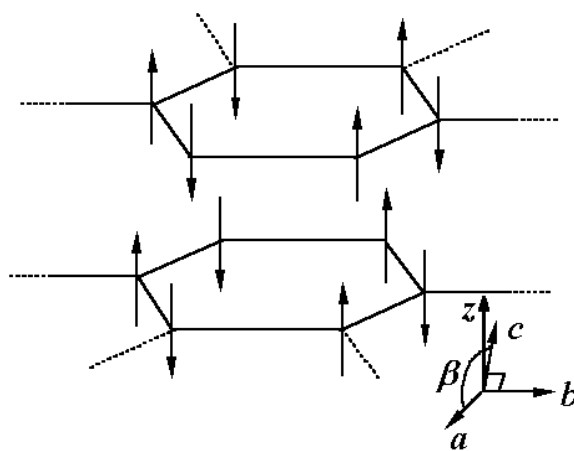


Figure 1: The magnetic structure of MnPS_3 .

References

1. D.J.Goossens, A.R.Wildes, C.Ritter and T.J.Hicks, 'Order and the nature of the spin flop phase transition in MnPS_3 ', *Journal of Physics: Condensed Matter*, **12** (2000) 1845-1854.
2. D.J.Goossens, A.J.Studer, S.J.Kennedy and T.J.Hicks, 'The impact of magnetic dilution on magnetic order in MnPS_3 ', *Journal of Physics: Condensed Matter*, **12** (2000) 4233-4242.