Tetranuclear 3*d*-4*f* complexes of hexaimine macrocycles as potential Single Molecule Magnets

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Single Molecule Magnets (SMMs) are compounds in which the individual molecules act as discrete magnetic domains. SMMs have attracted attention recently because, after being magnetized at low temperatures (< 5 K), the magnetization can be retained as the strength of the external magnetic field is lowered. This property may permit SMMs to be utilized as components for nano-scale data storage.

For any practical application of SMMs, the temperature at which the retention of magnetization occurs clearly needs to be raised. Since higher temperatures are more likely to be observed for a compound with a high ground spin and large anisotropy of that state, one potential method of preparing promising SMMs is to aggregate both 3*d* transition metal and 4*f* lanthanide ions (which confer both spin and anisotropy). To this end, we have prepared hexa**imine** macrocycles from the dialdehyde **1** (Fig. 1) which are capable of binding a large lanthanide ion and three transition metal ions. As well as conveniently preventing undesirable inter-molecular magnetic interactions, a macrocyclic approach also offers the advantages of stability and solubility.

This presentation will discuss the synthesis, structures and magnetic properties of the macrocyclic complexes.

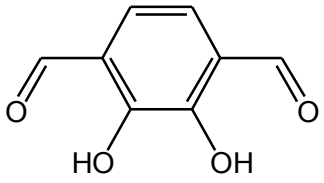

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Figure 1 – 1,4-Diformyl-2,3-dihydroxybenzne