Heterotetranuclear Oxalato-Bridged $Re^{IV}_3M^{II}$ (M = Mn, Fe, Co, Ni, Cu) Complexes: A New Example of a Single-Molecule Magnet (M = Ni)

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Single molecule magnets (SMMs), assembled from building blocks of simple paramagnetic metal-containing units have been of intense interest due to their potential for application in magnetic storage media quantum computing and other areas. Typically, the building blocks contain 3d and 4d transition metals, occasionally also 4f rare-earth elements. In this work, we synthesized and characterized a series of heteronuclear complexes containing heavy metal Rhenium (Re) belonging to the 5d transition row.

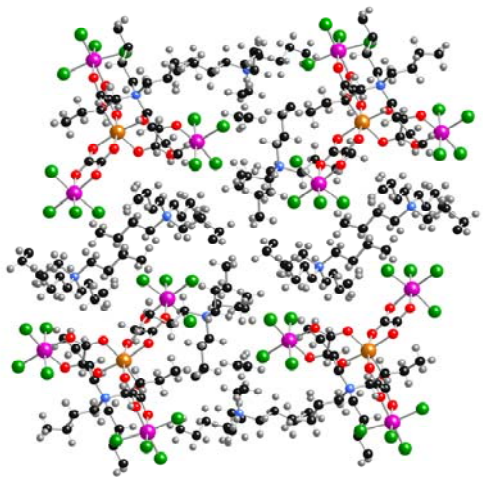

*Figure 1. Crystal packing in **1**.*

Of the whole series, the $Re^{IV}_3Ni^{II}$ cluster (**1**, Fig. 1), showed magnetic properties qualifying it as an SMM. These include characteristic steps in the magnetization plots at low temperatures (Fig. 2). Properties of **1** and other members of the series were also investigated using high frequency electron paramagnetic resonance at the NHMFL EMR Facility.

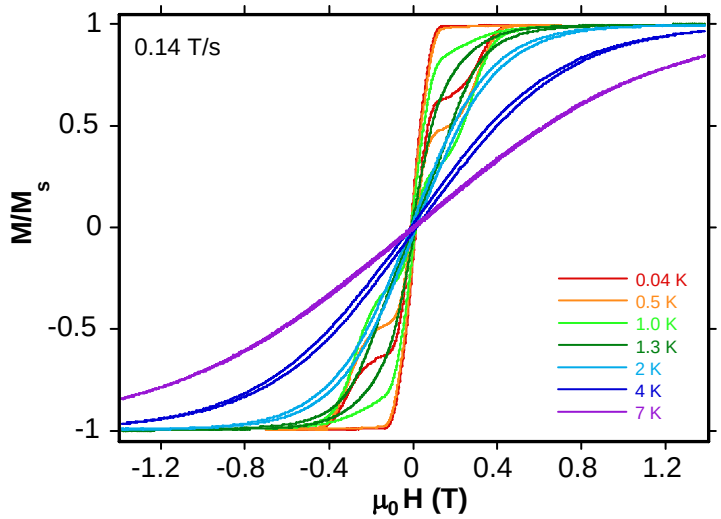

*Figure 2. Magnetization (M) (plotted as fraction of maximum value M_S) vs. applied field ($\mu_0 H$) recorded on a single crystal of **1** at different temperatures.*

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