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Magnetic Properties and Inelastic Neutron Scattering for a Spin Hexamer: Application to the V_6 Molecular Magnets J. T. HARALDSEN, University of Tennessee, T. BARNES, University of Tennessee/Oak Ridge National Laboratory, J. SINCLAIR, University of Tennessee, J. THOMPSON, University of Tennessee/Oak Ridge National Laboratory, R. SACCI, University of Tennessee, J. TURNER, University of Sussex, UK — We present the study of the magnetic susceptibility and inelastic neutron scattering energies and intensities for a spin hexamer formed by two interacting spin S and S' trimers. Using an isotropic Heisenberg Hamiltonian, we conclude that, regardless of spin, the structure factors for the magnetic excitations will have a specific function form which is dependent on the symmetric parts of the hexamer being excited. This work is then compared to previous work performed on two vanadium compounds $(CN_3H_6)_4Na_2[H_4V_6O_8(PO_4)_4((OCH_2)_3CCH_2OH)_2] \cdot 14H_2O$ and $Na_6[H_4V_6O_8(PO_4)_4((OCH_2)_3CCH_2OH)_2] \cdot 18H_2O$, which are thought to be magnetically well described as trimers of $S=1/2$ V^{4+} ions. We show that it is possible to that a very weak inter-trimer interaction exists and we predict the energy and momentum transfer dependence for these compounds that may be observable with inelastic neutron scattering.

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