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Neutron Magnetic Excitation Study of the Giant Magnetic Molecule {$Mo_{72}Fe_{30}$} V.O. GARLEA, Ames Lab.& ISU, Ames, IA, USA, S.E. NAGLER, ORNL, Oak Ridge, TN, USA, J.L. ZARESTKY, C. STASSIS, D. VAKNIN, P. KOGERLER, Ames Lab.& ISU, Ames, IA, USA, D.F. MCMORROW, Univ. College London, UK, C. NIEDERMAYER, Lab. Neutron Scattering PSI, Switzerland, Y. QIU, NCNR, Gaithersburg, MA, USA , D.A. TENNANT, Univ. St Andrews, Scotland, UK, B. LAKE, Clarendon Lab, Univ. Oxford, UK, M. EXLER, J. SCHNACK, Univ. Osnabruck, Germany, M. LUBAN, Ames Lab.& ISU, Ames, IA, USA — We report cold-neutron inelastic scattering measurements on deuterated samples of {$Mo_{72}Fe_{30}$} Keplerate. The nanocluster {$Mo_{72}Fe_{30}$} is a molecular quasi-sphere in which 30 Fe^{3+} ions (S = 5/2) occupy the vertices of an icosidodecahedron. The spins interact via an isotropic AF exchange coupling between nearest-neighbors. The measurements reveal a magnetic excitation spectrum that can be interpreted within the context of an effective three-sublattice Hamiltonian model. At mK temperatures, an excitation at E $\sim$ 0.63 meV is observed that can be attributed to the gap between the two lowest rotational-bands predicted by the model. Applied magnetic fields in the 0 – 8.5 Tesla range confirm the magnetic origin of the spectrum. The temperature and field dependence of the energy spectra are discussed.

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