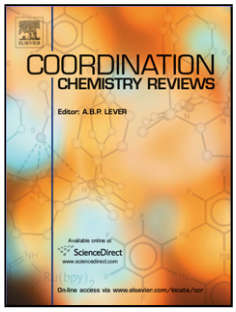

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Quantum Tunneling of the Magnetization in $[Mn^{III}_6M]^{3+}$ ($M = Cr^{III}$, Mn^{III}) SMMs: Impact of Molecular and Crystal Symmetry

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Abstract

Single-molecule magnets (SMMs) are compounds that exhibit a hysteresis in the magnetization of pure molecular origin and that stay magnetized for a certain time without applied magnetic field. This behavior is associated with an energy barrier for magnetization reversal resulting in a slow relaxation of the magnetization at low temperature. The energy barrier can be overcome by a thermal pathway over the top of the barrier and by a quantum tunneling through the barrier. In order to slow down the magnetization reversal, the probability for both pathways must be minimized. We evaluate the influence of the molecular and crystal symmetry on the quantum tunneling for a family of heptanuclear SMMs $\mathbf{[Mn^{III}_6M^{III}]^{3+}}$ (M^{III} = Cr^{III}, Mn^{III}) synthesized with the triplesalen ligand $(talen^{t\text{-}Bu_2})^{6-}$ using different salts and solvates.