

Magnetism in a Series of Aqua-Bridged Cyanometalate Coordination Polymers

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We have studied a novel series of $M(\mu\text{-OH}_2)_2[\text{Au}(\text{CN})_2]_2$ coordination polymers ($M \equiv \text{Mn, Fe, Co, Ni, Cu}$) and the related $\text{Fe}(\mu\text{-OH}_2)(\mu\text{-OH})[\text{Au}(\text{CN})_2]_2$ coordination polymer by ZF- μ SR. The $M(\mu\text{-OH}_2)_2[\text{Au}(\text{CN})_2]_2$ polymers contain an unusual structural motif consisting of chains of metal centers bridged by two water molecules, with pendant $[\text{Au}(\text{CN})_2]^-$ groups on both sides of the metal centers [1]. The $\text{Fe}(\mu\text{-OH}_2)(\mu\text{-OH})[\text{Au}(\text{CN})_2]_2$ polymer has hydroxide and water groups bridging the metal centers [2]. While magnetic order is detected in $\text{Cu}(\mu\text{-OH}_2)_2[\text{Au}(\text{CN})_2]_2$ below $T \sim 0.2$ K, the Mn, Fe, Co, and Ni-based polymers all undergo a spin-freezing transition at $T \sim 3.5$ K into a highly-disordered state. We find a large variation in the relaxation rate of the ZF- μ SR signal for different metal centers in both the spin-frozen and paramagnetic states. We attribute this to differences in the strength and nature of the intra- and interchain couplings.

[1] J. Lefebvre, F. Callaghan, M.J. Katz, J.E. Sonier and D.B. Leznoff, *Chemistry: A European Journal* 12 (2006) 6748.

[2] J. Lefebvre, P. Tyagi, S. Trudel, V. Pacradouni, J.E. Sonier and D.B. Leznoff, in preparation.