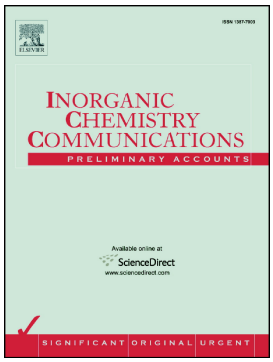

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Syntheses, structures and magnetic properties of cyano-bridged $Fe^{III}_2M^{II}$ (M = Mn, Co and Ni) one-dimensional chains

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ABSTRACT

Three novel cyano-bridged one-dimensional chains $\{[(pzTp)Fe(CN)_3]_2M(BYI)_2(CH_3OH)_2\cdot 2CH_3OH\}_n$ (M = Mn (**1**), Co (**2**) and Ni (**3**), BYI = 1, 1′-(1, 4-Butanediyl)bis(imidazole)) composed of cyano-bridged trinuclear $Fe^{III}_2M^{II}$ units were successfully synthesized based on $[(pzTp)Fe(CN)_3]^-$ (pzTp = tetrakis(pyrazolyl)borate) unit and bidentate bridging ligand. Structural characterization showed that the three compounds were isostructural. The magnetic interactions could be adjusted by replacing the metal ions with different magnetic anisotropy. Magnetic studies revealed that compound **1** showed antiferromagnetic interaction, while compounds **2** and **3** exhibited ferromagnetic interaction. Interestingly, compound **3** showed the spin glass behavior with the typical slow magnetic relaxation due to the large anisotropy for Ni^{II} ions and the non-negligible interchain interaction.

Keywords: cyano-bridged; one-dimensional chain; building block; magnetic interaction; spin glass

The search of functional molecule-based magnetic materials that exhibit the slow magnetic relaxation and hysteresis under blocking temperature have been becoming a hot topic owing to the underlying application for high density information storage and quantum computing in recent years [1]. These molecule-based materials are known as molecular nanomagnets, which include the one-dimensional single-chain magnets (SCMs) [2] and discrete single-molecule magnets (SMMs)

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