MAGNETIC PROPERTIES OF $TM_3[Cr(CN)_6]_2 \cdot nH_2O$

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9.7 cm

Recently, Prussian blue analogues $TM_3^{II}[Cr^{III}(CN)_6]_2 \cdot nH_2O$, crystallizing in fcc crystal structure, have received increasing attention as molecule-based magnets. In these materials the effective exchange interactions between TM and Cr via the cyano ligand are strong, leading to high Curie temperature T_c ranging from $T_c = 16$ K for $Fe_3^{II}[Cr^{III}(CN)_6]_2 \cdot nH_2O$ to $T_c = 314$ K for $V_3^{II}[Cr^{III}(CN)_6]_2 \cdot nH_2O$. Magnetic ordering varies from ferrimagnetic to ferromagnetic in relation to $3d$ ions present in the structure. The Curie temperature decreases linearly from maximal value for V^{II}–compound reaching minimal value for Fe^{II}–compound and increases again linearly having the maximal value for Cu^{II}–compound. All compounds obey the Curie–Weiss law in the high temperature region. In our paper we report on detailed study of magnetic properties of Prussian blue analogues $TM_3^{II}[Cr^{III}(CN)_6]_2 \cdot nH_2O$, where TM = Mn, Fe, Co and Ni. In addition to already published results we have found hysteresis behavior in ZFC and FC magnetization curves for all compounds with temperature of bifurcation only slightly dependent on applied magnetic field. A detailed study of $M(B)$ curves and $M(T)$ dependencies suggests possible field induced re–arrangement of magnetically ordered state leading to increase of the Curie temperature of about 4 K for Fe- and Co-hexacyanochromates.

13.4 cm

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