MAGNETIC PROPERTIES OF $Pr[Fe(CN)_6].5H_2O$

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9.7 cm

Rare earth ferricyanide $Pr[Fe(CN)_6].5H_2O$ was prepared by reacting of mixture $PrCl_3$ solution with $K_3[Fe(CN)_6]$ aqueous solution at room temperature. The prepared compound was characterized by thermogravimetric and differential thermal analysis. The hexagonal crystal structure (space group P 63/m) was refined from powder x-ray measurements by Rietveld method using GSAS software program package. The zero–field–cooled magnetization curves deviates from the field–cooled magnetization measurements M(T) below certain temperature T_f = 14.5 K, and shows a broad maximum at about 12 K. Such a behavior of M(T) is typical for the small particles system or for non–interacting magnetic clusters. From M(T) curves were determined the saturation magnetic moment $\mu_s = 2.1\mu_B$, which corresponds very well with theoretical one $\mu_s^{teor} = 2.2\mu_B$, and the ferrimagnetic Curie temperature T_c = 15.2 K. Magnetic susceptibility χ obeys Curie–Weiss law very well above T = 50 K with $\mu_{eff} = 3.8\mu_B$ and Θ = -18.6 K. The M(H) curves show hysteresis behavior at T = 4.5 K. Low–temperature ^{1}H- -spin–lattice relaxation time and ^{1}H–solid–echo of NMR spectra reflect changes in magnetic state of the sample. Both second moments (M_2) and full widths and half maximums ($\nu_{1/2}$) have to much greater slopes at T < 30 K than at higher temperatures.

13.4 cm

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