Static and Dynamic Low Temperature Magnetic Properties of the $(Nd_{0.9}Y_{0.1})_{2/3}Ca_{1/3}MnO_3$ Perovskite

E. Fertman[a], A. Beznosov[a], A. Desnenko[a], S. Dolya[a], M. Kajňaková[b], and A. Feher[b]

[a]Institute for Low Temperature Physics and Engineering NASU, 61103, Kharkov, Ukraine
[b]Centre of Low Temp. Physics of the Faculty of Science UPJ and IEP SAS, Kosice, Slovakia

Colossal magnetoresistive perovskite $(Nd_{0.9}Y_{0.1})_{2/3}Ca_{1/3}MnO_3$ exhibits a sequence of magnetic phase transitions at low temperatures leading to its phase segregated state: nanoclusters of two antiferromagnetic phases and the ferromagnetic one coexist below 42 K [1]. We have studied its static and dynamic magnetic properties in the 2 – 250 K temperature range in magnetic fields up to 6 T. The data obtained, such as strongly divergent ZFC and FC dc magnetization, frequency dependent ac magnetization and the aging effect, are evident of a glassy magnetic state (GS) of the compound at low temperatures. The freezing temperature $T_f = 60$ K has been defined as a maximum on the ZFC curve in magnetic field $H = 100$ Oe. The effect of the applied magnetic field on the GS of the compound was estimated fitting the experimental data by the expression $\Delta M/M_{FC} = \exp(-H/H_g)$, where $\Delta M = M_{FC}(T,H) - M_{ZFC}(T,H)$, Hg is a "glassy" parameter. At 2 K the magnetic field $H \sim 1$ T effectively suppresses the GS , $H_g = 0.38$ T. The obtained rate of the frequency shift $\partial \ln(T_f)/\partial \ln(\omega) \approx 0.017$ is in agreement with the results for related compounds. The obtained high value of the magnetic field which suppresses the GS of the compound implies that its cluster glass state is tightly connected with the phase separation.

[1]E. Fertman, et al., J. Magn. Magn. Mater. **321**, 316 (2009).