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Peculiarities of magnetic properties of nanostuctured $Ba_6Mn_{24}O_{48}$

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Static and dynamic magnetic properties of nanostructured compound $Ba_6Mn_{24}O_{48}$ was investigated in temperature range 4.2-100 K in magnetic fields op to 6 kOe. Two types of samples were investigated: a powder and a compacted powder. The magnetic moment temperature dependences for both samples demonstrate an anomaly around 50 K caused by phase transition in the magnetically ordered state. Temperature dependences of magnetic moment measured in field cooling FC nd zero field cooling ZFC regimes in magnetic fields from 24 to 3000 Oe are strongly different for two type of samples. Magnetization at 4.2 K in a field 200 Oe differs by almost two-fold. Existence of splitting point between FC and ZFC regimes indicates that in this compound exists a phase separation at low temperature. The temperature of the splitting for both samples, T * is weakly dependent on the external magnetic field. This indicates that the compound is in a state of spin glass. Conducted study of the temperature dependence of the dynamic magnetization of pressed powder $Ba_6Mn_{24}O_{48}$ in the frequency range 10 - 10 000 Hz allowed to determine the frequency dependence of the freezing temperature T_f. Based on these data determined the rate of frequency shift of the freezing temperature T_f. This rate is approximately equal to 0.013, resulting value is consistent with similar estimates for the spin - glass systems.