

Nanocomposites and nanomaterials

Features of magnetic phase transformations in low-level Bi doped LaMnO_3 nanopowders

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Lanthanum-bismuth manganites $\text{La}_{1-x}\text{Bi}_x\text{MnO}_3$ (LBMO) have been attracting attention of researchers due to their multiferroic nature [1,2]. Recent studies have revealed a complex character of magnetic phase transformations in these oxides [2,3]. At the nanometer scale, the behavior of LBMO may acquire new features. In this work, the magnetic and resonance properties have been investigated for the LBMO nanopowders, with a special attention to the region of low-level Bi doping ($x \leq 0.1$), where the properties of LBMO are studied least of all.

The LBMO nanopowders with particle diameters less than 40 nm were synthesized by a sol-gel method from La_2O_3 , Bi_2O_3 , Mn_3O_4 oxides. The samples sintered at 1100 °C (30 hours) are single phase and have rhombohedral $R\bar{3}c$ structure. For all the samples under study, electron spin resonance and magnetic susceptibility measurements have revealed coexistence of different magnetic phases over wide temperature regions. Concentration dependences of the temperature of the ferromagnetic phase nucleation and the regions of the phase coexistence have been determined.

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