Features of the Ferromagnetic State of Lanthanum Manganite Weakly Doped by Bismuth

T.N. Tarasenko,[1] Z. F. Kravchenko,[1] V. V. Burkhovetskiy,[1] and A. I. Linnik[1]

[1] *Donetsk Institute for Physics and Engineering named after A.A. Galkin, Donetsk, 83114 Ukraine*

The investigation of complex oxide systems as functional materials for spintronics is of great interest today, both in solid state physics and from a practical point of view. Solid solutions based on multiferroic $BiMnO_3$ and lanthanum manganite $LaMnO_3$ are examples of systems with string correlations of magnetic and electric characteristics. Much interest has been devoted to manganites in which La^{3+} ions are replaced with Bi^{3+}. Up to now, however, there have been few works dedicated to $LaMnO_3$ weakly doped with bismuth. In addition, the question of the nature of ferromagnetism in Bi-doped lanthanum manganites remains open.

Polycrystalline samples of lanthanum manganite weakly doped with bismuth $Bi_xLa_{1-x}MnO_3$ ($x \leq 0.1$) were synthesized using the sol–gel technique. Structural and magnetic studies are performed. The considerable growth of the grain size that was is observed in the samples upon increasing the degree of doping was a consequence of the volume diffusion of Bi^{3+} ions. Studies of imaginary part of magnetic susceptibility found inhomogeneity of the ferromagnetic state and the presence of several ferromagnetic phases in the lanthanum manganites lightly doped by bismuth.