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ABSTRACTS

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Neutron Diffraction of $\text{La}_{0.67}\text{Ba}_{0.33}\text{Mn}_{1-x}\text{Fe}_x\text{O}_3$ ($x=0.0, 0.01, 0.03, 0.05$)

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The perovskite $\text{La}_{0.67}\text{Ba}_{0.33}\text{Mn}_{1-x}\text{Fe}_x\text{O}_3$ ($x=0.0, 0.01, 0.03, 0.05$) compound was prepared by wet chemical solution process at 1200 oC in 3h. Magnetic properties of $\text{La}_{0.67}\text{Ba}_{0.33}\text{Mn}_{1-x}\text{Fe}_x\text{O}_3$ were studied using by x-ray diffraction, neutron diffraction, Mössbauer spectroscopy, vibrating sample magnetometer, and magnetoresistance (MR) measurements.

The polycrystalline $\text{La}_{0.67}\text{Ba}_{0.33}\text{Mn}_{1-x}\text{Fe}_x\text{O}_3$ had a orthorhombic phase of perovskite structure. The Curie temperature (TC) was decreased with increasing Fe concentration x .

Neutron diffractions for $\text{La}_{0.67}\text{Ba}_{0.33}\text{Mn}_{1-x}\text{Fe}_x\text{O}_3$ were measured from 10 to 350 K. For all temperature range below TC, it was observed that there was a noticeable enhancement of the Bragg reflections with lowering of temperature denoting important magnetic contribution to these reflections in the low angle region. The diffraction peaks were found to be remain very sharp and indicating the presence of magnetic long-range order (LRO) in this sample. Mössbauer analysis and neutron diffraction refinement lead to the conclusion that Fe ions are anti-ferromagnetically coupled to the Mn-O layer.