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Mössbauer studies of iron-doped $\text{La}_{0.67}\text{Sr}_{0.33}\text{Mn}_{0.99}^{57}\text{Fe}_{0.01}\text{O}_3$

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Abstract

The iron-doped perovskite $\text{La}_{0.67}\text{Sr}_{0.33}\text{Mn}_{0.99}^{57}\text{Fe}_{0.01}\text{O}_3$ compound has been studied by X-ray diffraction, Mössbauer spectroscopy, and vibrating sample magnetometry. The single phase of the polycrystalline $\text{La}_{0.67}\text{Sr}_{0.33}\text{Mn}_{0.99}^{57}\text{Fe}_{0.01}\text{O}_3$ powder has been prepared by a water-based sol-gel method. Crystalline $\text{La}_{0.67}\text{Sr}_{0.33}\text{Mn}_{0.99}^{57}\text{Fe}_{0.01}\text{O}_3$ was a rhombohedral structure with lattice parameters $a_0 = 5.480 \text{ \AA}$, $\alpha = 60.259^\circ$. Mössbauer spectra of $\text{La}_{0.67}\text{Sr}_{0.33}\text{Mn}_{0.99}^{57}\text{Fe}_{0.01}\text{O}_3$ have been taken at various temperatures ranging from 20 to 400 K. Analysis of ^{57}Fe Mössbauer spectrum has considered anisotropic hyperfine field fluctuation. Temperature dependence of anisotropy energy is calculated from the relaxation rate.

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Keywords: CMR; Sol-gel; Mössbauer spectroscopy
