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Program

THE CHARGE STRUCTURE OF COMBINEED SYSTEM $(La_{0.6}Sr_{0.4}MnO_3)_{0.7}(La_{0.6}Sr_{0.4}FeO_3)_{0.3}$ AS INVESTIGATED BY MÖSSBAUER SPECTROSCOPY

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The charge structure of combined system of $(La_{0.6}Sr_{0.4}MnO_3)_{0.7}(La_{0.6}Sr_{0.4}FeO_3)_{0.3}$ and $La_{0.6}Sr_{0.4}FeO_3$(LSMO) is investigated by mainly Mössbauer spectroscopy. The prototypical half metal with 100 % spin polarized $La_{0.6}Sr_{0.4}MnO_3$ have low Néel temperature(T_N) of 320 K, which is measured by SQUID magnetometer. The antiferromagnetically ordered $La_{0.6}Sr_{0.4}FeO_3$(LSFO) have possible charge ordering state of $Fe^{3+}Fe^{4+}Fe^{3+}Fe^{4+}$, which include low-spin state of Fe^{4+} at and above 230 K. The LSFO with T_N of 370 K is founded to be disordered phase resulting in low spin tetravalent iron with no magnetic hyperfine field of 0 kOe. However, The metastable Fe^{4+} ion is founded instead of low-spin(^1T_g) state in combined $(LSMO)_{0.7}(LSFO)_{0.3}$ system. The temperature dependence of Mössbauer spectra for $La_{0.6}Sr_{0.4}FeO_3$ and combined $(LSMO)_{0.7}(LSFO)_{0.3}$ system are fitted as three sets of Zeeman pattern corresponding to Fe^{3+} and Fe^{4+} below 230 K. At and above 230 K, The fitted Mössbauer spectra for combined system are same at all temperature ranges. In case of $La_{0.6}Sr_{0.4}FeO_3$ consists of two sets of six Lorentzians Fe^{3+} and one line for low spin of Fe^{4+} above 230 K. It is notify induced large field in combined system.

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