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T.P. Gavrilova, I.F. Gilmutdinov, J.A. Deeva, T.I. Chupakhina, N.M. Lyadov, I.A. Faizrakhmanov, F.O. Milovich, Yu.V. Kabirov, R.M. Eremina

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Magnetic and magnetocaloric properties of (1-x)La_{0.7}Sr_{0.3}MnO₃/xNaF composites

T.P. Gavrilova^{a,b,*}, I.F. Gilmutdinov^b, J.A. Deeva^c, T.I. Chupakhina^c,
N.M. Lyadov^{a,b}, I.A. Faizrahmanov^{a,b}, F.O. Milovich^{d,e}, Yu.V. Kabirov^f,
R.M. Eremina^{a,b}

^aKazan E. K. Zavoisky Physical-Technical Institute of the FIC KazanSC of RAS,
Sibirsky tract, 10/7, Kazan, 420029, Russia

^bKazan (Volga Region) Federal University, Kremlevskaya st., 18, Kazan, 420008, Russia

^cInstitute of Solid State Chemistry of the Russian Academy of Sciences (UB),
Pervomaiskaya St., 91, Ekaterinburg, 620990, Russia

^dNational University of Science and Technology, Leninskii pr. 4, Moscow, 119991,
Russia

^eFiber Optics Research Center, Russian Academy of Sciences, ul. Vavilova 38, Moscow,
119333, Russia

^fSouthern Federal University, Bolshaya Sadovaya Str., 105/42, Rostov-on-Don, 344006,
Russia

Abstract

(1-x)La_{0.7}Sr_{0.3}MnO₃/xNaF (x=0.05, 0.15, 0.2) composites were synthesized by the conventional solid-state synthesis route, while the sodium fluoride NaF was added to the stoichiometric amount of La₂O₃, SrCO₃ and Mn₂O₃, that allowed to reduce the synthesis temperature of composites in respect to the pure lanthanum strontium manganite. The phase purity and microstructures of composites were analyzed by X-ray diffraction, scanning electron microscopy, and energy-dispersive X-ray spectroscopy. Magnetocaloric effect was investigated by means of field dependence magnetization measurements. The significant affect of the additive NaF to the final size and morphology of (1-x)La_{0.7}Sr_{0.3}MnO₃/xNaF composite samples was observed. Though the high-concentration samples (x=0.15, 0.2) exhibit the lower magnetic entropy changes ΔS_M in respect to the pure La_{0.7}Sr_{0.3}MnO₃, the expanded temperature dependence of ΔS_M curves leads to the slightly higher values of the relative cooling power.

*tatyana.gavrilova@gmail.com

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