CQ03

High TCR and MR of $La_{0.7}Ca_{0.2}Ba_{0.1}MnO_3$: Agx Composite Near Room Temperature

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In our previous studies we have reported the temperature coefficient of resistance (TCR) for $La_{0.7}Ca_{0.3}MnO_3$ in double digits (>10%) with Ag doping below room temperature (~280K) [1]. On the other hand in the case of $La_{0.7}Ba_{0.3}MnO_3$: Ag_x, even though we could achieve the T_c above room temperature but the TCR is quite low i.e. below 4% [2]. Since the bolometric applications of CMR materials are based on the steep drop in resistivity with temperature in the vicinity of metal-insulator transition (TMI). Therefore for practical applications of manganites the high TCR and magnetoresistance (MR) need to be achieved at/or above room temperature. In order to achieve the high TCR at room temperature we synthesize $La_{0.7}Ca_{0.2}Ba_{0.1}MnO_3$: Agx (x = 0.0, 0.2, 0.4 and 0.6) composites. Such composite system is good enough for bolometric or infrared detector applications. We have successfully achieved the T_{MI} near about room temperature. Further with the Ag addition the sharpness in TMI has improved. Interestingly, increase in the TCR percentage is five times (~10%) with the addition of Ag in our sample.

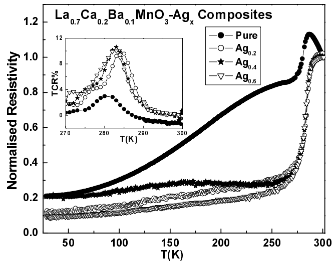

Fig. 1. Normalized resistivity with temperature for $La_{0.7}Ca_{0.2}Ba_{0.1}MnO_3$: Agx (x = 0.0, 0.2, 0.4 and 0.6. Inset shows the variation of TCR % with temperature for the same samples.

REFERENCES
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CQ04

Effect of Pr Doping in La-Sn-Mn-O

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Structural, transport and magnetic studies on $La_{0.9-x}Pr_xSn_{0.1}MnO_3$ (x = 0.0 and 0.18) were performed. The samples were prepared by solid-state technique. Since from literature it is found that no work has been reported on such kind of compound i.e. with Pr and Sn simultaneous doping. Therefore, our interest is to investigate such La deficient CMR compounds for the basic understanding. Rietveld fitting of X-ray diffraction (XRD) results into the multiphase structure in the present compounds [1]. Temperature dependence of resistance is shown in Fig. 1. Remarkable difference is being observed in the R-T behaviour for both the compounds. Very clear insulator-metal transition is seen in the pure sample (shown in the inset). Further La0.72Pr0.18Sn0.1MnO3 undergo insulator-metal transition but surprisingly the resistance increases with decrease in the temperature. This unusual increase in resistance at low temperatures has been explained on the basis of the presence of antiferromagnetic contribution in the compound [2]. To compliment the R-T results we have performed the magnetization measurements with the temperature. To understand these material in detail we also studied $La_{0.9-x}Pr_xSn_{0.1}MnO_3$ with x = 0.05, 0.1, 0.15 and 0.2).

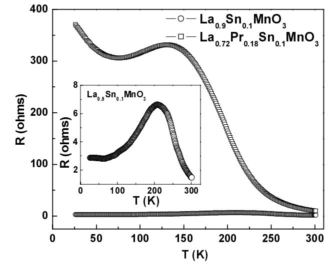

Fig. 1. Variation of resistance with temperature for $La_{0.9-x}Pr_xSn_{0.1}MnO_3$ (x= 0.0 and 0.18). Inset shows the enlarged view of R-T for $La_{0.9}Sn_{0.1}MnO_3$.

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