Transport Properties of Low-noise of La－Ca－Sr－Mn－O bulks with High Temperature Coefficient of Resistance

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ABSTRACT

In this article, we study the doping effect on the values of temperature coefficient of restistance (TCR) and metal-insulator transition temperature (TP) of La-Ca-Sr-Mn-O bulks. We found that the maximum values of TCR (TCRMAX) was decreased for La0.75Ca0.25-xSrxMnO3 with an increased x, companying with an increase of TP .We also study the effect of atomic ratio of O/Mn on TCRMAX and TP for the La0.75Ca0.15Sr0.1MnO3 sample. We find that for the sample annealed at 1000 ℃, the value of the O/Mn ratio becames to be 4.1, and the value of TP is increased to 316 K, companying an increased TCRMAX value of 9.81 %/K.

In addition, the relationship between TCRMAX and bipolaron binding energy (λ1) is deduced by the current-carries-density-collapse model. It is found that the TCRMAX increases as λ1 is decreased, being consistent with the theoretic prediction.

Finally, the noise spectra for the La0.75Ca0.25-xSrxMnO3 sample were measured with a home made Low-noise amplifier. It is found that value of noise is below 1.2×10-9 Hz -0.5

Keywords : infrared detectors、temperature coefficient of restistance(TCR)、metal-insulator transition temperature(TP)、current-carries-density-collapse、bipolaron、Johnson noise

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