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INFLUENCE OF SINTERING TEMPERATURE ON MICROSTRUCTURAL, ELECTRICAL AND MAGNETO-TRANSPORT OF Nd0.68Sr0.32MnO3

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ABSTRACT

A systematic study on $Nd_{0.68}Sr_{0.32}MnO_3$ manganites has been undertaken, primarily to understand the influence of varying grain size on the structural, electrical resistivity and magneto transport properties at the insulating and metallic regions. The materials were prepared by the solid state reaction method at sintering temperature 1170^{o}C, 1270^{o}C and 1350^{o}C. The XRD patterns show all samples have a single phase with orthorhombic structure. SEM images show a linear relationship between sintering temperature and grain size. The insulator metal transition temperatures, *T*im were determined and remained nearly constant (~ 200 K) for samples sintered at 1270 ^{o}C and 1350^{o}C. While for sample sintered at 1170 ^{o}C, *T*im is found around 180 K. The resistivity data fits well with equations $\rho = \rho o + \rho 2T2$ and $\rho = \rho o + \rho 2.5T2.5$ in metallic (ferromagnetic) region. At high temperature (T>*Tim*) insulating (paramagnetic) region, small polaron hopping and variable range hopping models were used to compute the density of states at Fermi level *N*(*E*F) and the activation energy (*E*a) of the electrons.

Keywords: magnetotransport; grain size; activation energy

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