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Investigation on structural, electrical, magnetic and thermoelectric properties of low bandwidth $Sm_{1-x}Sr_xMnO_3$ ($0.2 \leq x \leq 0.5$) manganites

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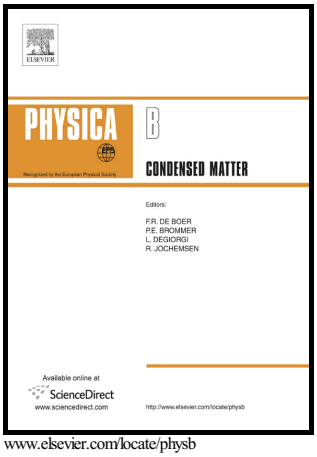

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Investigation on structural, electrical, magnetic and thermoelectric properties of low bandwidth $Sm_{1-x}Sr_xMnO_3$ ($0.2 \leq x \leq 0.5$) manganites

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Abstract: We present a systematic study on structural, electrical and magnetic properties of low bandwidth compounds of the family $Sm_{1-x}Sr_xMnO_3$. The samples were prepared by conventional solid-state reaction. Rietveld analysis of XRD results show that the samples crystallized in orthorhombic crystal structure with Pbnm space group. The unit volume is decreasing with increasing Sr concentration. The electrical resistivity is suppressed with application of magnetic field. Huge magnetoresistance has been observed for samples with x=0.4 and x=0.5. The validity of the percolation model has been verified in the entire temperature range. The magnetic studies show that the field-induced critical temperature and Neel temperature transitions are seen in all compounds. The samples with x=0.2 and 0.3 show positive S values in the entire temperature range. The Seebeck coefficient (S) of the x=0.5 sample is negative in the entire temperature range, and for the sample with x=0.4 exhibits a crossover in S value from positive to negative values. The analysis of S data indicates that the small polaron hopping model is valid in the high temperature region.

Keywords: Manganites, Rietveld refinement, Percolation model, Magnetoresistance, Magnetization, Seebeck coefficient.

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