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Transport studies on manganite based thin film composite

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Manganites are oxide ceramics having the general chemical formula: $R_{1-x}A_xMnO_3$ (R is the rare earth ions and A is monovalent / divalent / trivalent / tetravalent ions) with ABO₃ type perovskite structure. Manganites are known to exhibit metal – insulator transition temperature (T_p), ferromagnetic – paramagnetic transition temperature (T_C), magnetoresistance (MR), charge ordering (CO), orbital ordering (OO), spin ordering (SO), different ground electronic – magnetic states, etc which have been understood on the basis of zener double exchange (ZDE) mechanism, Jahn – Teller (JT) effect, charge – spin – lattice – orbital couplings, etc. In this communication, we report the results of the studies on manganite based $LaMnO_{3-\delta}/La_{0.7}Ca_{0.3}MnO_3/LaAlO_3$ (LMO / LCMO / LAO) thin film composite fabricated by low cost and vacuum free chemical solution deposition (CSD) method. Presently studied bi-layered thin film composite was studied by X-ray diffraction (XRD) measurements for structural properties which reveal that two layers of composite, i.e. LMO and LCMO, are grown in parallel epitaxial orientations. Temperature dependent current – voltage (I – V) characteristics have been investigated for transport properties suggesting the transition from normal to backward diode like characteristics of the LMO/LCMO junction. This transformation strongly depends upon an applied voltage and temperature. Electric field dependent electroresistance (ER), recorded at different temperatures, has been discussed on the basis of various phenomena such as charge injection mechanism, tunneling phenomenon, depletion region modifications and thermal processes across LMO / LCMO interface.

Biography

P S Solanki has completed his PhD in 2010 from Saurashtra University, Rajkot, India and he has been selected as Fast Track Young Scientist under Department of Science and Technology (DST), New Delhi, India. Presently, he is an Assistant Professor in Physics at Department of Physics, Saurashtra University, Rajkot, India. He is working in the field of ceramic manganite and multiferroic based thin film devices for spintronic based potential applications. He has published 41 research articles in internationally and nationally reputed high impact journals.

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