

Effect of Co Substitution on Structural, Magnetocaloric, Magnetic, and Electrical Properties of $\text{Sm}_{0.6}\text{Sr}_{0.4}\text{Co}_x\text{Mn}_{1-x}\text{O}_3$ Synthesized by Sol-gel Method

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Abstract : In this work, $\text{Sm}_{0.6}\text{Sr}_{0.4}\text{Co}_x\text{Mn}_{1-x}\text{O}_3$ ($x=0, 0.1, 0.2$ and 0.3) was synthesized by sol-gel method for magnetocaloric effect (MCE) applications. XRD analysis confirmed formation of the required orthorhombic phase of perovskite, and there is crystallographic phase transition as a result of substitution. Maxwell-Wagner interfacial polarisation and Koops phenomenological theory were used to investigate and analyze the temperature and frequency dependency of the dielectric permittivity. The phase transition from the ferromagnetic to the paramagnetic state was demonstrated to be second order. Based on the isothermal magnetization curves obtained at various temperatures, the magnetic entropy change was calculated. A magnetocaloric effect (MCE) over a wide temperature range was studied by determining DSM and the relative cooling power (RCP).

Keywords : magnetocaloric effect, perovskite, magnetic phase transition, dielectric permittivity

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