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Investigation of Magnetocaloric Effect in a New Perovskite Oxide $La_{0.7-x}Ho_xSr_{0.3}MnO_3$ ($x = 0.2$ and 0.3)

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The magnetocaloric effect (MCE) of $La_{0.7-x}Ho_xSr_{0.3}MnO_3$ ($x = 0.2$ and 0.3) perovskite oxides has been investigated. A phenomenological model is adopted for simulation of magnetization variation with temperature to investigate magnetocaloric properties such as magnetic entropy change, heat capacity change and relative cooling power. The results indicate the potential of this series of materials to achieve the MCE at temperatures near Curie temperature (T_C). These compounds present as prospective candidates for cooling system in a wide temperature interval in the vicinity of room temperature. The results confirm that the phenomenological model is undoubtedly beneficial for the prediction of the magnetocaloric effect of magnetic materials. Moreover, the effect of holmium (Ho) doping in MCE of $La_{0.7}Sr_{0.3}MnO_3$ has been discussed comparing the results obtained from our calculation for Ho-doped $La_{0.7}Sr_{0.3}MnO_3$ and for non-doped $La_{0.7}Sr_{0.3}MnO_3$ calculated earlier.

Keywords: solid state magnetic refrigeration, phase transition, phenomenological model.