Influence of sn-doping on magnetocaloric properties of la0.7ca0.3mn1?xsnxo3(x = 0.0, x = 0.02 and x = 0.04) compounds

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Modern technology for refrigerators and coolers is based on the chemical gas Chlorofluorocarbon (CFC) compression method that is indicative of a high consumption of electricity. The CFC is also understood as a reason for global warming. One of the solutions to this issue is magnetic refrigeration technology, which is environmentally friendly because it does not use any hazardous chemicals or ozone depleting/greenhouse gases. Magnetic refrigeration technology is based on the magnetocaloric effect of magnetic refrigerant materials. Exploring the magnetocaloric effect of magnetic refrigerant materials is important because these contain many of the physical properties needed for magnetic refrigeration technology. Herein, the present work reports on the magnetocaloric effect of La0.7Ca0.3Mn1?xSnxO3 (x = 0.0, x = 0.02 and x = 0.04) compound samples produced with the solid state reaction technique. Curie temperature TC obtained for the La0.7Ca0.3Mn1?xSnxO3 (x = 0.0, x = 0.02 and x = 0.04) are 260 K, 176 K and 170 K with -?SM max of 4.32 J×kg-1×K-1, 1.61 J×kg-1×K-1 and 1.24 J×kg-1×K-1 and a refrigerant capacity of 48 J/kg, 41.43 J/kg and 28.53 J/kg for x = 0.0, x = 0.02 and x = 0.04, respectively. A small addition of Sn-doped resulted in a significant decrease of more than 80 K on the Curie temperature scale compared to that of La0.7Ca0.3MnO3. The large gap in the decreasing magnetic temperature phase transition might be useful as an option of metal/transition metal doped for tuning the Curie temperature of magnetic refrigerant materials.