

Abstract

The physics properties of manganite oxides $\text{La}_{0.8}\text{Sr}_{0.15}\text{Na}_{0.05}\text{Mn}_{1-x}\text{Al}_x\text{O}_3$ synthesized by solid-solid method were studied in details. X-ray diffraction analyses showed a single rhombohedral phase with R3-c space group. The inhomogeneous magnetic compartment coupled was used to explain the magnetic properties and the evolution of the paramagnetic-ferromagnetic transition of the materials. The maximum values of magnetic entropy change (ΔS_{Max}) decreased from 5.15 Jkg⁻¹K for $\text{La}_{0.8}\text{Sr}_{0.15}\text{Na}_{0.05}\text{MnO}_3$ to 4.46 Jkg⁻¹K for $\text{La}_{0.8}\text{Sr}_{0.15}\text{Na}_{0.05}\text{Mn}_{0.9}\text{Al}_{0.1}\text{O}_3$ upon an applied magnetic field of $\mu_{0H}=5$ T, indicating an excellent quality of our samples as compared to many manganite oxides. The high quality of our samples was also checked by the large relative cooling power (RCP) which provides a good performance for industrial technologies in refrigeration device.