

Study on the magnetic properties of $\text{La}_{0.7}\text{Ca}_{0.3}\text{Mn}_{1-x}\text{V}_x\text{O}_3$

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It has been investigated the magnetic properties of CMR (colossal magnetoresistance) materials, especially, $\text{La}_{0.7}\text{Ca}_{0.3}\text{Mn}_{1-x}\text{TM}_x\text{O}_3$ (TM = transition metal : V). The CMR phenomena have been understood on basis of double-exchange interaction due to the hopping of e_g electrons between Mn sites promoting the ferromagnetic order and the strong phonon coupling arising from the Jahn-Teller splitting of Mn 3d levels. Generally, the CMR properties can be significantly influenced by transition-metal ions into the Mn sites. The doping at the Mn site in perovskite manganites causes change in the electronic structure of Mn ion and a magnetic coupling between dopants and Mn. When x is $0.1 < x < 0.2$, two distinct magnetic transitions appear, indicating the reentrant character. This also result in the growth of ferromagnetic insulating phase, caused by the localization of charge carriers and the ferromagnetic metallic clusters. The magnetic relaxation occurs in both the reentrant spin-glass and the high-temperature ferromagnetic regions. We measured the magnetic properties by using a superconducting-quantum-interference-device magnetometer (Quantum Design).