

“Magnetocaloric effect and critical behavior in $\text{La}_{0.8}\text{K}_{0.2}\text{MnO}_3$ nanoparticle”

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Abstract

We report on the magnetocaloric effect and critical phenomenon on $\text{La}_{0.8}\text{K}_{0.2}\text{MnO}_3$ nanoparticle through a systematic magnetic and electrical measurement. The magnetic entropy change (ΔS_M) presents close values obtained from resistivity and magnetic measurements, however, with a discrepancy in the magnetic entropy maximum values. This discrepancy is due to the presence of an extrinsic effect associated with the nanometric grain size affecting the electrical behavior. Interestingly, our results show a good agreement with the calculation of the critical exponents and the temperature coefficient of resistance shows positive and negative values. The obtained critical exponents are close to that of the mean field theory (with $\beta = 0.5$, $\gamma = 1$, and $\delta = 3$). This indicates a long-range interaction between spins a consequence of the presence the presence of dipole- dipole interaction in this system.

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