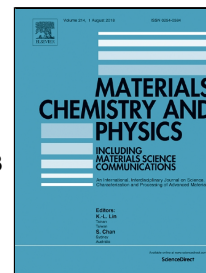


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Critical behaviors of ferromagnetic-paraferromagnetic transition in $\text{La}_{0.5}\text{Sr}_{0.5}\text{MnO}_3$ nanowires bundles under low applied field

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Abstract

The critical behaviors of the perovskite $\text{La}_{0.5}\text{Sr}_{0.5}\text{MnO}_3$ nanowires bundles around the ferromagnetic-paraferromagnetic (FM-PM) transition through modified Arrott plot and critical isothermal analysis is investigated. The obtained critical exponents are determined by modified Arrott Noakes equation $(H/M)^{1/\gamma} = (T - T_C)/T_C + (M/M_1)^{1/\beta}$ under a low external magnetic field of 0-0.8T, where $\beta=0.93$ and $\gamma=2.25$ were obtained at $T_C \approx 328$ K. The availability of the parameters is proved by fulfilling the Widom scaling relation $\delta = 1 + \gamma/\beta$ which obeys the single scaling equation of $M(H, |\varepsilon|) = \varepsilon^\beta f_\pm(H/|\varepsilon|^{\beta+\gamma})$. The critical exponents determined in this system is unique and not following theories in any published literature. It may be attributed to the nano-size effect and surface

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