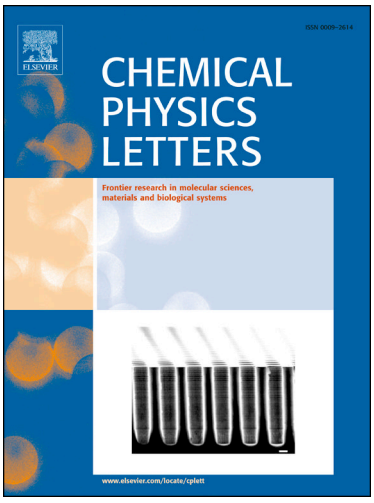

Research paper

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Unconventional critical behavior near the phase transition temperature and magnetocaloric effect in $La_{0.5}Ca_{0.4}Ag_{0.1}MnO_3$ compound.

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Abstract

The critical behavior associated with the magnetic phase transition has been investigated by magnetization isotherms in $La_{0.5}Ca_{0.4}$ $Ag_{0.1}MnO_3$ (LCAMO) powder. The X-ray diffraction characterization has revealed that this sample crystallized in the orthorhombic symmetry with Pnma space group. While the experimental results revealed that this sample underwent a paramagnetic-ferromagnetic transition, the magnetic measurements data indicated that the compound exhibited a second-order phase transition. Furthermore, the critical exponents values were found as β =0.79, γ =0.71 and δ =1.828 with T_C=189.87 K. The relative cooling power of the sample was determined as 14.70 J/kg under a magnetic field of 1 T making it a potential working material in magnetic refrigeration.

Keywords: Magnetic properties; Unconventional critical behavior; Magnetocaloric effect; relative cooling power.

I- Introduction

Over the last years, the magnetocaloric effect (MCE) has become an interesting field of research in the field of magnetic materials and refrigeration technologies. The mixed valence manganites with the general formula $R_{1-x}A_xMnO_3$ (where R is a rare-earth ion and A an alkaline-earth ion) were extensively studied due to their physical properties manifested through complex phase diagrams, which can be adjusted with