

COMPARISON OF THE MAGNETIZATION BEHAVIORS IN
PEROVSKITE COMPOUNDS $\text{La}_{0.7-x}\text{Ln}_x\text{Pb}_{0.3}\text{MnO}_3$ (Ln=Pr AND Sm)

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Abstract

The magnetization behaviors of two manganite oxide systems, $\text{La}_{0.7-x}\text{Ln}_x\text{Pb}_{0.3}\text{MnO}_3$ (Ln=Pr and Sm), have been synthesized. The replacement of La ions by Pr or Sm results in a considerable decrease in the ferromagnetic ordering temperature T_C and clearly irreversible behavior in the zero-field-cooling-field-cooling curve at a low applied field, showing a short-range spin order phase. These facts are in agreement with the smaller ionic radii of Pr (0.130 nm) and Sm (0.124 nm) ions in contrast to La ion (0.136 nm), and the corresponding larger distortion of perovskite structures. The saturation magnetization M_S decreases as Sm content increases relative to the increase of M_S as Pr content increases. This can be interpreted in terms of the competition between suppression of ferromagnetism due to structure tuning induced by the small ionic radius of the interpolated cations into the La-site and the increase of ferromagnetically interacting spins due to the introduction of magnetic Pr or Sm ions with f-shell electrons.

Key words : Magnetization; Manganite; Perovskite; Ferromagnetism