



ELSEVIER

Journal of Magnetism and Magnetic Materials 226–230 (2001) 803–805

---

---

**M** Journal of  
**M** magnetism  
**M** and  
magnetic  
materials

---

---

[www.elsevier.com/locate/jmmm](http://www.elsevier.com/locate/jmmm)

## Phase transitions in $\text{La}_{1-x}\text{Ce}_x\text{MnO}_3$ ( $x = 0.2, 0.3, 0.4$ )

B.W. Lee<sup>a,\*</sup>, K.Y. Seo<sup>a</sup>, Y.J. Kim<sup>a</sup>, H. Han<sup>a</sup>, H.H. Lee<sup>a</sup>, J.C. Han<sup>a</sup>,  
S.Y. Park<sup>a</sup>, C.S. Kim<sup>b</sup>

<sup>a</sup>*Department of Physics, Hankuk University of Foreign Studies, Yongin, Kyungki, 449-791, South Korea*

<sup>b</sup>*Department of Physics, Kookmin University, Seoul, 136-702, South Korea*

---

### Abstract

The phase transitions in  $\text{La}_{1-x}\text{Ce}_x\text{MnO}_3$  (LCeMO;  $x = 0.2, 0.3, 0.4$ ) have been studied by using magnetization  $M$ , resistivity  $\rho$ , specific heat  $C$ , and photoacoustic measurements. The substitution of La by Ce in  $\text{LaMnO}_3$  induces a metal–insulator transition accompanied by the occurrence of ferromagnetic ordering. No observable thermal hysteresis at transition temperatures implies that the phase transitions in LCeMO can be regarded as a second-order phase transition with no latent heat at transition temperature. © 2001 Elsevier Science B.V. All rights reserved.

*Keywords:* Colossal magnetoresistance; Phase transitions—second-order; Resistivity—temperature dependent; Photoacoustic effect

---