



Available online at [www.sciencedirect.com](http://www.sciencedirect.com)

SCIENCE @ DIRECT®

Physica B 345 (2004) 103–106

PHYSICA B

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

## Mössbauer and neutron diffraction studies of $\text{La}_{0.67}\text{Pb}_{0.33}\text{Mn}_{0.99}^{57}\text{Fe}_{0.01}\text{O}_3$

Hi Min Lee<sup>a</sup>, Sam Jin Kim<sup>a</sup>, In-Bo Shim<sup>a</sup>, Sung Baek Kim<sup>b</sup>, Chul Sung Kim<sup>a,\*</sup>

<sup>a</sup> *Department of Physics, Kookmin University, 861-1 Chong Rung Dong, Sung Buk Gu, Seoul 136-702, South Korea*

<sup>b</sup> *Department of Physics and Astronomy, Rutgers University, NJ 08854, USA*

### Abstract

$\text{La}_{0.67}\text{Pb}_{0.33}\text{Mn}_{1-x}^{57}\text{Fe}_{1-x}\text{O}_3$  powders were prepared by the sol–gel method and their structural and magnetic properties were investigated with X-ray and neutron diffraction, Mössbauer spectroscopy and vibrating sample magnetometer. Rietveld refinements show that the samples adopt rhombohedral crystal structure with  $R\bar{3}c$  symmetry. Mössbauer spectra of  $\text{La}_{0.67}\text{Pb}_{0.33}\text{Mn}_{0.99}^{57}\text{Fe}_{0.01}\text{O}_3$  have been taken at various temperatures ranging from 14 to 400 K. Temperature dependence of Mössbauer spectra are interpreted with anisotropic hyperfine field fluctuation.

© 2003 Elsevier B.V. All rights reserved.

PACS: 61.10.–i; 61.12.–q; 76.80.+y

Keywords: Neutron diffraction; Mössbauer spectroscopy; Sol–gel method