

# Accepted Manuscript

## Research articles

Griffiths-like phase, critical behavior near the paramagnetic-ferromagnetic phase transition and magnetic entropy change of nanocrystalline  $\text{La}_{0.75}\text{Ca}_{0.25}\text{MnO}_3$

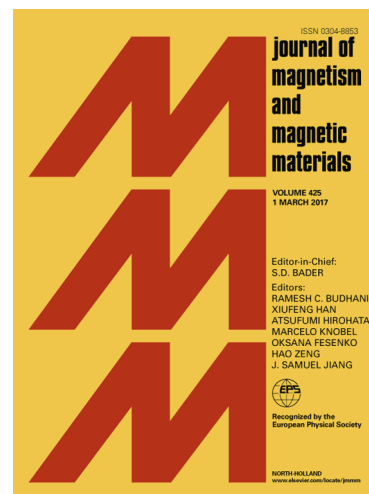
P.T. Phong, L.T.T. Ngan, N.V. Dang, L.H. Nguyen, P.H. Nam, D.M. Thuy, N.D. Tuan, L.V. Bau, I.J. Lee

PII: S0304-8853(17)32377-6  
DOI: <https://doi.org/10.1016/j.jmmm.2017.10.103>  
Reference: MAGMA 63319

To appear in: *Journal of Magnetism and Magnetic Materials*

Received Date: 28 July 2017  
Revised Date: 17 September 2017  
Accepted Date: 26 October 2017

Please cite this article as: P.T. Phong, L.T.T. Ngan, N.V. Dang, L.H. Nguyen, P.H. Nam, D.M. Thuy, N.D. Tuan, L.V. Bau, I.J. Lee, Griffiths-like phase, critical behavior near the paramagnetic-ferromagnetic phase transition and magnetic entropy change of nanocrystalline  $\text{La}_{0.75}\text{Ca}_{0.25}\text{MnO}_3$ , *Journal of Magnetism and Magnetic Materials* (2017), doi: <https://doi.org/10.1016/j.jmmm.2017.10.103>



This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Griffiths-like phase, critical behavior near the paramagnetic-ferromagnetic phase transition and magnetic entropy change of nanocrystalline



P. T. Phong<sup>1,2</sup>, L. T. T. Ngan<sup>3,4</sup>, N. V. Dang<sup>3</sup>, L. H. Nguyen<sup>4</sup>, P. H. Nam<sup>4,5</sup>,

D. M. Thuy<sup>6</sup>, N. D. Tuan<sup>6</sup>, L. V. Bau<sup>7</sup>, I. -J. Lee<sup>8</sup>

<sup>1</sup>*Department for Management of Science and Technology Development, Ton Duc Thang University, Ho Chi Minh City, Viet Nam.*

<sup>2</sup>*Faculty of Applied Sciences, Ton Duc Thang University, Ho Chi Minh City, Viet Nam*

<sup>3</sup>*Department of Physics and Technology, Thai Nguyen University of Sciences, Viet Nam*

<sup>4</sup>*Graduate University of Science and Technology, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Hanoi, Viet Nam*

<sup>5</sup>*Institute of Materials Science, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet Road, Cau Giay District, Ha Noi, Viet Nam*

<sup>6</sup>*Department of Physics, Quy Nhon University, 170 An Duong Vuong Road, Quy Nhon City, Viet Nam*

<sup>7</sup>*Hong Duc University, 565 Quang Trung Street, Thanh Hoa City, Viet Nam*

<sup>8</sup>*Department of Advanced Materials Chemistry, Dongguk University-Gyeongju, Dongdaero 123, Gyeongju-Si, Gyeongbuk 38066, Korea*

**Abstract.** In this work, we report the structural and magnetic properties of  $\text{La}_{0.75}\text{Ca}_{0.25}\text{MnO}_3$  nanoparticles synthesized by the sol-gel route. Rietveld refinement of X-ray powder diffraction confirms that our sample is single phase and crystallizes in orthorhombic system with Pnma space group. The facts that effective magnetic moment is large and the inverse susceptibility deviates from the Curie Weiss law indicate the presence of Griffiths-like cluster phase. The critical exponents have been estimated using different techniques such as modified Arrott plot, Kouvel-Fisher plot and critical isotherm technique. The critical exponents values of  $\text{La}_{0.75}\text{Ca}_{0.25}\text{MnO}_3$  are very close to those found out by the mean-field model, and this can be explained by the existence of a long-range interactions between spins in this system. These results were in good agreement with those obtained using the critical exponents of magnetic entropy change. The self-consistency and reliability of the critical exponent was verified by the Widom scaling law and the universal scaling hypothesis. Using

Download English Version:

<https://daneshyari.com/en/article/8154196>

Download Persian Version:

<https://daneshyari.com/article/8154196>

[Daneshyari.com](https://daneshyari.com)