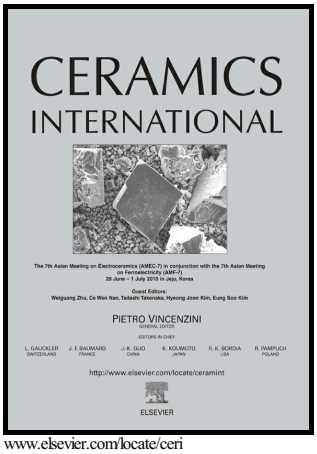

www.elsevier.com/locate/ceri

Effects of Sr-doping on the giant magnetocaloric effect of $EuTiO_3$

Zhao-Jun Mo, Qi-Lie Sun, Chang-Hong Wang, Hai-Zhen Wu, Lan Li, Feng-Bin Meng, Cheng-Chun Tang, Yun Zhao, Jun Shen

PII: S0272-8842(16)31978-2
DOI: http://dx.doi.org/10.1016/j.ceramint.2016.10.184
Reference: CERI14063

To appear in: *Ceramics International*

Received date: 5 August 2016
Revised date: 24 October 2016
Accepted date: 28 October 2016

Cite this article as: Zhao-Jun Mo, Qi-Lie Sun, Chang-Hong Wang, Hai-Zhen Wu, Lan Li, Feng-Bin Meng, Cheng-Chun Tang, Yun Zhao and Jun Shen, Effects of Sr-doping on the giant magnetocaloric effect of $EuTiO_3$, *Ceramics International,* http://dx.doi.org/10.1016/j.ceramint.2016.10.184

Effects of Sr-doping on the giant magnetocaloric effect of $EuTiO_3$

Zhao-Jun Mo[1*], Qi-Lie Sun[3], Chang-Hong Wang[1], Hai-Zhen Wu[1], Lan Li[1], Feng-Bin Meng[3], Cheng-Chun Tang[3], Yun Zhao[1], Jun Shen[2]*

[1]Institute of Material Physics, Key Laboratory of Display Materials and Photoelectric Devices of Ministry of Education of Ministry of Education, Key Laboratory for Optoelectronic Materials and Devices of Tianjin,Tianjin University of Technology, Tianjin 300191, China

[2]Key laboratory of cryogenics, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing, China.

[3]School of Material Science and Engineering, Hebei University of Technology, Tianjin, China

[*]Corresponding author at: 391 Binshui Xidao, Xiqing District Tianjin 300384, P.R.China. Tel: +86-22-60215338. electronic mail: mzjmzj163@163.com (Z. J. Mo)

Abstract

The magnetic properties and magnetocaloric effect of $Eu_{1-x}Sr_xTiO_3$ (x=0-0.1) compounds are investigated. With slight Sr-doping, the ferromagnetic (FM) coupling significantly increased and FM exchange is dominant in the delicate balance. A giant reversible magnetocaloric effect (MCE) and large refrigerant capacity (RC) for $Eu_{1-x}Sr_xTiO_3$ compounds were observed. The values of $-\Delta S_M^{max}$ are evaluated to be around 10 J/kg K under a magnetic field change of 1T and 21 J/kg K under a magnetic field change of 2 T, respectively. But, the values of RC are increased with the more Eu in $EuTiO_3$ to be substituted by Sr. Therefore, the giant reversible MCE and large RC make the $Eu_{1-x}Sr_xTiO_3$ compound a good candidate for magnetic refrigerant working at low-temperature and low-field.

Keywords: magnetocaloric effect; magnetic entropy change; refrigerant capacity