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PII: S0925-8388(18)30455-9

DOI: 10.1016/j.jallcom.2018.02.025

Reference: JALCOM 44901

To appear in: *Journal of Alloys and Compounds*

Received Date: 29 November 2017

Revised Date: 2 February 2018

Accepted Date: 3 February 2018

Please cite this article as: Y. Jia, J. Ma, X. Xu, Z. Han, Z. Wu, M. Ismail, N.O. Haugen, L. Wang, S. Yu, Z. Xu, S. Li, J. Zou, H. Luo, Abnormal magneto-capacitance of multiferroic perovskite oxide $Pb(Fe_{1/2}Nb_{1/2})_{1-x}Ti_xO_3$ ($x$=0.48) crystal, *Journal of Alloys and Compounds* (2018), doi: 10.1016/j.jallcom.2018.02.025.

# Abnormal magneto-capacitance of multiferroic perovskite oxide $Pb(Fe_{1/2}Nb_{1/2})_{1-x}Ti_xO_3$ ($x$=0.48) crystal

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**ABSTRACT** Herein is presented our investigation of an abnormal magnetocapacitance effect couples the magnetic and dielectric properties in the multiferroic $Pb(Fe_{1/2}Nb_{1/2})_{0.52}Ti_{0.48}O_3$ crystal. The variation of capacitance reaches a maximum value at a glasslike transition, and it exhibits a ~10 % decrease under application of only a 1 T steady state magnetic field. The characteristic relaxor temperature shifts to higher temperatures with increasing magnetic field. The dielectric constant decreases upon application of a magnetic field. The space-charge and the ordering of $Fe^{2+}$ and $Fe^{3+}$ in the glasslike transition region may lead to the anomalous dielectric diffusion under the applied magnetic field and the giant dielectric behavior of $Pb(Fe_{1/2}Nb_{1/2})_{0.52}Ti_{0.48}O_3$ crystal.

**Keywords**: Multiferroic Materials; Ferroelectric materials; Magneto-capacitance; $Pb(Fe_{1/2}Nb_{1/2})_{1-x}Ti_xO_3$ crystal; Dielectric property.