

Abstract Submitted
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The internal and external magnetoelectric effect in LiFeP_2O_7 K.-C. LIANG, TCSUH and Department of Physics, University of Houston, Houston, TX 77204, USA, W. ZHANG, TCSUH and Department of Chemistry, University of Houston, Houston, TX 77204, USA, B. LORENZ, Y.Y. SUN, TCSUH and Department of Physics, University of Houston, Houston, TX 77204, USA, P.S. HALASYAMANI, TCSUH and Department of Chemistry, University of Houston, Houston, TX 77204, USA, C.W. CHU, TCSUH and Department of Physics, University of Houston, Houston, TX 77204, USA — We study the internal and external magnetoelectric (ME) effect of the single-crystalline LiFeP_2O_7 by magnetic, thermodynamic, and magnetoelectric measurements. The Fe^{3+} spins form a canted antiferromagnetic (AFM) order below $T_N \sim 27\text{K}$ with weak ferromagnetic components along the b -axis. A sharp peak found in the pyroelectric current at 27K indicates the strong internal ME interaction resulting in a sizeable polarization decrease. With external magnetic field applied, the ME polarization shows a combination of a linear and a quadratic field dependence below T_N , but it only shows the quadratic ME response above then. A large uniaxial magnetoelastic response in the thermal expansion data indicates strong spin-lattice coupling. A qualitative explanation regarding to the ME interaction between electric polarization and magnetic order parameters will be proposed and discussed.

Kao-Chen Liang
TCSUH and Department of Physics,
University of Houston, Houston, TX 77204, USA

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