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Anisotropy in magnetic properties of single crystal $LiFePO_4$ GAN LIANG, Sam Houston State University, KEESEONG PARK, JOHN MARKERT, University of Texas at Austin, JIYING LI, DAVID VAKNIN, Ames Lab and Iowa State University — We report the experimental and theoretical results on the anisotropies in the magnetic properties and x-ray absorption spectra of single crystal $LiFePO_4$. A mean-field theory is developed to explain the observed strong anisotropies in Lande g-factor, paramagnetic Curie temperature, and effective moment for $LiFePO_4$ single crystals. The values of the in-plane nearest- and next-nearest-neighbor spin-exchange (J_1 and J_2), inter-plane spin-exchange ($J_\perp$), and single-ion anisotropy (D), obtained recently from neutron scattering measurements, are used for calculating the Curie temperatures with the formulas derived from the mean-field Hamiltonian. It is found that the calculated Curie temperatures match well with that obtained by fitting the magnetic susceptibility curves to the modified Curie-Weiss law.

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