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Crystal and Magnetic Structure of FeV_2O_4 with e_g and t_{2g} orbital degeneracies SUNGDAE JI, J.-H. KIM, S.-H. LEE, Department of Physics, University of Virginia, Charlottesville, VA 22904, USA, Q. HUANG, NIST Center for Neutron Research, Gaithersburg, MD 20899, USA, T. KATSUFUJI, Department of Physics, Waseda University, Tokyo 169-8555, Japan — We have performed neutron diffraction measurements on a powder and a single crystal of a spinel FeV_2O_4 that has e_g as well as t_{2g} orbital degeneracy. Our data show that upon cooling this system undergoes three successive phase transitions: a cubic-to-tetragonal structural transition at 140 K, a tetragonal-to-orthorhombic transition at 110 K accompanied by a ferri-magnetic order and an orthorhombic-to-orthorhombic phase transition with another magnetic order at 80 K. The magnetic structures of the two magnetic phases were refined by the group theoretical analysis of our powder diffraction data. We will also discuss implication of the magnetic structures regarding to the orbital states of FeV_2O_4 .

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