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**Magnetic and Ferroelectric Anisotropy in Multiferroic $FeVO_4$**[1]
EHAB ABDELHAMID, Wayne State U, AMBESH DIXIT, IIT Jodhpur, KENTA KIMURA, TSUYOSHI KIMURA, Osaka U, ONATTU JAYAKUMAR, Bhabah Atomic Research Ctr, VAMAN NAIK, U of Michigan-Dearborn, RATNA NAIK, GAVIN LAWES, BORIS NADGORNY, Wayne State U — $FeVO_4$ has been studied as a model system for understanding the magnetoelectric interaction mechanisms in low symmetry multiferroics. Triclinic $FeVO_4$ is characterized by two antiferromagnetic phase transitions, occurring at $T_{N1}$ =22 K and $T_{N2}$ =15 K, with the latter transition signaling a break in the space inversion symmetry, accompanied by the development of a non-collinear magnetic order which induces ferroelectricity. Earlier measurements on polycrystalline $FeVO_4$ doped with magnetic (Cr and Mn) as well as non magnetic (Zn) dopants indicate the stability of the two antiferromagnetic transition temperatures. In this work, single crystals of both undoped and doped $FeVO_4$ were grown from flux. To track the changes in lattice parameters induced by changing the doping concentration (measured by EDAX), XRD and Raman spectra were obtained. By recording the magnetization along two different crystal orientations, we were able to confirm the easy magnetic axis in this structure. Finally, we obtain the crystal's ferroelectric polarization along two different directions in an attempt to further understand the mechanism responsible for the ferroelectric transition.

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