Abstract Submitted
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Investigation of the multiferroic behavior in $FeVO_4$ single crystals[1] EHAB ABDELHAMID, Wayne State University, KENTA KIMURA, TSUYOSHI KIMURA, Osaka University, ONATTU D. JAYAKUMAR, Bhabha Atomic Research Centre, VAMAN M. NAIK, University of Michigan-Dearborn, RATNA NAIK, GAVIN LAWES, Wayne State University — $FeVO_4$ is considered as a model system for understanding the magnetoelectric interaction mechanisms in low symmetry multiferroics. Bulk $FeVO_4$ exhibits two antiferromagnetic phase transitions at $T_{N1} = 22$ K and $T_{N2} = 15$ K. Below T_{N2}, a noncollinear magnetic order develops, breaking the space inversion symmetry that induces ferroelectric order. Earlier measurements on polycrystalline samples of $FeVO_4$ doped with magnetic (e.g.: Chromium) as well as non-magnetic (e.g.: Zinc) ions, indicate the stability of the two antiferromagnetic transition temperatures, with a change of only 2% corresponding to the doping concentration of 20%. It also shows the ability of the $FeVO_4$ triclinic structure to accommodate such high doping levels. Working along the same line, we have prepared both doped and undoped single crystals of $FeVO_4$ by a flux method. Samples were characterized using XRD and Raman spectroscopy to track the changes in lattice parameters induced by different dopants. The magnetic and ferroelectric properties were investigated in order to understand the origin of magnetoelectric coupling in low symmetry multiferroics.

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Ehab Abdelhamid
Wayne State University

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