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Magnetoelastic coupling in doped multiferroic $YCrO_3$ YOGESH SHARMA, Materials Science Programme, Indian Institute of Technology Kanpur, SOMDUTTA MUKHERJEE, RAJEEV GUPTA, Department of Physics, Indian Institute of Technology Kanpur, ASHISH GARG, Materials Science and Engineering, Indian Institute of Technology Kanpur — Recent years have witnessed a renewed interest in ABO_3 structured perovskites due to possibility of combining ferroelectric and ferromagnetic order parameters in a single phase. Here we show an experimental study on one such material namely $YCrO_3$ which shows a phase transition from paramagnetic to a canted antiferromagnetic state at T_N ∼142K and a ferroelectric transition at T_C ∼473K. The material has an orthorhombic crystal structure (S.G.Pbnm) In the present work, we prepared polycrystalline samples of $YCr_{1-z}X_zO_3$ (X= V or Ni) by conventional solid-state-reaction method. X-ray diffraction shows the formation of single phase material. DC magnetic measurements exhibit a magnetic transition at T_N ∼140 K and the presence of magnetic hysteresis below this temperature. Above T_N, the susceptibility follows the Curie-Weiss law with the corresponding effective magnetic moment μ_{eff} of $3.75\mu_B$close to the theoretically expected value of 3.87 μ_B. Further, we investigated the magneto-elastic coupling in the material using temperature dependent Raman scattering. We observe 16 phonon modes below Tc. Phonon modes at 145, 403 and 422 cm^{-1} showed pronounced deviation from the expected anharmonic behavior below T_N, suggesting a spin-phonon coupling below T_N Further, we also look at the effect of doping at the Cr site on the magnetoeleastic coupling strength in this material.

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