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Magneto-dielectric study of multiferroicity in biferroic YCrO_3
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Florida State University — Dielectric measurements are used to characterize multi-ferroicity in the doped monoclinic ferroelectric oxides $\text{Y}_{1-x}\text{Ca}_x\text{MnO}_3$ ($x = 0, 0.15, 0.3$). The focus of this study is on the effects of the magnetic field and Ca doping on the temperature- magnetic field dependent dielectric response of polycrystalline samples of rare earth chromates YCrO_3 . YCrO_3 shows dielectric relaxation around 150 K related to the weak ferromagnetic ordering in system. Dipolar response is activated following Arrhenius formalism in the frequency range of 0.01-100 kHz, but it is independent on magnitude of magnetic field. As frequency increases dielectric peaks become broader and smaller. Dielectric constant relaxation behavior and magnetic phase transitions are not coupled through lattice distortions in this ferroelectric ferromagnetic system. YCrO_3 is an example of system with dipolar response in magnetic field without coupling with magnetic structure. There is strong dispersion of Debye relaxation peaks but absence of influence of magnetic field on ferroelectric system YCrO_3 .

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