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Inter-relationship among magnetization, polarization and magnetic wave vector in multiferroic spinel $CoCr_2O_4$ YOUNG JAI CHOI, JUN OKAMOTO, DI-JING HUANG, KUO SHENG CHAO, HONG-JI LIN, CHIEN-TE CHEN, MICHEL VAN VEENENDAAL, THOMAS A. KAPLAN, SANG-WOOK CHEONG — It has been known that the spinel $CoCr_2O_4$ is a multiferroic with conical spiral magnetic order characterized by three physical parameters: magnetization (**M**), polarization (**P**) and magnetic modulation vector (**Q**). We have found that these observables have a close inter-relationship in the multiferroic state and their inter-relationship changes in a methodical manner upon temperature variation and through applied magnetic fields. In order to understand the origin of this inter-relationship, we have performed comprehensive characterization experiments on the multiferroic compound, including measurements of dielectric constant, polarization, specific heat, magnetic susceptibility, and resonant x-ray scattering as functions of temperature and applied magnetic field.

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