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SPIN-DEPENDENT ELECTRIC PROPERTIES OF MULTIFERROIC COCR₂O₄ BY NEUTRON DIFFRACTION

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The role of Cr ions in CoCr₂O₄ and CoCr₁.₉₈₅₇Fe₀.₀₂O₄ exhibited dielectric property[1, 2]. The spinel CoCr₂O₄ and CoCr₁.₉₈₅₇Fe₀.₀₂O₄ powders were prepared by sol-gel method. The crystal structures and magnetic properties of the samples were examined by x-ray and neutron diffraction. The crystal structures were found to be cubic spinel with space group of Fd3m. The lattice constants a₀ and the internal structural parameter (x) of the oxygen for CoCr₂O₄ and CoCr₁.₉₈₅₇Fe₀.₀₂O₄ were determined to be 8.331 Å, 8.340 Å, and 0.260, 0.264, respectively. Magnetic properties and dielectric constants of CoCr₂O₄ and CoCr₁.₉₈₅₇Fe₀.₀₂O₄ were taken at various temperatures ranging from 4 to 300 K. The dielectric constant shows an anomaly at $T_S = 28$ K, which is related by spiral magnetic order. This result corresponds with the sudden change of magnetic peaks at same temperature region in neutron diffraction patterns.

![Graph showing dielectric properties of CoCr₂O₄ and CoCr₁.₉₈₅₇Fe₀.₀₂O₄](image)

Fig. 1. Dielectric properties of CoCr₂O₄ and CoCr₁.₉₈₅₇Fe₀.₀₂O₄


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