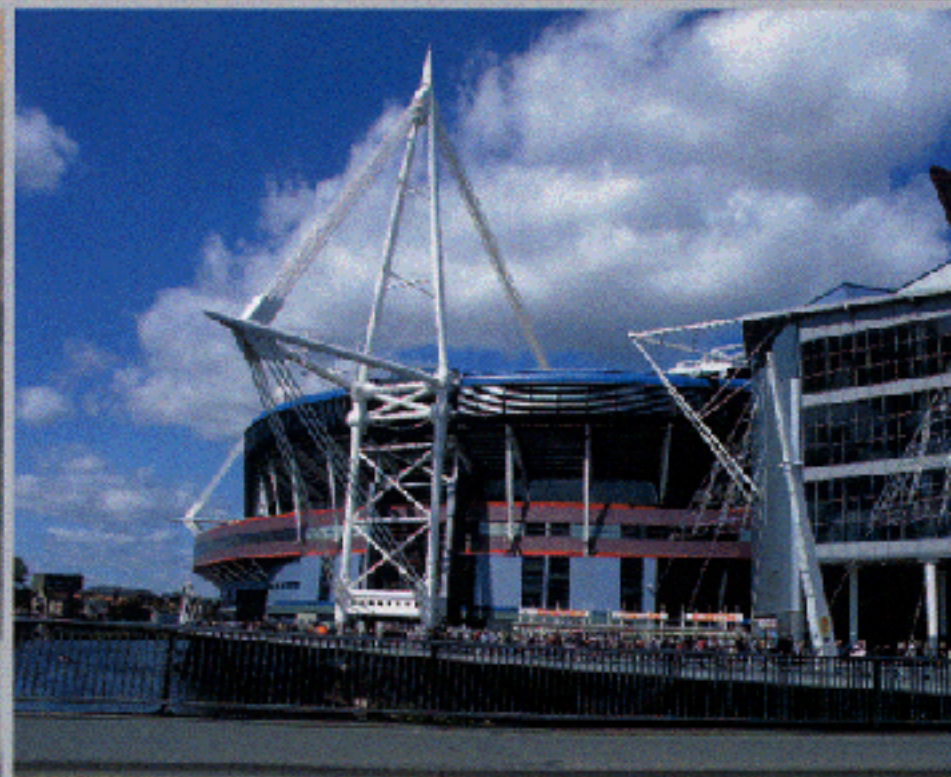




Soft Magnetic Materials Conference (SMM 18)



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SPIN-DEPENDENT ELECTRIC PROPERTIES OF MULTIFERROIC CoCr_2O_4 BY NEUTRON DIFFRACTION

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The role of Cr ions in CoCr_2O_4 and $\text{CoCr}_{1.98}^{57}\text{Fe}_{0.02}\text{O}_4$ exhibited dielectric property[1, 2]. The spinel CoCr_2O_4 and $\text{CoCr}_{1.98}^{57}\text{Fe}_{0.02}\text{O}_4$ 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 $Fd\bar{3}m$. The lattice constants a_0 and the internal structural parameter (x) of the oxygen for CoCr_2O_4 and $\text{CoCr}_{1.98}^{57}\text{Fe}_{0.02}\text{O}_4$ were determined to be 8.331 Å, 8.340 Å, and 0.260, 0.264, respectively. Magnetic properties and dielectric constants of CoCr_2O_4 and $\text{CoCr}_{1.98}^{57}\text{Fe}_{0.02}\text{O}_4$ 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.

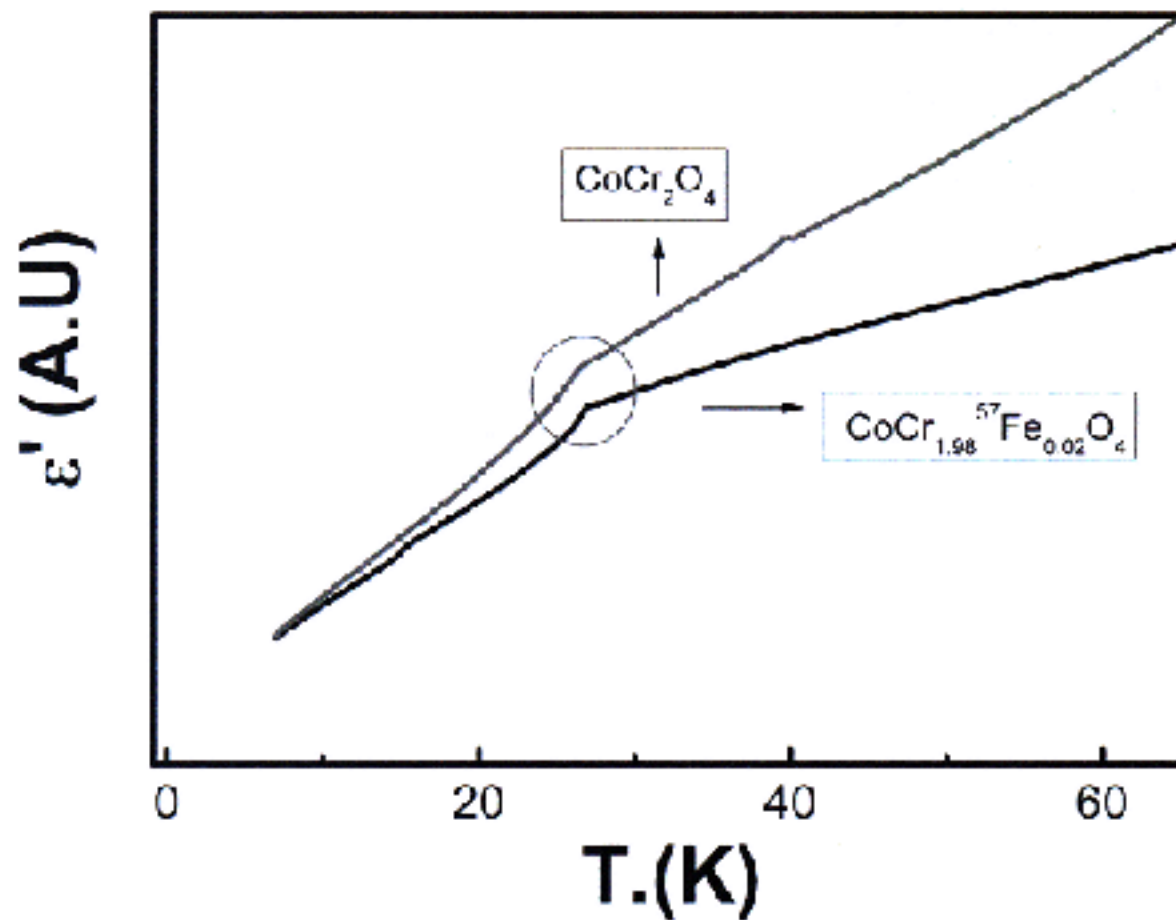


Fig. 1. Dielectric properties of CoCr_2O_4 and $\text{CoCr}_{1.98}^{57}\text{Fe}_{0.02}\text{O}_4$

- [1] G. Lawes, B. Melot, K. Page, C. Ederer, M. A. Hayward, Th. Proffen, and R. Seshadri, *Phys. Rev. B*, **74**(2006), 024413.
 [2] Y. Yamasaki, S. Miyasaka, Y. Kaneko, J.-P. He, T. Arima, and Y. Tokura, *Phys. Rev. Lett.*, **96**(2006), 207204.

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