

Neutron scattering study of $\text{Pr}_{0.5}\text{Sr}_{0.5}\text{CoO}_3$

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$\text{Pr}_{0.5}\text{Sr}_{0.5}\text{CoO}_3$ exhibits metal-insulator transition at 230 K. Ferromagnetism is also induced below 230 K. Recently, Mahendiran and Schiffer suggests the existence of antiferromagnetic order below 100K from magnetization measurements.

We have performed neutron diffraction measurements to explore the magnetic order.

We have performed neutron diffraction measurements with the ISSP triple-axis spectrometer HQR installed at the T11 experimental port of JRR-3M in JAEA (Tokai). We prepare the 0.5 cc crystal sample and cooled with a ^4He gas closed-cycle cryostat.

Figure 1 shows powder diffraction patterns of 11 K and 300 K. It indicates that the ferromagnetic order exists in the low temperature. It also indicates that the structural phase transition exists.

Figure 2 shows temperature dependence of ferromagnetic Bragg peak and nuclear peak. It indicates that the ferromagnetic order temperature is 230K and the phase transition temperature, 120 K.

No antiferromagnetic magnetic peak is observed. Nevertheless, the ferromagnetic moments become depressed at 120 K. The structural phase transition may affect magnetic order.

Reference

1) R. Mahendiran *et. al*: Phys. Rev. B **68** (2003) 024427.

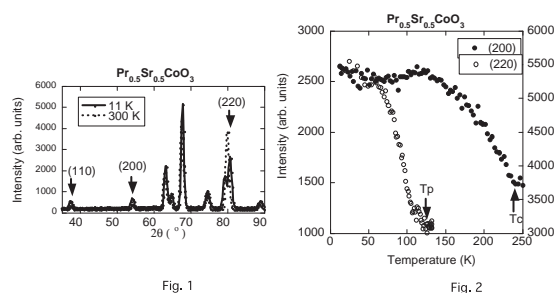


Fig. 1

Fig. 2

Fig. 1. Diffraction pattern (Fig.1) and temperature dependence of Bragg intensity (Fig.2)