Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

X-ray absorption study of the electronic structures of quasi-one-dimensional Co oxides Ca_3CoYO_6 (Y = Co, Rh, Ir, Mn) J. OKAMOTO, D.J. HUANG, H.-J. LIN, C.T. CHEN, National Synchrotron Radiation Research Center, Taiwan, A. FUJIMORI, Univ. of Tokyo, Japan, E.V. SAMPATHKUMARAN, Tata Institute, India — Crystal structures of Sr_3NiIrO_6-type Ca_3CoYO_6 (Y=Co, Rh, Ir, Mn) are characterized by the chains of alternating CoO_6 trigonal prisms and YO_6 octahedra along c-axis. Since these chains form a triangular lattice in ab-plane and interaction between chains is generally anti-ferromagnetic, magnetic frustration is expected to be observed in these compounds. $Ca_3Co_2O_6$ shows ferromagnetic-intrachain ordering and anti-ferromagnteic interchain coupling at 24 K and shows magnetic frustration between chains at 10-24 K. Ca_3CoRhO_6 also shows the same magnetic frustration at 30-90 K. But this magnetic frustration is not observed in Ca_3CoIrO_6 and Ca_3CoMnO_6. Direct information about their electronic structures is necessary to understand the mechanism of their interesting magnetic behavior. We have measured Co $2p$ and O $1s$ x-ray absorption spectra (XAS) of Ca_3CoYO_6 (Y=Co, Rh, Ir, Mn) to study their electronic structures. In the O $1s$XAS spectra large spectral change has been observed in region of 526-528 eV. We will discuss the influence of the trigonal-prism-site Co $3d$ states on the magnetic interaction of Ca_3CoYO_6.

Jun Okamoto
National Synchrotron Radiation Research Center

Date submitted: 01 Dec 2004 Electronic form version 1.4