

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Resonant soft x-ray scattering study of the multiferroicity in TbMn_2O_5 J. OKAMOTO, D. J. HUANG, K. S. CHAO, H.-J. LIN, C. T. CHEN, National Synchrotron Radiation Research Center, Taiwan, C. Y. MOU, National Tsing Hua University, Taiwan, S. PARK, S-W. CHEONG, Rutgers University, USA — TbMn_2O_5 is one of the fascinating multiferroic compounds whose spontaneous polarization can be controlled by applying magnetic field. Neutron diffraction measurements reported that incommensurate-commensurate transition of antiferromagnetic ordering is related to the appearance of ferroelectricity. In order to investigate the relationship between magnetic ordering and ferroelectricity associated with electronic structures of the Mn $3d$ states, we measured soft x-ray resonant magnetic scattering of the single crystalline TbMn_2O_5 with photon energies around Mn $L_{2,3}$ edge. We observed that antiferromagnetic ordering of TbMn_2O_5 with incommensurate propagation vectors $(\frac{1}{2} \pm \delta_x, 0, \frac{1}{4} + \delta_z)$ coexists with antiferromagnetic ordering with a commensurate propagation vector $(\frac{1}{2}, 0, \frac{1}{4})$ in the ferroelectric phase ($22 \text{ K} < T < 37 \text{ K}$). Comparing the temperature dependence of resonant x-ray scattering and the arguments based on symmetry considerations, we discuss the magnetic ordering which leads to the magneto-electric effect in TbMn_2O_5 .

Jun Okamoto
National Synchrotron Radiation Research Center, Taiwan

Date submitted: 26 Nov 2006

Electronic form version 1.4