Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Epitaxially stabilized hexagonal $TbMnO_3$ thin films DAESU LEE, JUNG-HYUK LEE, PATTUKKANNU MURUGAVEL, HYEJIN RYU, TAE WON NOH, ReCOE & FPRD, Department of Physics and Astronomy, Seoul National University, JAE WOOK KIM, HYUNG JIN KIM, KEE HOON KIM, CSCMR, Department of Physics and Astronomy, Seoul National University, YOUNGHUN JO, MYUNG-HWA JUNG, Quantum Material Research Team, Korea Basic Science Institute, JONG-GUL YOON, Department of Physics, University of Suwon, JIN-SEOK CHUNG, Department of Physics and CAMDRC, Soongsil University
— We observed that hexagonal $TbMnO_3$ thin films showed multiferroic properties with enhanced ferroelectricity. The hexagonal $TbMnO_3$ thin film shows 1.6 $\mu C/cm^2$ as the remnant polarization value, which is 20 times larger than that of its orthorhombic bulk phase. In addition, the ferroelectric Curie temperature is shifted to 60 K compared to the low temperature value (27 K) of its bulk orthorhombic phase. Interestingly, the hexagonal $TbMnO_3$ film displayed the emergence of a new antiferroelectric-like phase just above 65 K, which is the first of its kind in the family of multiferroic hexagonal manganites. A clear anomaly in dielectric constant near the antiferromagnetic Neel temperature (T_N $\sim$70 K) shows the possible coupling between the spin and charge degrees of freedom. This is indeed confirmed by the observed second-order magnetoelectric effect below T_N.

Woo Seok Choi
ReCOE & FPRD, Department of Physics and Astronomy, Seoul National University

Date submitted: 03 Dec 2006 Electronic form version 1.4