

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

High Magnetic Field Investigations of Multiferroic RMn₂O₅ (R=Tb, Dy, Bi, and Y) KEE HOON KIM, S. Y. HAAM, J. W. KIM, Y. S. OH, Seoul National University, N. HUR, S. PARK, S.-W. CHEONG, Rutgers University, P. A. SHARMA, N. HARRISON, A. MIGLIORI, NHMFL, Los Alamos National Laboratory — We have systematically investigated electric/magnetic phase diagram of a series of multiferroic crystals RMn₂O₅ (R=Tb, Dy, Bi, and Y) from dielectric constant, electric polarization, and magnetization measurements under intense magnetic fields up to 45 tesla by use of various static and pulsed magnets. Comparative studies of the phase diagram reveal several unprecedented findings: (1) phase evolution of the incommensurate antiferromagnetic Mn d spin ordering and related magneto-dielectric effects up to 33 T, (2) a new high field phase coupled to an incommensurate Mn d spin ordering appearing around 20 T, (3) phase evolution coupled to rare earth f-spin ordering and resultant polarization changes, and (4) significant modification of phase boundaries due to strong d-f spin interaction. Based on the determined electric/magnetic phase diagram, we also discuss how dielectric constant and polarization can be dependent on the commensurate and incommensurate magnetic phases under magnetic field to result in the observed large magneto-dielectric effects.

Kee Hoon Kim
Seoul National University

Date submitted: 30 Nov 2005

Electronic form version 1.4