

Abstract Submitted
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Multiferroics in $\text{Eu}_{1-x}\text{Tb}_x\text{MnO}_3$ system¹ YUNG-YUAN HSU, H.C. HSU, H.C. CHEN, W.Y. TSENG, C.D. YANG, National Taiwan Normal University, H.C. KU, National Tsing Hua University — A low- T phase diagram of the $\text{Eu}_{1-x}\text{Tb}_x\text{MnO}_3$ ($0 \leq x \leq 1$) is reported. Systematic substitution of Tb into the system changes the perovskite lattice structure which further varies the electronic and magnetic behaviors of the system from a paraelectric-canted-AFM to a ferroelectric-spiral-AFM ground state. The Mn^{3+} spins ordered, presumably, in a collinear incommensurate sinusoidal antiferromagnetic structure below $T_N = 52\text{-}45$ K ($x = 0$ to 1). Then system enters a canted-AFM (weak-ferromagnetic) state below T_{cant} for the $x \leq 0.5$ compounds, which decreases from 42 K to 25 K with increasing x . For the $x \geq 0.5$ compounds, ferroelectricity was found below $T_C \sim 28$ K with a presumably spiral spin arrangement as that in TbMnO_3 . At the boundary, $x = 0.5$, the multiferroics coexists with the weak-ferromagnetism. The Rietveld refinement shows an Mn-O2-Mn angle of 145.9° for the $\text{Eu}_{0.5}\text{Tb}_{0.5}\text{MnO}_3$ suggesting a critical Mn-O2-Mn angle of $\sim 146^\circ$ that multiferroics appears at the smaller angle side.

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