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Preparation and properties of single phase $\text{PbTi}_{1-x}\text{Mn}_x\text{O}_3$ perovskites at high Mn concentrations. STANISLAV STOUPIN, CARLO SEGRE, SOMA CHATTOPADHYAY, Physics Division, Illinois Institute of Technology — Recent observation of multiferroic properties in the $\text{PbTi}_{0.5}\text{Fe}_{0.5}\text{O}_3$ perovskite material raises questions about the electronic and structural driving forces causing the coupling between ferroelectric and ferromagnetic properties. It is known that the Jahn-Teller distortion of oxygen octahedra due to d orbital occupancy inhibits formation of the ferroelectric double well potential in ABO_3 perovskites. Thus, the presence of a ferroelectric distortion in d^n magnetic transition metal perovskite oxide is an unexpected result. We report observation of tetragonal structure (XRD) in a similar $\text{PbTi}_{1-x}\text{Mn}_x\text{O}_3$ system. The material is prepared using the sol-gel method with various Mn concentrations. In this study, we access a range of concentrations starting from a relatively high value of $x=0.1$ in order to introduce considerable amount of magnetic sites into the system. Reduction in the tetragonal ratio (c/a) is observed with increase in x as expected. Further characterization of the material involves magnetoelectric measurements and X-ray Absorption Spectroscopy. Preliminary results are discussed.

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