

Abstract Submitted  
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**EXAFS Studies of Multiferroic Pb(Ti,Fe)O<sub>3</sub>** YING ZOU, SOMADITYA SEN, SHISHIR RAY, MARK WILLIAMSEN, University of Wisconsin-Milwaukee, USA, TOMOHIRO SHIBATA, SOMA CHATTOPADHYAY, Illinois Institute of Technology, USA, MALI BALASUBRAMANIAN, APS-Argonne National Laboratory, USA, PRASENJIT GUPTASARMA<sup>1</sup>, University of Wisconsin-Milwaukee, USA — Recent suggestions [1] of multiferroic behavior in Pb(Ti,Fe)O<sub>3</sub> has revived an interest in this text-book ABO<sub>3</sub> type ferroelectric material. Here, we study the effect of Fe-substitution on the local structural and chemical environment of the parent PbTiO<sub>3</sub> phase. We have carried out extended x-ray absorption fine structure (EXAFS) measurements at the Fe-K, Ti-K and Pb-LIII edge at the Advanced Photon Source, on a series of single phase samples of PbTi<sub>1-x</sub>Fe<sub>x</sub>O<sub>3</sub> (0 < x < 0.5) synthesized using a sol-gel technique. The near edge fine structure (XANES) reveals that Fe cations are trivalent. A fascinating new result is the observation of charge disproportionation of Pb into Pb<sup>2+</sup> and Pb<sup>4+</sup>, likely a result of charge redistribution arising from Fe<sup>3+</sup> substitution. Radial distribution function (RDF) study of EXAFS spectra from the Ti-K edge and the Fe-K edge confirms that Fe substitutes Ti up to x=0.5. 1. Palkar et al, Appl. Phys. Lett. 90(2007)172901.

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