

PbZr_{1-x}Ti_xO₃ BY SOFT SYNTHESIS: A STRUCTURAL POINT OF VIEW

Swapan Kumar Pradhan^{1#}, Milen Gateshki¹, Markus Niederberger^{2,3}, Yang Ren⁴ and Valeri Petkov^{1*}

¹Department of Physics, Central Michigan University, Mt. Pleasant, MI 48859, USA

²Colloid Chemistry, Max Planck Institute of Colloids and Interfaces, Research Campus Golm, 14424 Potsdam, Germany

³Department of Materials, ETH Zurich, Wolfgang-Pauli-Str. 10, 8093 Zurich, Switzerland

⁴Advanced Photon Source, Argonne National Laboratory, Argonne, Illinois 60439, USA

#On leave from Department of Physics, The University of Burdwan, Burdwan, India.

The structural aspects of a soft synthetic route employed to obtain fine crystallite PbZr_{1-x}Ti_xO₃ (x=0,0.5,1) powders are revealed by total x-ray diffraction and atomic Pair Distribution Function analysis. It is found that the atomic-scale structure of the intermediate, highly disordered phase the route passes through resembles but is not exactly of the targeted, perovskite-type structure. It is suggested that future synthesis efforts are directed toward closing the observed “structure gap” as much as possible.

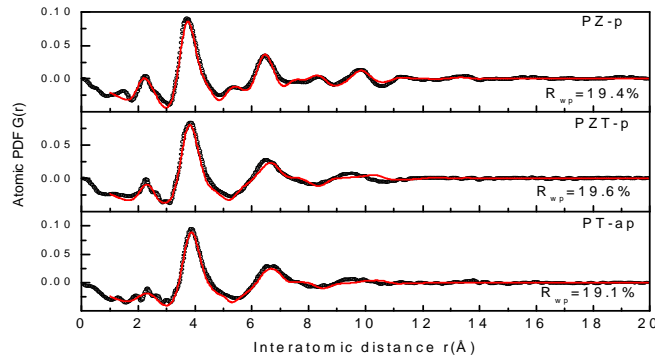


Figure 1 : PDF analysis of precursor powders of PbZr(1-x)Ti(x)O₃ (x=0,0.5,1)

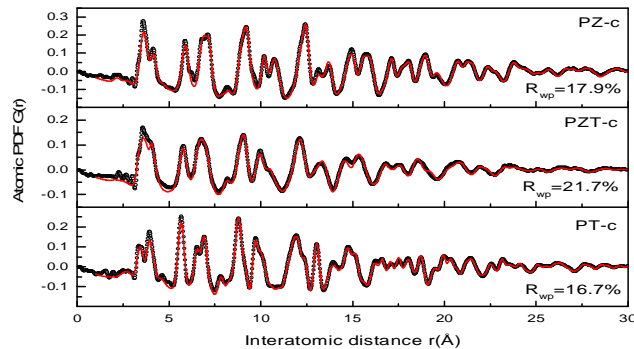


Figure 2. PDF analysis of nanocrystalline PbZr(1-x)Ti(x)O₃ (x=0,0.5,1)