

W0348

Pressure Dependence of Tolerance Factor of $\text{Sr}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$. R. Kiyanagi, O. Chmaissem, B. Dabrowski, J.D. Jorgensen, J.W. Richardson, J. Fieramosca, IPNS ANL, Argonne, IL 60439, Dept. of Physics, Northern Illinois Univ., Dekalb, IL 60115, MSD ANL, Argonne, IL 60439.

$\text{Sr}_{1-x}\text{Ca}_x\text{MnO}_3$ is one of the ABO_3 type perovskite compound which has been investigated intensively. A previous work on this material demonstrated that a magnetic phase transition at low temperature and structural changes due to the size of the A-site ion are describable by a tolerance factor which is a function of Sr/Ca-O and Mn-O bond lengths. Thus this factor is considered an important parameter to predict a stable structure when synthesizing a new perovskite compound. In order to study a pressure dependence of the tolerance factor of $\text{Sr}_{0.7}\text{Ca}_{0.3}\text{MnO}_3$, neutron powder diffractions were carried out under high pressure. We found that the tolerance factor is pressure independent within the applied pressure (up to 5.5 Kbar). However the pressure dependencies of Sr/Ca-O and Mn-O bond lengths differ relative to each other. According to Sr/Ca-O bond the change in length corresponds to a temperature change by 50 K while change in Mn-O bond length corresponds to a change by 120 K. In a low temperature antiferromagnetic phase it was revealed that the spin moment lies in the a - b plane instead of along the c -axis. Work at ANL supported by the U.S. DOE, BES--Materials Sciences, under Contract W 31-109-ENG-38.