

Phase Transformations in the lead-containing perovskites by the neutron and X-ray scattering

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For at least 50 years the lead-containing perovskites, namely relaxor ferroelectrics ($\text{PbMg}_{1/3}\text{Nb}_{2/3}\text{O}_3$ - PMN and similar) and antiferroelectric/ferroelectric solid solutions ($\text{PbZr}_{1-x}\text{Ti}_x\text{O}_3$ - PZT and similar) are the most important and widely used ferroelectric, piezoelectric and electrostrictive materials. Their unique properties are often attributed to the electronic structure of the Pb^{2+} ion forming in these compounds lone electron pair. First experimental prove was obtained by the Egami group by performing the PDF analysis of the local structure of the lead containing perovskites [1].

In the report that will be presented at the workshop we are going to discuss several static and dynamic features of the lead containing perovskites concentrating on the PZT solid solutions. In particular the details of the formation of the modulated structure and low-x compounds will be discussed. The results of the critical dynamics study using X-ray inelastic scattering technique will be shown.

1. The details of the pioneering studies and the comprehensive discussion of the technique can be found in the book: Egami, T.; Billinge, S. J. L.: *Underneath the Bragg-Peaks: Structural Analysis of Complex Materials*. Elsevier Science B.V. Amsterdam 2002.