

Insights to Ferroelectric Perovskites by Diffuse Scattering Techniques

J. Hlinka*

Department of Dielectrics, Institute of Physics, Czech Acad. Sci.
Na Slovance 2, Prague 8, Czech Republic, CZ 182 21

* hlinka@fzu.cz

Properties and applications of ferroelectric perovskites will certainly belong to major subjects of the 2017 ISAF/IWATMD/PFM conference. In crystalline materials, the diffuse scattering techniques are typically employed to characterize the structural deviations from the average crystal periodicity. Some of such structural deviations are reflecting physical mechanisms, responsible for the functional properties of ferroelectric perovskites.

In this tutorial presentation, aimed to review the field and to facilitate a broader discussion of most recent related achievements, I intend to cover the following subjects:

1. Basic aspects X-ray and neutron scattering, elastic and inelastic scattering, typical experimental possibilities at currently operating large scale facilities
2. Our understanding to ferroelectricity in perovskites, challenges, motivation for diffuse scattering experiments
3. Basic concepts for interpretation, types of disorder, thermal diffuse scattering, critical scattering, complementary theoretical approaches.
4. Diffuse scattering in classical perovskite ferroelectrics and antiferroelectrics with ABO_3 formula.
5. Diffuse scattering in relaxor ferroelectrics.
6. Perspectives and challenges for future studies.