Temperature- and Pressure-dependent X-ray Diffraction on A-site Doped Lead Scandium Niobate

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High-resolution powder and synchrotron-based single crystal X-ray diffraction studies in a wide temperature range on the A-site doped perovskite-type relaxor-ferroelectrics $Pb_{1-x}A_xSc_{0.51}Nb_{0.49}O_3$ (A_x = $Ba_{0.07}$, $Bi_{0.06}$) are presented. The temperature evolution of the pseudo-cubic lattice parameter reveal structural phase transformations near 450-550 K associated with coupling of polar nano-regions (PNR).
Further, pressure-induced structural changes are compared to the temperature-driven phase transformations. High pressure single crystal X-ray diffraction analysis was applied at room temperature in the pressure range up to 8 GPa. The pressure dependence of the volume compressibility reveals structural phase transformations around 4 GPa in both compounds due to a pressure-induced decrease in the correlation length of PNR.
Complementary polarized Raman spectroscopy data in the same temperature and pressure range will be presented to complete the structural picture on a local scale.

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