Local Order in the PSN, PST and PSNT Ferroelectric Relaxors

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Diffuse X-ray scattering studies were performed for as grown $Pb(Sc_{0.5}Nb_{0.5})O_3$ - PSN, $Pb(Sc_{0.5}Ta_{0.5})O_3$ - PST and $Pb(Sc_{0.5}Nb_{0.2}Ta_{0.3})O_3$ - PSNT which belong to the ferroelectric relaxors family of complex $Pb(B^{3+}_{0.5}B^{5+}_{0.5})O_3$ perovskites in which the degree of order could be controlled by the thermal history [1]. In the disordered state the ferroelectric relaxors consist of a nonpolar matrix (*Pm3m* space group) that contains nanosize chemical domains and polar nanodomains [2,3]. The crystal structures of PSN, PST and PSNT were studied on single crystals at several temperature points in the range from 300 to 550 K by means of a four-circle single crystal diffractometer equipped with CCD area detector. Diffuse streaks and superstructure reflections were found in PSN, PST and PSNT crystals. The diffraction patterns of the disordered structures for the relaxors of the 1:1 composition were simulated using the DISCUS program [4] and compared with those obtained experimentally.

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