

Abstract Submitted
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Neutron Diffuse Scattering in Pure and Ba-Doped Single Crystals of the Relaxor NBT¹ WENWEI GE, CHRISTOPHER DEVREUGD, Virginia Tech, DANIEL PHELAN², PETER GEHRING, National Institute of Standards and Technology, QINHUI ZHANG, Chinese Academy of Sciences, Shanghai Institute of Ceramics, MUHTAR AHART, Carnegie Institution of Washington, JIEFANG LI, HAOSU LUO, DWIGHT VIEHLAND, Virginia Tech — We report neutron diffuse scattering measurements on the lead-free relaxors $\text{Na}_{1/2}\text{Bi}_{1/2}\text{TiO}_3$ (NBT) and NBT doped with 5.6% BaTiO_3 , a composition that is located close to the morphotropic phase boundary. The diffuse scattering in NBT appears on cooling near 700 K, which coincides with the temperature at which the dielectric constant deviates from Curie-Weiss behavior. Strong, anisotropic diffuse scattering intensity is observed near the (100), (110), (200), (220), and (210) Bragg peaks. The reciprocal space distribution of the diffuse scattering is consistent with the presence of competing rhombohedral and tetragonal short-range structural correlations. Doping NBT with 5.6% BaTiO_3 reduces the correlation length associated with the tetragonal order by a factor of 10 while simultaneously enhancing the piezoelectric properties.

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