

Supplemental Material

Local strain heterogeneity and elastic relaxation dynamics associated with relaxor behaviour of single crystal $\text{Pb}(\text{In}_{1/2}\text{Nb}_{1/2})\text{O}_3\text{-PbZrO}_3\text{-Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3\text{-PbTiO}_3$ perovskite

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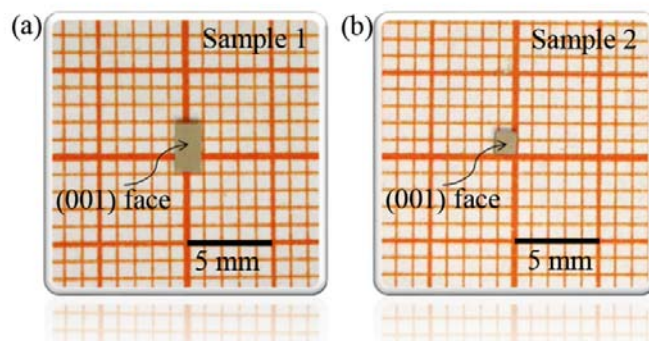


FIG. S1. Photographs of as-prepared $[001]_C$ PIN-PZ-PMN-PT single crystals, (a) Sample 1, (b) Sample 2.

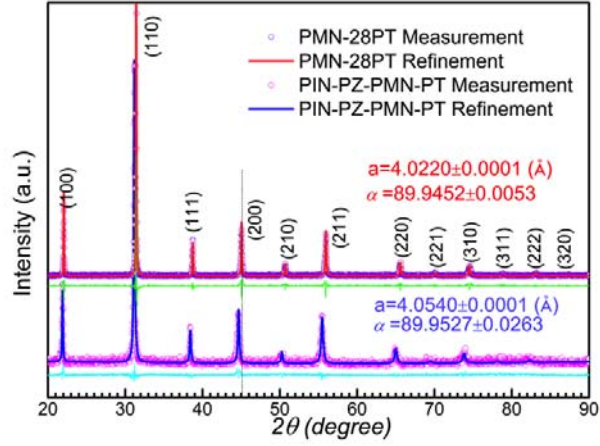


FIG. S2. Powder X-ray diffraction patterns of PIN-PZ-PMN-PT and PMN-28PT collected at room temperature. Both have a rhombohedral structure but the distortion from cubic lattice geometry is below the limit of resolution.

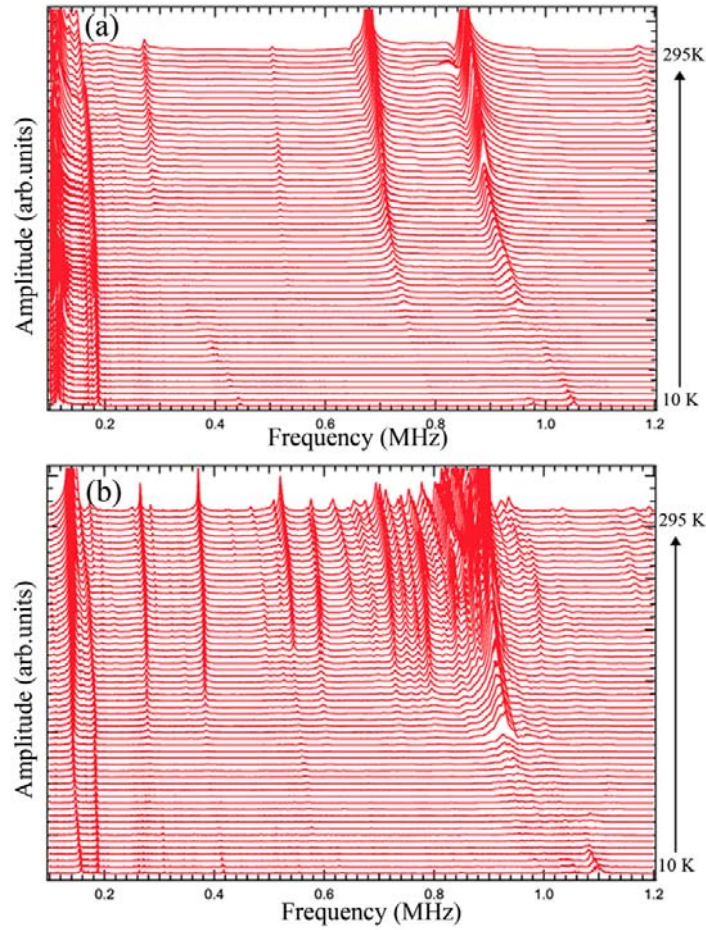


FIG. S3. Low temperature RUS spectra for (a) $[001]_c$ PIN-PZ-PMN-PT and (b) $[001]_c$ PMN-28PT relaxor single crystals.

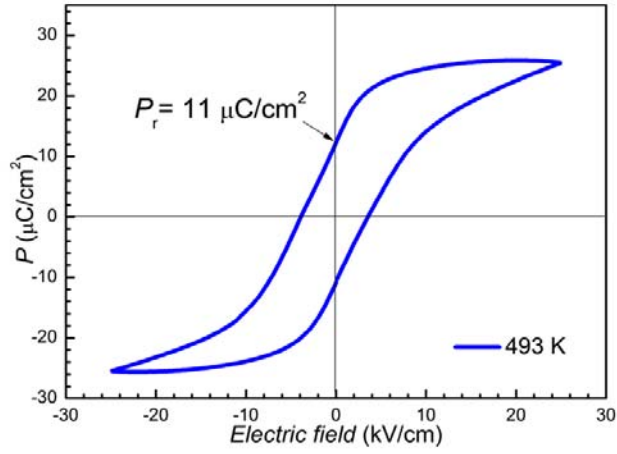


FIG. S4. Bipolar polarization hysteresis loop pattern of the $[001]_c$ PIN-PZ-PMN-PT single crystal at 493 K.

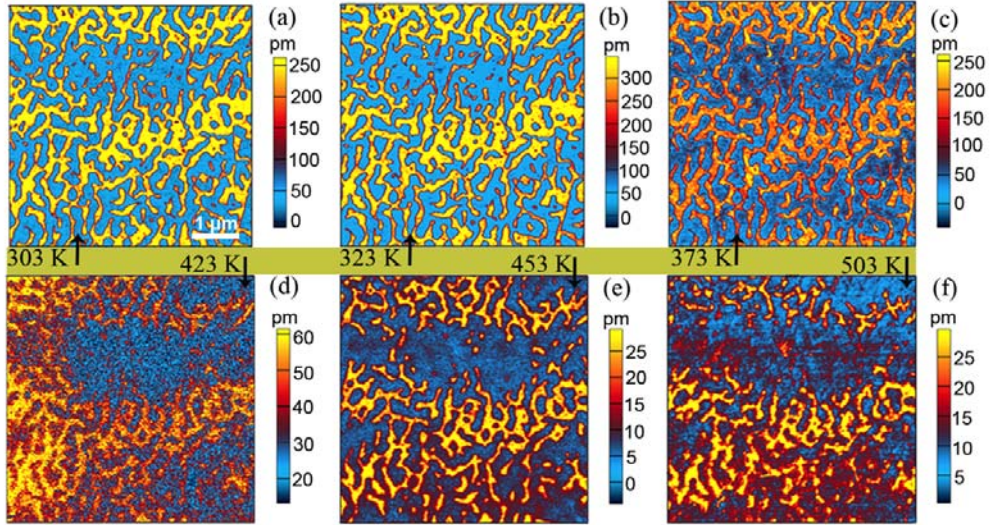


FIG. S5. Temperature dependent amplitude images of $[001]_c$ PIN-PZ-PMN-PT single crystal obtained by PFM.

Inspection of PFM amplitudes shows that the domain walls have no significant variation ahead of the R-T phase transition, which is consistent with the interpretation of the phase images in terms of collapse occurring within the mesoscopic domain structures. At 423 K, domain walls became vague and the local piezoresponse decreased, which is attributed to the formation of macroscopic domains in the T phase. On subsequent heating, it is clearly seen that 180° domain walls reappeared.