Supplementary Material:

Emerging antiferroelectric phases with fascinating dielectric, polarization and strain response in $NaNbO_3$-$(Bi_{0.5}Na_{0.5})TiO_3$ lead-free binary system

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Table S1 Refined structural parameters by using the Rietveld method for poled (1-*x*)NN-*x*BNT ceramics measured at room temperature.

x	Space group	Lattice parameters	V (Å^3)	R_{wp} (%)	R_p (%)	χ^2
0	*Pm*	a=7.8289(2) Å, b=7.7626(3) Å, c=7.8245(2) Å, α=γ=90°, β=90.097(4)°	475.523(18)	7.99	6.52	1.94
0.05	*Pm* (19%) *P2$_1$* (81%)	a=7.8164(2) Å, b=7.7834(1) Å, c=7.8101(1) Å, α=γ=90°, β=90.056(2)° a=5.4971(1) Å, b=15.5689(3) Å, c=5.5501(1) Å, α=γ=90°, β=90.046(2)°	475.145(21) 475.016(16)	8.31	6.22	1.81
0.1	*P2$_1$*	a=5.4954 (1) Å, b=15.5726(1) Å, c=5.5477(1) Å, α=γ=90°, β=90.045(2)°	474.761(12)	8.23	5.92	1.63
0.15	*P2$_1$*	a=5.4950(2) Å, b=15.5800(3) Å, c=5.5450(2) Å, α=γ=90°, β=90.043(1)°	474.741(15)	9.03	6.81	1.90
0.16	*Pbma* (15%) *Pnma* (85%)	a=5.5379(2) Å, b=15.5448(8) Å, c=5.5040(2) Å, α=β=γ=90° a=7.7892(6) Å, b=7.7906(4) Å, c=23.3803(9) Å, α=β=γ=90°	473.824(48) 1418.786(97)	9.51	7.24	1.83
0.18	*Pnma*	a=7.7810(4) Å, b=7.7880(5) Å, c=23.3955(9) Å, α=β=γ=90°	1417.744(90)	8.83	6.79	1.67

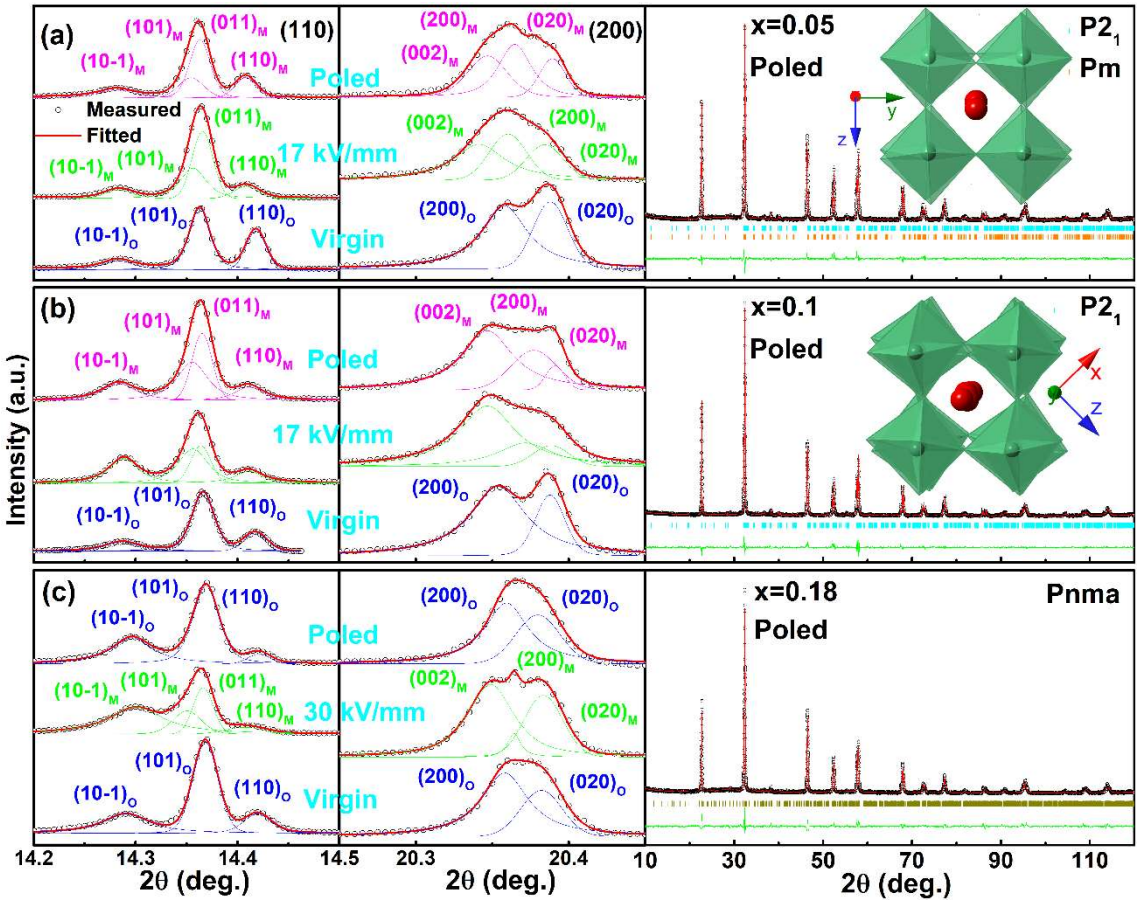

Fig. S1. Evolution of *(110)*$_C$ and *(200)*$_C$ reflections under various electric fields and Rietveld refinement of poled ceramic powders for the (a) x=0.05, (b) x=0.1 and (c) x=0.18 samples. The insets of (a) and (b) are the crystal structure models of *Pm* and *P2*$_1$ space groups, respectively, showing the tilt of oxygen octahedra along *[010]*$_C$.

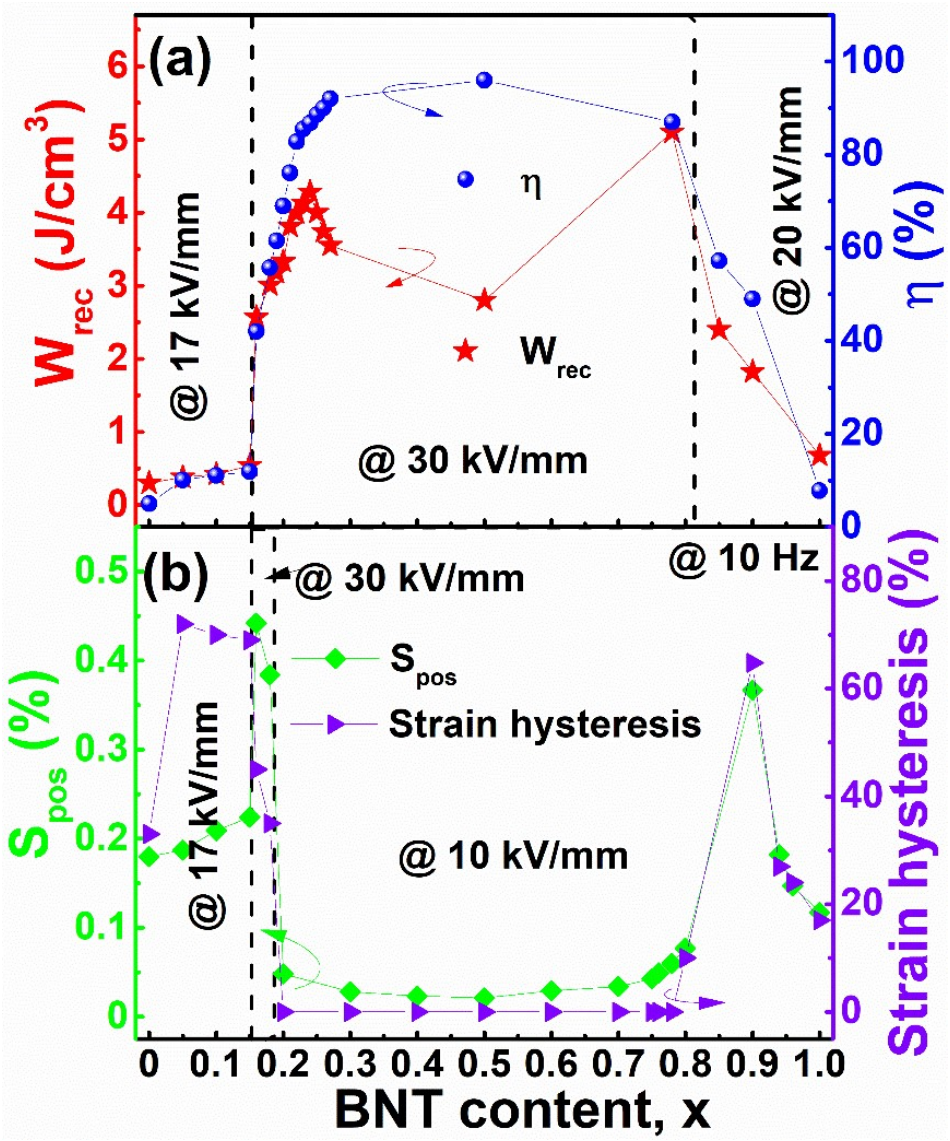

Fig. S2. (a) Energy storage and (b) electrostrain behaviors of NN-BNT ceramics.