

## Supplementary Materials

### **High capacitive energy-storage in BNT-based Pb-free relaxors via dispersing strong long-range polarization within expanded lattice framework**

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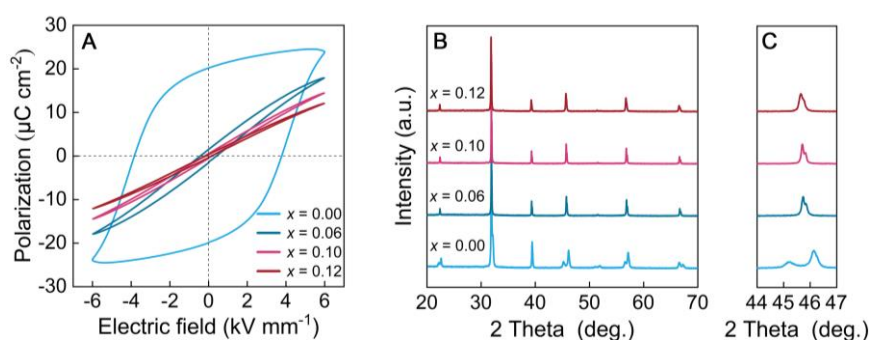
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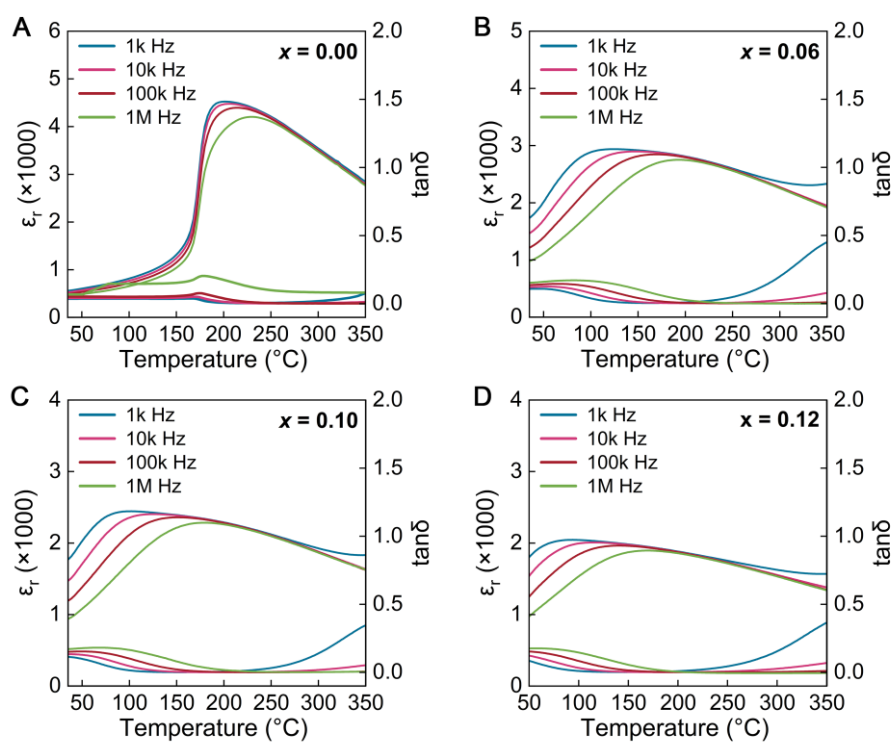
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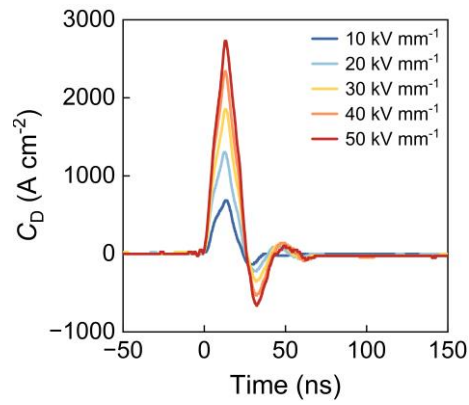
## 1. Supplementary Figures



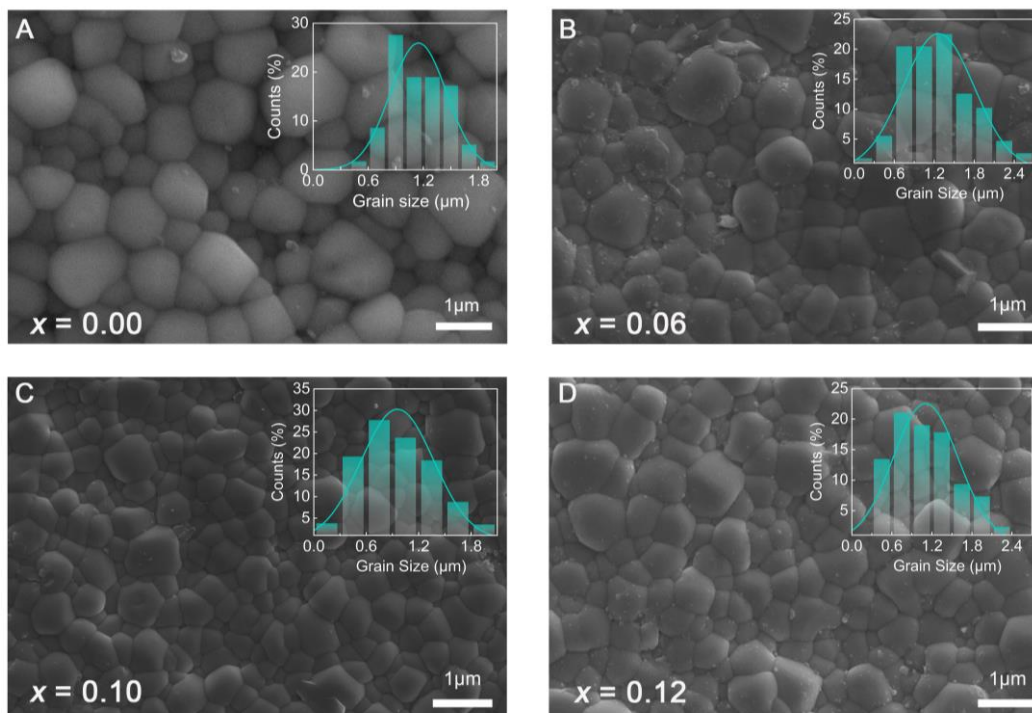
**Supplementary Figure 1.** Ferroelectric hysteresis loops and XRD patterns of BNT-BT- $x$ BS ceramics. (A) Bipolar  $P-E$  loop under an electric field of at room temperature at 1Hz, (B) XRD patterns at room temperature, (C) Magnified  $\{200\}$  diffraction peaks.



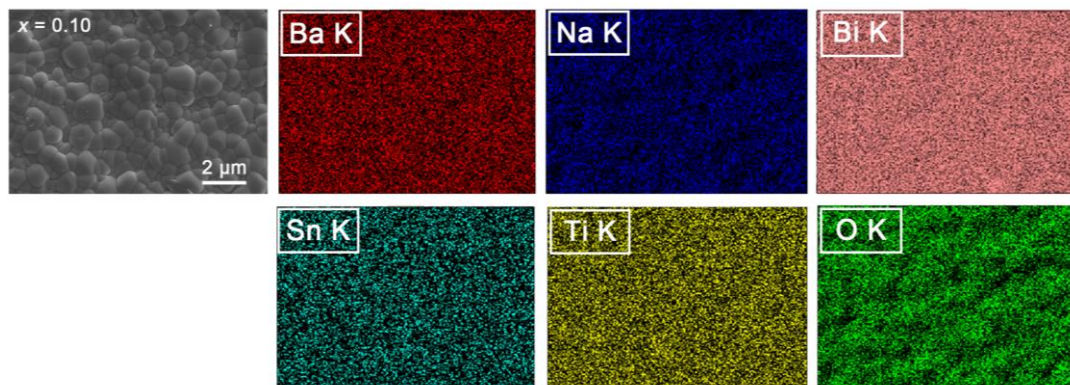
**Supplementary Figure 2.** Dielectric permittivity as a function of temperature of BNT-BT- $x$ BS ceramics: (A)  $x = 0$ , (B)  $x = 0.06$ , (C)  $x = 0.10$ , (D)  $x = 0.12$ .



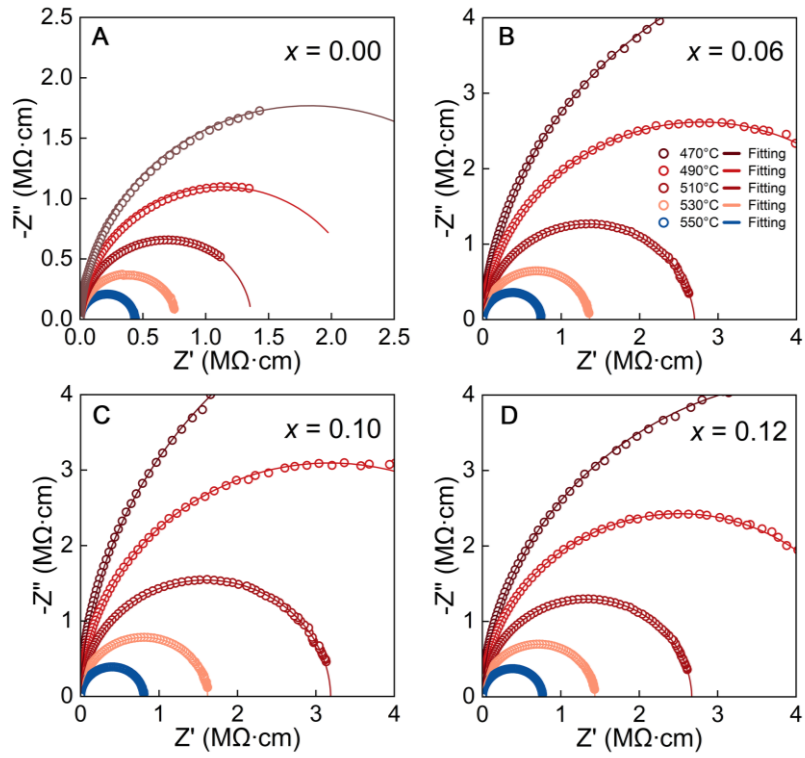
**Supplementary Figure 3.**  $C_D$  under different electric fields of BNT-BT-0.1BS.



**Supplementary Figure 4.** SEM micrographs of the as-sintered surfaces for BNT-BT- $x$ BS ( $x = 0, 0.06, 0.10, 0.12$ ) samples. The insets show the grain size distributions.



**Supplementary Figure 5.** SEM surface morphology of BNT-BT-0.1BS and the corresponding element mapping of BNT-based ceramics.



**Supplementary Figure 6.** Impedance profiles at different temperatures of BNT-BT- $x$ BS: (A)  $x = 0$ , (B)  $x = 0.06$ , (C)  $x = 0.10$ , (D)  $x = 0.12$ .