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Electronic Supplementary Information

















Figure S1. Polarization hysteresis loops (*P*-*E*), current curves (*I*-*E*), bipolar strain curves and unipolar strain curves (*S*-*E*) of 100(1-x-y)BNT-100xBT-100yKNN ($0 \le x \le 0.12$, $0 \le y \le 0.12$), where "94-4-2" in the graph represents that the molar proportions of BNT, BT and KNN were 0.94, 0.04 and 0.02, respectively, and the same below.













2.5





















Figure S2. The temperature-dependence of the dielectric constant and loss tangent for the poled 100(1-x-y)BNT-100xBT-100yKNN ($0 \le x \le 0.12, 0 \le y \le 0.12$) samples under the frequency from 100 Hz to 1 MHz, where "94-4-2" in the graph represents that the molar proportions of BNT, BT and KNN were 0.94, 0.04 and 0.02, respectively, and the same below.



Figure S3. Vertical phase images of the (a) 96BNT-2BT-2KNN; (b) 91BNT-7BT-2KNN; (c) 89BNT-9BT-2KNN; (d) 91BNT-4BT-5KNN; (e) 89BNT-6BT-5KNN ceramics; (f) the schematic sketch of corresponding compositions.