Support Information

Fig. S1 (a) The ε_r-T curves of (1-x)KNN-xBLZ ceramics measured between -120-200 °C; (b) The XRD patterns of (1-x)KNN-xBLZ ceramics with different x contents; (c-f) The Rietveld refinement on XRD patterns of x = 0.02, x = 0.025, x = 0.03 and x = 0.04 samples.
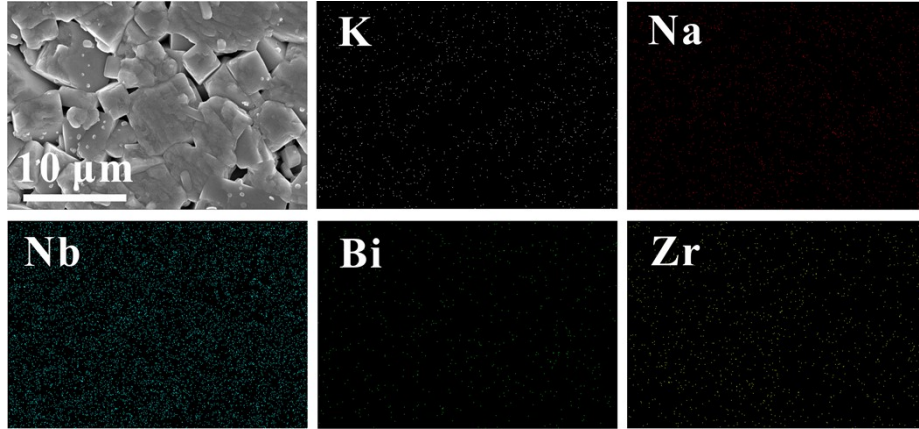
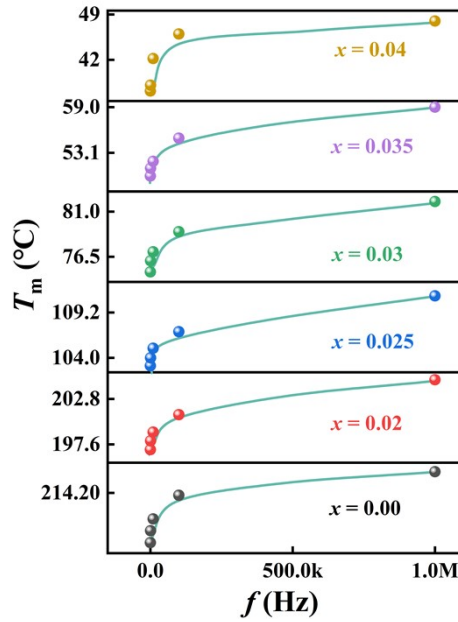**Fig. S2** The SEM photo and element mapping of $x = 0.035$ sample.

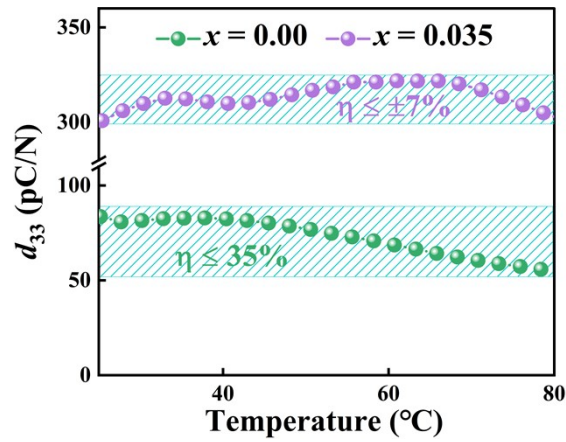**Fig. S3** Vogel-Fulcher fitting curves of (1-x)KNN-xBLZ ceramics.

Fig. S4 The d_{33} as a function of temperature for $x = 0.00$ and $x = 0.035$.
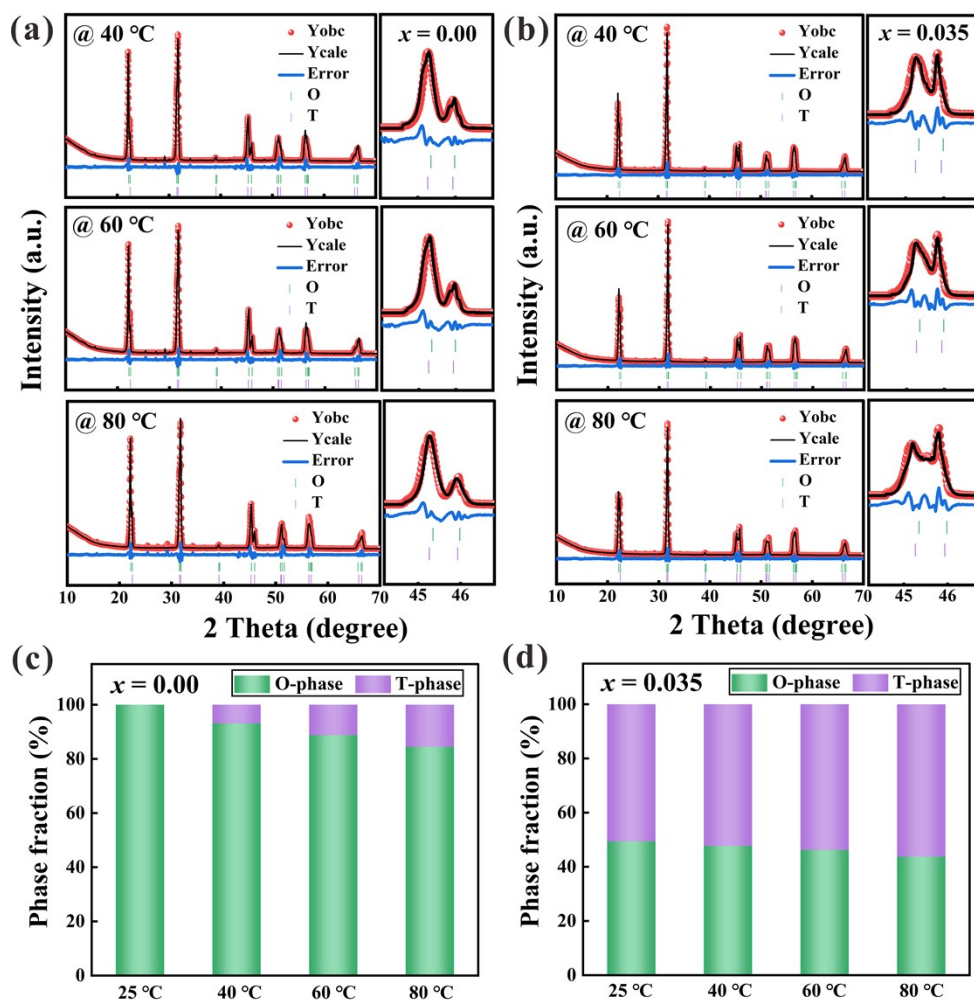
Fig. S5 (a-b) The Rietveld refinements on XRD patterns of $x = 0.00$ and $x = 0.035$ samples at the temperature range of 40-80 ℃; (c-d) The corresponding phase composition of $x = 0.00$ and $x = 0.035$ samples under variable temperature condition.
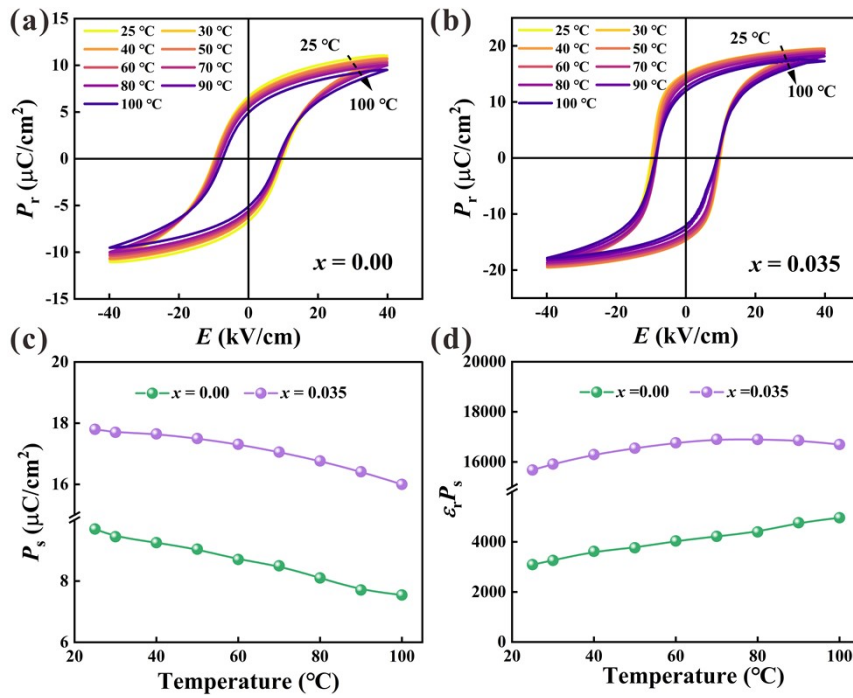
Fig. S6 (a-b) The variable temperature P-E loops of $x = 0.00$ and $x = 0.035$ samples; (c-d) The P_s and $\varepsilon_r P_s$ as a function of temperature for $x = 0.00$ and $x = 0.035$.
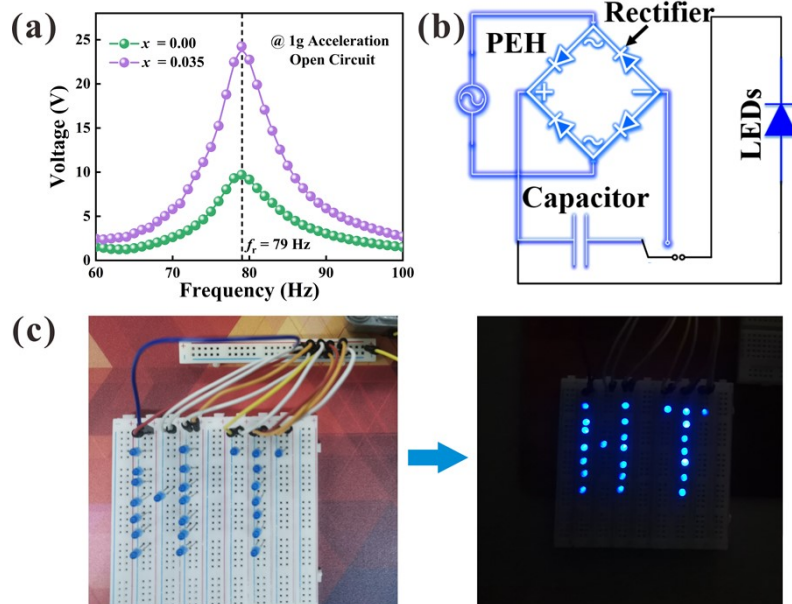

Fig. S7 The relationship between the open circuit voltage and frequency of the cantilever PEH prepared by the $x = 0.00$ and $x = 0.035$ samples; (b) The schematic of the charging-discharging circuit integrated with a full-wave rectifying bridge; (c) The 24 LEDs lit up by the electrolytic capacitor charged with $x = 0.035$ PEH at 80 °C.