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# The Structural Origin of Enhanced Energy Harvesting Performance in Piezoelectric Perovskite

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## Abstract

Energy harvesting, which can translate the wasted vibration energy into electric energy, is now a hot topic in the field of new energy, and the key point is to design high power piezoelectric ceramic according with the requirements of low-frequency vibration energy harvesting. In this study, high quality Co-modified 0.2Pb(Zn<sub>1/3</sub>Nb<sub>2/3</sub>)O<sub>3</sub>–0.8Pb(Zr<sub>0.50</sub>Ti<sub>0.50</sub>)O<sub>3</sub> (PZN–PZT+Co) ceramics have been prepared by the two-stage method, and the energy harvesting characteristics were investigated. The results showed that the hierarchical nanodomain structure boosts the strong piezoelectric activity, leading to the high energy harvesting performance. The PZN–PZT+Co ceramic sintered at 1000 °C exhibits an excellent  $d_{33} \times g_{33}$  value of  $14080 \times 10^{-15} \text{ m}^2/\text{N}$ , which are much larger than that of commercial PZT-based ceramics. In the mode of the cantilever-type energy harvester, the output voltage and energy density of 33 V,  $4.4 \mu\text{W}/\text{mm}^3$  were obtained at a low resonance frequency of

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