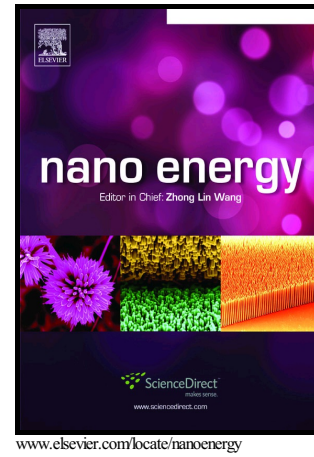


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# Effective Polarization of Ferroelectric Materials by Using a Triboelectric Nanogenerator to Scavenge Wind Energy

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## ABSTRACT

Effective polarization of ferroelectric materials can be achieved by utilizing a conventional high-voltage polarization equipment with a high voltage but a large volume. Here, we report that the polarization of a ferroelectric BaTiO<sub>3</sub> material can be realized by using a triboelectric nanogenerator (TENG) to scavenge ambient wind energy, where the TENG is ideal for providing a higher voltage, a smaller current, and especially a smaller volume. Both the output voltage and current signals of TENG can be adjustable by controlling different wind speeds, where the TENG can deliver an output voltage pulse (<10 ms in period) of about 1000 V and an output current pulse of smaller than 100  $\mu$ A under a wind speed of about 14 m/s. A piezoelectric constant of larger than 150 pC/N and a pyroelectric constant of larger than 14 nC/cm<sup>2</sup>K were achieved by using a TENG to polarize the ferroelectric BaTiO<sub>3</sub> material. A handheld TENG can be also utilized to polarize the ferroelectric material, demonstrating the possibility of obtaining small-scale high-voltage polarization equipments.

## TOC

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