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Triboelectric Nanogenerator from Inversely Polarised Ferroelectric Contacting Layers

Andris Šutka[1*]

[1] *Research Laboratory of Functional Materials Technologies, Faculty of Materials Science and Applied Chemistry, Riga Technical University, Paula Valdena 3/7, 1048 Riga, Latvia.*
andris.sutka@rtu.lv

Triboelectric nanogenerators (TENG) are mechanical energy harvesting devices that have the potential to satisfy energy needs in portable electronics, sensors and implantable medical devices.[1] TENG is made from electrodes, covered with layers of triboelectrically active materials. Friction between contacting surfaces during oscillatory motion of electrodes produces electrification, electrostatic induction and current between the electrodes.

We have reported recently that more efficient TENG-like devices can be prepared using inversely polarized ferroelectric films as the contacting layers.[1] The electrostatic induction in these TENG devices is driven by piezoelectric charges. We are demonstrating here clear correlation between piezoelectric response of inversely polarized ferroelectric films and the performance of TENG device from these films. Layers with higher intrinsic piezoelectricity allow observing higher output of TENG. The using of PVDF/$BaTiO_3$ nanocomposite films with high intrinsic polarisation allow us to reach three-fold higher open circuit voltages (2.2 kV V from 5 cm^2) than state of the art TENG (Figure 1).

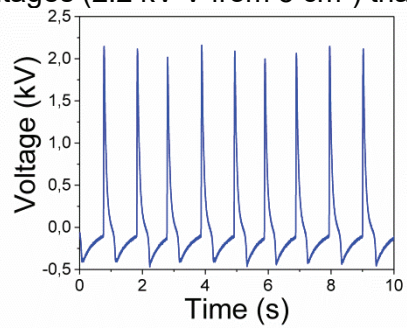

Figure 1. Output open circuit voltage of TENG based on inversely polarised PVDF/$BaTiO_3$ nanocomposite contacting layers (5 cm^2).

References:

1. A. Šutka, K. Mālnieks, A. Linarts, M. Timusk, V. Jurķāns, I. Gorņevs, J. Blūms, A. Bērziņa, U. Joost, M. Knite, *Energy Environ. Sci.*, **2018**, *11*, 1437-1443.