Researchers Develop Lever-inspired Triboelectric Nanogenerator with Ultra-high Output for Pulse Monitoring

2022-06-02

Researchers have proposed a new strategy aimed at increasing the charge transfer speed, which provides new paths for improving the output signal. They developed a lever-inspired contact separation TENG (Li-TENG).

Triboelectric nanogenerators (TENGs) can collect mechanical energy extensively through contact initiation and electrostatic induction. TENGs have shown a wide range of applications in self-powered sensors and mechanical energy harvesting.

The contact-separation mode is one of the most fundamental and common modes of working. Previous studies have made efforts for improving output signal of contact-separation TENGs.

Recently, researchers from the Institute of Mechanics and Beijing Institute of Nanoenergy and Nanosystems of the Chinese Academy of Sciences have proposed a new strategy aimed at increasing the charge transfer speed, which provides new paths for improving the output signal. They developed a lever-inspired contact separation TENG (Li-TENG).

Related results were published in Nano Energy.

By varying the lever ratio to change the contact separation velocity, the signal output can be significantly increased without changing the charge transfer amount.

To accommodate the unique rotational motion of the lever, the researchers designed the upper friction layer in the curved shape and investigated the electrical and mechanical

properties of the curved-shaped friction layer under different compression strains.

They found that when the magnification was increased from 22 to 50 times, the voltage of Li-TENG increased from 91 to 232 V and the maximum power from 83 to 1031 μW.

As self-powered pulse sensor, the Li-TENG measured a pulse signal as high as 12.3 V without surface microstructure treatment.

This work demonstrates a new strategy which has the potential for improving the signal of contact-separation TENG-based self-powered sensors and energy harvesting devices.

Read the original article on Chinese Academy of Sciences (CAS).