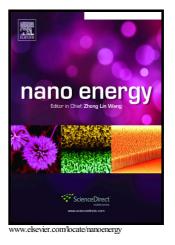
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Self-powered transparent glass-based single electrode triboelectric motion

tracking sensor array

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Abstract:

Α single electrode triboelectric generator (SETEG) is developed with glass-based polydimethylsiloxane (PDMS) as the negative material. Its performance under different contact forces, frequencies and spacers is investigated in detail. The SETEGs have higher electric output under higher contact force, frequency and spacer, and show better performance with a thinner glass layer at lower humidity condition. An open circuit voltage, short circuit current and power up to 318 V, 8.3 µA and 427 μ W are obtained for a SETEG of 5×5 cm² size. Based on the study, a tracking sensor array consisting of nine 5×5 mm² SETEGs is proposed and developed. A LabVIEW-based automatic measurement system is also developed to record, process and display the real-time output voltages of the sensing array. Results show that an output voltage up to 4 V can be easily generated when a PDMS-covered stylus touches/slides the sensor array, and the output voltages from different sensors are independent from each other. This work demonstrates the great application potential of the SETEGs sensor array for self-powered detection, tracking or monitoring motion or a touch of a stylus or some objects, thus would be very useful for touch screen display, handheld tracking device, domestic security, traffic monitoring etc.

Graphical abstract

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