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## Pulse Sensor Based on Single-Electrode Triboelectric Nanogenerator

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### Highlights:

- A pulse sensor based on a single-electrode triboelectric nanogenerator (TENG) with simple device structure demonstrated its capability of monitoring pulse.
- The typical human radial artery pressure wave including an incident wave and two reflected waves is successfully observed in the output signal.
- The trench structure and its dimension are proved to be critical for the sensitivity of the pulse sensor.
- Due to the simple device structure, the stability of the device is verified through 2500 times of cycling test.

### Abstract

A self-powered pulse sensor based on single-electrode triboelectric nanogenerator is reported in this work. The device has simple device structure: a PET film with ITO coating layer stacking with a thin polydimethylsiloxane (PDMS) film with a trench structure. The surface of PDMS film is negatively charged through triboelectric effect with the acrylic mould. The typical human pulse presenting the radial artery pressure wave is successfully extracted from the output pulse signal. The incident wave and two reflected waves are clearly shown in the output signal. The radial artery augmentation index  $AI_r$  and the time difference between two peaks  $\Delta T_{DVP}$  used to diagnose arterial stiffness are gained and it's consistent with the typical medical value. The correlation between the structure parameters and the output signal

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