Sliding-Mode Triboelectric Nanogenerator using Fractal-Patterned Flexible Electrode

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Inspired by energy harvesting for self-powered flexible microsystems, triboelectric nanogenerators (TENGs) have been lately developed as a highly efficient, cost-effective and robust approach to generate electricity from mechanical movements and vibrations on the basis of the coupling between triboelectrification and electrostatic induction. Here, we present a sliding-mode TENG with hierarchically designed fractal patterns via contact-sliding mode between two contacting surfaces. It consists of a layer of silicon rubber and a layer of silver/silicon rubber composite film that acts as the electrode. By stretching and releasing the electrode, the changes of triboelectric charge distribution/density on the polymer surface relative to the silver surface induce alterations to the electrical potential, leading to an alternating charge flow between the aluminum electrode and the ground. The reported TENG provides a new strategy for fabricating self-powered stretchable and wearable devices.