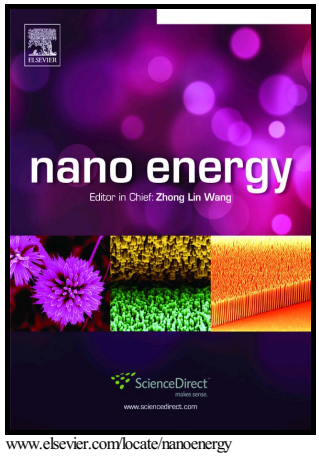

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Stretchable 3D Polymer for Simultaneously Mechanical Energy Harvesting and Biomimetic Force Sensing

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Abstract

Stretchability is an essential element for wearable electronics. Creating intelligent devices using stretchable polymers, which can simultaneously harvest mechanical energies and mimic the properties of fast adapting (FA) receptors, could be of significant importance for plastic bioelectronics and transistors. In this paper, we report an all-organic triboelectric nanogenerator (TENG) that enables both energy harvesting and biomimetic pressure sensing on the base of three-dimensional polypyrrole (PPy) network. By combining with polydimethylsiloxane (PDMS) and $BaTiO_3$ nanoparticles, this composite triboelectric interface shows not only an enhanced uniaxial stretchability of up to 310%, but also a high short circuit current density of 18.0 $mA \cdot m^{-2}$ in response to