

Bio-based Piezoelectric Materials with High Energy Conversion Efficiency

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Development of non-toxic, ultra-sensitive, and flexible bio-inspired piezoelectric nanogenerator has become a great challenge for next generation biomedical applications. High performance organic/inorganic materials based piezoelectric nanogenerators suffer from several unavoidable problems such as complex synthesis and high toxicity. Biodegradable and biocompatible piezoelectric material is utmost needed in in-vivo condition to harvest energy for biomedical applications. Here, we report a novel bio-piezoelectric nanogenerator using naturally abundant self-aligned cellulose fibrous untreated onion skin, spider silks, and egg shells, as efficient piezoelectric materials. The fabricated device generated high output voltage, current, instantaneous power density and energy conversion efficiency. It is highly effective during throat movement such as coughing, drinking and swallowing. Furthermore, because it works at very low pressure originating from heart pulse or beat, it could be used in pacemakers and health care units.