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High-Performance Triboelectric Nanogenerators with Artificially Well-Tailored Interlocked Interfaces

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Abstract

We report a facile and cost-effective route for fabricating highly efficient triboelectric energy harvesters via formation of artificially well-tailored interlocked interface with a nanostructured Ni electrode and polydimethylsiloxane (PDMS). The interlocked interface formed between the nano-pillar Ni electrode and nano-pillar PDMS composite thin film effectively enhanced the triboelectricity of a triboelectric nanogenerator (TENG) by increasing the surface contact area and contact time, related to the frictional forces. The output power of four different kinds of TENGs was evaluated to confirm the effect of the surface morphology, especially the interlocked interface. A dramatic enhancement of the output voltage (~100 V) was observed with a current of up to ~23 μ A. The effectiveness of the interlocked TENG (i-TENG) was also demonstrated by the greater efficiency for charging a capacitor compared with the flat-to-flat

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