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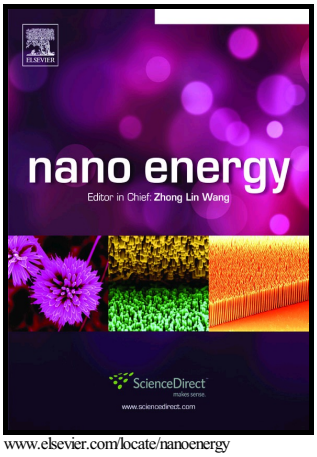

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High Efficiency Power Management and Charge Boosting Strategy for a Triboelectric Nanogenerator

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Abstract

Triboelectric nanogenerator (TENG) has emerging as an important approach for energy harvesting. However, low charging efficiency as well as low power conversion efficiency have restricted its practical application for powering traditional electronics. Here we propose a power management (PM) strategy by extracting maximum energy from TENG and transferring the energy to storage unit employing optimized Inductor-Capacitor (LC) oscillating. PM module using this strategy designed shown universality and high-efficiency for different modes TENG. Over 2600 times improvement in stored energy than standard circuit was achieved, and more than 72 % alternating current (AC) to direct current (DC) power transfer efficiency was obtained for different modes TENGs. The regulated and managed output shown the ability as a power source for the continuously working of commercial electronics, such as LED bulbs, calculators and pedometers. Our work provides an effective, universal and practical strategy for efficiently power management of TENG from theoretical derivation and experimental validation, which is promising to serve as a standard PM module for TENG as well as to guide its design.