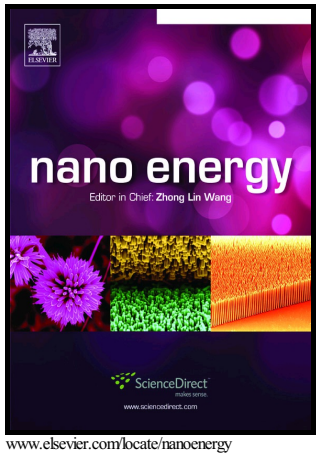

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An ultrathin paper-based self-powered system for portable electronics and wireless human-machine interaction

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Abstract

Developing lightweight, flexible and sustainable sensor networks with miniaturized integration and functionality for the Internet of Things (IoT) remains a challenge and an urgent demand for the next-generation electronic devices. Paper-based electronics, which represents one of the main green electronics in the future, have been considered as one of the most exciting technologies to meet the consumption of the frequently upgraded electronics. Here, we presented an ultrathin (about 200 μm) and lightweight paper-based self-powered system that consists of a paper-based triboelectric/piezoelectric hybrid nanogenerator and a paper-based supercapacitor. Under human motions such as flipping the page and moving the book/document, the as-fabricated self-powered system built-in the smart book/document was capable of sustaining power for portable devices, such as continuously driving LEDs and the temperature/humidity sensor. With the signal-processing circuit, the paper-based system was further developed into a wireless human-machine interaction system for documents management and smart reading. The ultrathin and highly flexible characteristics of the self-powered system not only endow the device with power generation feature for portable devices, but also build up the wireless human-machine interactions in developing potential applications for the IoT.

[1] X.H., Y.Z. and H.Y. contributed equally to this work.