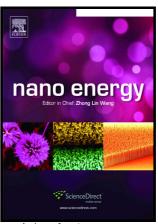
## Author's Accepted Manuscript

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www.elsevier.com/locate/nanoenergy

PII: S2211-2855(17)30500-1

DOI: http://dx.doi.org/10.1016/j.nanoen.2017.08.024

Reference: NANOEN2138

To appear in: Nano Energy

Received date: 28 June 2017 Revised date: 13 August 2017 Accepted date: 16 August 2017

Cite this article as: Xianming He, Quan Wen, Yafeng Sun and Zhiyu Wen, A Low-Frequency Piezoelectric-Electromagnetic-Triboelectric Hybrid Broadband Vibration Energy Harvester, *Nano Energy*, http://dx.doi.org/10.1016/j.nanoen.2017.08.024

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## **ACCEPTED MANUSCRIPT**

# A Low-Frequency Piezoelectric-Electromagnetic-Triboelectric Hybrid

#### **Broadband Vibration Energy Harvester**

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#### **Abstract**

In practical applications, vibration-based energy harvesters are usually restricted by their output performance and operating bandwidth. Therefore, improving the performance and increasing the operating bandwidth of vibration energy harvester become to two significant and urgent research focuses in past years. In this paper, a low-frequency piezoelectric-electromagnetic-triboelectric hybrid broadband vibration energy harvester is presented and investigated. It consists of flexible PET picking-up vibration structures which designed to achieve broadband behavior at low acceleration. In the meanwhile, integrate piezoelectric, triboelectric and electromagnetic mechanisms successfully enhanced the electric output of the hybrid energy harvester. As a result, the novel hybrid harvester can scavenge

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