

Flexible triboelectric nanogenerator based on cost-effective thermoplastic polymeric nanofiber membranes for body-motion energy harvesting with high humidity-resistance

Shan Yan, Jianwei Lu, Wei Song, Ru Xiao



PII: S2211-2855(18)30171-X
DOI: <https://doi.org/10.1016/j.nanoen.2018.03.031>
Reference: NANOEN2579

To appear in: *Nano Energy*

Received date: 13 January 2018
Revised date: 6 March 2018
Accepted date: 9 March 2018

Cite this article as: Shan Yan, Jianwei Lu, Wei Song and Ru Xiao, Flexible triboelectric nanogenerator based on cost-effective thermoplastic polymeric nanofiber membranes for body-motion energy harvesting with high humidity-resistance, *Nano Energy*, <https://doi.org/10.1016/j.nanoen.2018.03.031>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Flexible triboelectric nanogenerator based on cost-effective thermoplastic polymeric nanofiber membranes for body-motion energy harvesting with high humidity-resistance

Shan Yan, Jianwei Lu, Wei Song, Ru Xiao*

State Key Laboratory for Modification of Chemical Fibers and Polymer Materials, College of Materials Science and Engineering, Donghua University, Shanghai 2016, P.R. China

*Corresponding author: R. Xiao, email: xiaoru@dhu.edu.cn

ABSTRACT

The development of triboelectric nanogenerators (TENGs) which can be utilized to transform small and irregular energy into electricity provides a new idea to alleviate the serious energy crisis. In this study, a type of flexible TENG based on cost-effective thermoplastic polymeric nanofiber membranes fabricated via melt-blending extrusion method with good compatibility to garment had been proposed, which could be used to harvest the low-frequency mechanical energy produced by human motions. In the presence of modifications, in-situ chemical oxidative polymerization and facile dip-coating, the prepared TENG exhibited excellent humidity-resistance. Triggered by periodic motions, the device which could be applied to charge the commercial capacitor and more than 200 green LEDs revealed a high output power density of 2.06 W/m^2 after introducing polyaniline. The practicability of the obtained device to scavenge the energy of body motions had been successfully proved. Especially with hand tapping as an example, the open-circuit voltage and short-circuit current reached up to 340.8 V and 73.7 μA respectively, which indicated that it is suitable for thermoplastic polymeric nanofiber membranes with outstanding wearability to be employed in TENGs to be a power supply for the

Download English Version:

<https://daneshyari.com/en/article/7952636>

Download Persian Version:

<https://daneshyari.com/article/7952636>

[Daneshyari.com](https://daneshyari.com)