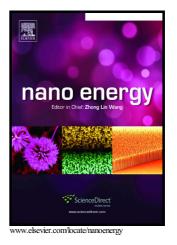
# Author's Accepted Manuscript

Polarization-FreeHigh-Crystallization  $\beta$ -PVDFPiezoelectric Nanogenerator Toward Self-Powered3D Acceleration Sensor

Long Jin, Songyuan Ma, Weili Deng, Cheng Yan, Tao Yang, Xiang Chu, Guo Tian, Da Xiong, Jun Lu, Weiqing Yang



PII:	S2211-2855(18)30383-5
DOI:	https://doi.org/10.1016/j.nanoen.2018.05.068
Reference:	NANOEN2776

To appear in: Nano Energy

Received date: 1 May 2018 Revised date: 18 May 2018 Accepted date: 28 May 2018

Cite this article as: Long Jin, Songyuan Ma, Weili Deng, Cheng Yan, Tao Yang, Xiang Chu, Guo Tian, Da Xiong, Jun Lu and Weiqing Yang, Polarization-Free High-Crystallization  $\beta$ -PVDF Piezoelectric Nanogenerator Toward Self-Powered 3D Acceleration Sensor, *Nano Energy*, https://doi.org/10.1016/j.nanoen.2018.05.068

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.

### **ACCEPTED MANUSCRIPT**

### Polarization-Free High-Crystallization $\beta$ -PVDF Piezoelectric

## Nanogenerator Toward Self-Powered 3D Acceleration Sensor

Long Jin<sup>a,1</sup>, Songyuan Ma<sup>a,1</sup>, Weili Deng<sup>a</sup>, Cheng Yan<sup>a</sup>, Tao Yang<sup>a</sup>, Xiang Chu<sup>a</sup>, Guo Tian<sup>a</sup>, Da Xiong<sup>a</sup>, Jun Lu<sup>a,\*</sup>, Weiqing Yang<sup>a,b,c\*</sup>

<sup>a</sup>Key Laboratory of Advanced Technologies of Materials (Ministry of Education), School of Materials Science and Engineering, Southwest Jiaotong University, Chengdu 610031, PR China

<sup>b</sup>State Key Laboratory of Traction Power, Southwest Jiaotong University, Chengdu 610031, PR China

#### <sup>c</sup>Lead Contact

\*Correspondence: junlyuprc@hotmail.com (J.L.), wqyang@swjtu.edu.cn (W.Y.)

#### Abstract:

The strong piezoelectric lead zirconate titanate (PZT) ceramic with inherent brittleness and highly tough Poly (vinylidene fluoride) (PVDF) polymer with intrinsic weak piezoelectricity cannot simultaneously fulfill the requirements of high sensitivity and excellent stability as a piezoelectric acceleration sensor in extreme service environments, such as intense impact. Here, we developed a polarization-free high-crystallization  $\beta$ -PVDF (h $\beta$ -PVDF) based piezoelectric nanogenerator (PENG) as acceleration sensor with high sensitivity (2.405 nA·s<sup>2</sup>·m<sup>-1</sup>) and excellent stability (97% remaining after 10000 cycles). Fundamentally, the excellent performance benefits from the PVDF by high-pressure melt crystallization with a high  $\beta$ -phase crystallinity of 86.48%, indicative of the enhanced piezoelectricity (high short-circuit current density of 145 nA·cm<sup>-2</sup>). With integration of PENGs in three axes, the self-powered 3D acceleration sensor is developed for vector acceleration

<sup>&</sup>lt;sup>1</sup> These authors contributed equally to this work.

Download English Version:

# https://daneshyari.com/en/article/7952498

Download Persian Version:

https://daneshyari.com/article/7952498

Daneshyari.com