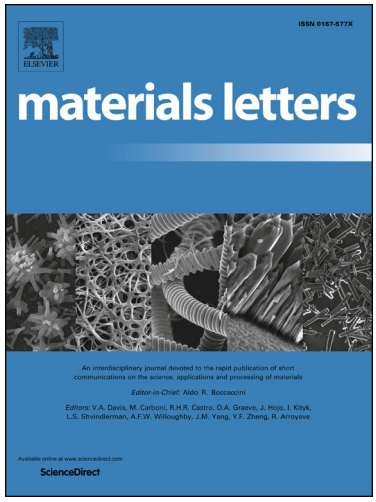
Accepted Manuscript



Enhanced mechanical and piezoelectric properties of BCZT-CuY/rGO-based nanogenerator for tiny energy harvesting

Yinghong Wu, Fei Ma, Jingkui Qu, Tao Qi

PII: S0167-577X(18)31143-1
DOI: https://doi.org/10.1016/j.matlet.2018.07.102
Reference: MLBLUE 24668

To appear in: *Materials Letters*

Received Date: 25 May 2018
Revised Date: 13 July 2018
Accepted Date: 24 July 2018

Please cite this article as: Y. Wu, F. Ma, J. Qu, T. Qi, Enhanced mechanical and piezoelectric properties of BCZT-CuY/rGO-based nanogenerator for tiny energy harvesting, *Materials Letters* (2018), doi: https://doi.org/10.1016/j.matlet.2018.07.102

Enhanced mechanical and piezoelectric properties of BCZT-CuY/rGO-based nanogenerator for tiny energy harvesting

Yinghong Wu[a,b], Fei Ma[a,b], Jingkui Qu[a,*], Tao Qi[a]

[a]National Engineering Laboratory for Hydrometallurgical Cleaner Production Technology, Institute of Process Engineering, Chinese Academy of Sciences, Beijing 100190, PR China.

[b]University of Chinese Academy of Sciences, Beijing100190, PR China.

[*]Corresponding author. E-mail: jkqu@ipe.ac.cn, Tel: +86-10-82544848.

Abstract

BCZT-CuY/rGO/PDMS composites with excellent elasticity and flexibility, and their nanogenerators (NGs) with favorable electrical properties, were fabricated. The impact of rGO on the dispersion of BCZT-CuY, the mechanical properties of BCZT-CuY/rGO/ PDMS, and electrical performance of BCZT-CuY/rGO-based NGs were systematically investigated. The results indicated that the distribution of BCZT-CuY in PDMS with added rGO was much more uniform than that without rGO. Moreover, its elastic modulus and elongation at the break increased to 4.6 MPa and 250%, respectively, with the introduction of rGO. Apart from a high d_{33} at the percolation threshold, the average V_{OC} (1.36 V) and I_{SC} (35 nA) achieved by finger tapping BCZT-CuY/rGO-based NGs suggested their considerable potential in harvesting tiny energy.

Keywords: rGO, piezoelectric nanogenerator, electrical properties, energy storage and conversion.

1. Introduction

Owing to its ability to convert negligible mechanical energy into electrical energy, the piezoelectric nanogenerator (NG) is considered one of the most promising devices for tiny energy harvesting [1, 2]. Among various piezoelectrics, poly-vinylidene fluoride