Accepted Manuscript

Polymer/carbon nanotube composite materials for flexible thermoelectric power generator

Haijun Song, Yang Qiu, Yao Wang, Kefeng Cai, Delong Li, Yuan Deng, Jiaqing He

PII: S0266-3538(17)31749-9

DOI: 10.1016/j.compscitech.2017.10.006

Reference: CSTE 6931

To appear in: *Composites Science and Technology*

Received Date: 19 July 2017

Revised Date: 3 October 2017

Please cite this article as: Song H, Qiu Y, Wang Y, Cai K, Li D, Deng Y, He J, Polymer/carbon nanotube composite materials for flexible thermoelectric power generator, *Composites Science and Technology* (2017), doi: 10.1016/j.compscitech.2017.10.006.

Polymer/Carbon Nanotube Composite Materials for Flexible Thermoelectric Power Generator

Haijun Song[1], Yang Qiu[2], Yao Wang[3], Kefeng Cai[1]*, Delong Li[2], Yuan Deng[3*], Jiaqing He[2*]

1. Key Laboratory of Advanced Civil Engineering Materials (Tongji University), Ministry of Education; School of Materials Science & Engineering, Tongji University, 4800 Caoan Road, Shanghai 201804, China

2. Physics department, Southern university of Science and Technology, 1088 XueYuan Avenue, Shenzhen 518055, China

3. School of Materials Science and Engineering, Ministry of Education Key Laboratory of Aerospace Advanced Materials and Performance, Beihang University, Beijing 100191, China

*Corresponding author: kfcai@tongji.edu.cn; dengyuan@baau.edu.cn; hejq@sustc.edu.cn

Abstract Flexible and lightweight thermoelectric (TE) generators have attracted increasing interest for powering wearable electronics using the temperature difference between human body and ambient air. Conducting polymers or their based composite materials are suitable for such applications; however, most conducting polymers show p-type conduction, hence, until now almost all reported flexible TE generators, which use conducting polymers or their based composite materials, are single-carrier-type (p-type) leg devices, connecting alternatively p-type legs electrically in series with silver or other metals. In this paper, both p- and n-type flexible TE materials have been developed using polymers and single-walled carbon nanotubes (SWCNTs). The p-type TE films are prepared by integrating SWCNTs into a high conductive poly(3,4-ethylenedioxythiophene): poly(styrenesulfonate) (PEDOT:PSS) matrix, using a