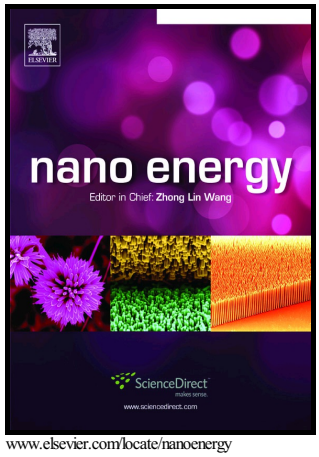
Author's Accepted Manuscript




www.elsevier.com/locate/nanoenergy

# Facile Integration of Low-Cost Black Phosphorus in Solution-Processed Organic Solar Cells with Improved Fill Factor and Device Efficiency

Yun Zhao, Teresa L. Chen, Liangang Xiao, Matthew A. Kolaczkowski, Liang Zhang, Liana M. Klivansky, Virginia Altoe, Bining Tian, Jinghua Guo, Xiaobin Peng, Yue Tian, Yi Liu

PII: S2211-2855(18)30625-6
DOI: https://doi.org/10.1016/j.nanoen.2018.08.063
Reference: NANOEN2993

To appear in: *Nano Energy*

Received date: 3 July 2018
Revised date: 24 August 2018
Accepted date: 27 August 2018

Cite this article as: Yun Zhao, Teresa L. Chen, Liangang Xiao, Matthew A. Kolaczkowski, Liang Zhang, Liana M. Klivansky, Virginia Altoe, Bining Tian, Jinghua Guo, Xiaobin Peng, Yue Tian and Yi Liu, Facile Integration of Low-Cost Black Phosphorus in Solution-Processed Organic Solar Cells with Improved Fill Factor and Device Efficiency, *Nano Energy,* https://doi.org/10.1016/j.nanoen.2018.08.063

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

# Facile Integration of Low-Cost Black Phosphorus in Solution-Processed Organic Solar Cells with Improved Fill Factor and Device Efficiency

Yun Zhao[a,b]*, Teresa L. Chen[a], Liangang Xiao[a,c], Matthew A. Kolaczkowski[a,d], Liang Zhang[e], Liana M. Klivansky[a], Virginia Altoe[a], Bining Tian[f], Jinghua Guo[e], Xiaobin Peng[c], Yue Tian[f]*, Yi Liu[a]*

[a]The Molecular Foundry, Lawrence Berkeley National Laboratory, Berkeley, California 94720, United States
[b]School of Chemical Engineering and Technology, China University of Mining and Technology Xuzhou 221116, China
[c]Institute of Polymer Optoelectronic Materials and Devices, State Key Laboratory of Luminescent Materials and Devices, South China University of Technology, 381 Wushan Road, Guangzhou 510640, P.R. China
[d]Department of Chemistry, University of California, Berkeley, Berkeley, California 94720, United States
[e]Advanced Light Source, Lawrence Berkeley National Laboratory, Berkeley, California 94720, United States
[f]Key Lab of Advanced Transducers and Intelligent Control System of Ministry of Education, College of Physics and Optoelectronics, Taiyuan University of Technology, Taiyuan 030024, China

yliu@lbl.gov
zhaoyun@cumt.edu.cn
tianyue@tyut.edu.cn

Accepted manuscript

## Abstract

Black phosphorus (BP) as a promising two-dimensional (2D) material has gained great attention in nanoelectronic devices because of its intrinsic semiconductor characteristics. However, the poor material availability and solution processability have been major roadblocks that hinder its wider application in microelectronics. Herein, readily available, lost-cost BP was utilized as an effective component that was integrated via a facile solution process for the fabrication of bulk heterojunction organic solar cells (OSCs). An impressive fill factor (FF) of 74.2% and power conversion efficiency (PCE) of 10.5% were realized in the OSCs incorporating 10wt% of BP in the active layer of the benchmark polymer donor PTB7-Th and PC71BM acceptor,

Download English Version:

https://daneshyari.com/en/article/10135872

Download Persian Version:

https://daneshyari.com/article/10135872

Daneshyari.com