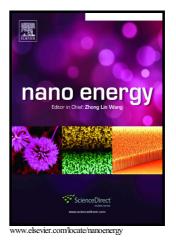
Author's Accepted Manuscript

Direct-Gap Semiconducting Tri-layer Silicene With 29% Photovoltaic Efficiency

Jian Lv, Meiling Xu, Shiru Lin, Xuecheng Shao, Xinyu Zhang, Yanhui Liu, Yanchao Wang, Zhongfang Chen, Yanming Ma



 PII:
 S2211-2855(18)30474-9

 DOI:
 https://doi.org/10.1016/j.nanoen.2018.06.079

 Reference:
 NANOEN2860

To appear in: Nano Energy

Received date:24 April 2018Revised date:22 June 2018Accepted date:25 June 2018

Cite this article as: Jian Lv, Meiling Xu, Shiru Lin, Xuecheng Shao, Xinyu Zhang, Yanhui Liu, Yanchao Wang, Zhongfang Chen and Yanming Ma, Direct-Gap Semiconducting Tri-layer Silicene With 29% Photovoltaic Efficiency, *Nano Energy*, https://doi.org/10.1016/j.nanoen.2018.06.079

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.

Direct-Gap Semiconducting Tri-layer Silicene With 29% Photovoltaic Efficiency

Jian Lv,^{&,†,#} Meiling Xu,^{&,†} Shiru Lin,[§] Xuecheng Shao,[†] Xinyu Zhang,[†] Yanhui Liu,[‡] Yanchao Wang,^{*,†} Zhongfang Chen,^{§,*} Yanming Ma^{†, ∞}

[†]State Key Lab of Superhard Materials, College of Physics, [#]College of Materials Science and Engineering and Key Laboratory of Automobile Materials of MOE, and [∞]International Center of Future Science, Jilin University, Changchun 130012, China
[‡]Department of Physics, College of Science, Yanbian University, Yanji 133002, China
[§] Department of Chemistry, University of Puerto Rico, Rio Piedras Campus, San Juan, PR 00931, USA

[&] The two authors contributed equally to this work and should be considered co-first authors

Corresponding Authors:

E-mail: wyc@calypso.cn (YW); zhongfangchen@gmail.com (ZC)

Abstract

Crystalline silicon is dominating the current solar cell market due to the significant efficiency improvement and cost reduction in last decades. However, its indirect band gap nature leads to inefficient visible-light absorption, which seriously impedes further performance enhancement in silicon-based photovoltaic devices. Thus, it is highly desirable to develop direct band gap silicon materials. Herein, by means of ab initio swarm-intelligence structuresearching method, we predicted a quasi-direct gap semiconducting tri-layer silicene structure consisting of alternating arrays of six-membered Si rings, which can be converted into a Download English Version:

https://daneshyari.com/en/article/7952342

Download Persian Version:

https://daneshyari.com/article/7952342

Daneshyari.com