

## Accepted Manuscript

Semi-transparent Cl-doped perovskite solar cells with graphene electrodes for tandem application

Jixiang Zhou, Zhiwei Ren, Shenghao Li, Zongcun Liang, Charles Surya, Hui Shen

PII: S0167-577X(18)30320-3  
DOI: <https://doi.org/10.1016/j.matlet.2018.02.106>  
Reference: MLBLUE 23932

To appear in: *Materials Letters*

Received Date: 11 January 2018  
Revised Date: 20 February 2018  
Accepted Date: 21 February 2018

Please cite this article as: J. Zhou, Z. Ren, S. Li, Z. Liang, C. Surya, H. Shen, Semi-transparent Cl-doped perovskite solar cells with graphene electrodes for tandem application, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.02.106>

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 proof before it is published in its final 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.



# Semi-transparent Cl-doped perovskite solar cells with graphene electrodes for tandem application

Jixiang Zhou<sup>a,⊥</sup>, Zhiwei Ren<sup>b,⊥</sup>, Shenghao Li<sup>a</sup>, Zongcun Liang<sup>c,d</sup>, Charles Surya<sup>b</sup>, and Hui Shen<sup>c,d,\*</sup>

<sup>a</sup> Institute for Solar Energy Systems, School of Materials Science and Engineering, Sun Yat-sen University, Guangzhou, Guangdong Province, P.R. China

<sup>b</sup> Department of Electronic and Information Engineering, The Hong Kong Polytechnic University, Hong Kong, P.R. China

<sup>c</sup> Shunde SYSU Institute for Solar Energy, Shunde, Guangdong, PR China

<sup>d</sup> Institute for Solar Energy Systems, School of Physics and State Key Laboratory of Optoelectronic Materials and Technologies, Sun Yat-sen University, Guangzhou, Guangdong Province, PR China

\* Corresponding author: shenhui1956@163.com

⊥ These authors contributed equally to this work.

## Abstract

The purpose of this study is to develop semi-transparent perovskite solar cells using graphene electrodes for high-efficiency tandem application. Two layers of graphene was considered optimum for perovskite solar cells, and this was confirmed by evaluating the optical and electrical performance. The tandem cells were further studied by controlling the thickness of perovskite films using different spin speeds, and 3000 rpm was considered the optimum speed. The bandgap of Cl-doped perovskite thin films was 1.59 eV. Measurement of morphology and crystal structure confirmed a good level of crystallinity. This study also examined both the optical and electrical performance of the semi-transparent perovskite solar cells, to optimize the power conversion efficiency (PCE) of the tandem application using silicon solar cells. To the best of our knowledge, the tandem cells demonstrated a total PCE of 18.1%, which is the highest value among those of other cells that have the same structure as that of tandem cells.

**Keywords:** Perovskite Solar Cells; Graphene; Tandem; Energy storage and conversion;

Download English Version:

<https://daneshyari.com/en/article/8013612>

Download Persian Version:

<https://daneshyari.com/article/8013612>

[Daneshyari.com](https://daneshyari.com)