

## Accepted Manuscript

Title: Polymer assisted growth of high-quality perovskite films by Lewis acid-base adduct for efficient planar-heterojunction solar cells

Authors: Xianyu Jia, Ziyang Hu, Jie Xu, Like Huang, Jing Zhang, Jianjun Zhang, Yuejin Zhu



PII: S0025-5408(17)31757-9  
DOI: <http://dx.doi.org/doi:10.1016/j.materresbull.2017.07.043>  
Reference: MRB 9472

To appear in: *MRB*

Received date: 4-5-2017  
Revised date: 16-7-2017  
Accepted date: 27-7-2017

Please cite this article as: Xianyu Jia, Ziyang Hu, Jie Xu, Like Huang, Jing Zhang, Jianjun Zhang, Yuejin Zhu, Polymer assisted growth of high-quality perovskite films by Lewis acid-base adduct for efficient planar-heterojunction solar cells, Materials Research Bulletin <http://dx.doi.org/10.1016/j.materresbull.2017.07.043>

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.

## Polymer assisted growth of high-quality perovskite films by Lewis acid-base adduct for efficient planar-heterojunction solar cells

Xianyu Jia <sup>a</sup>, Ziyang Hu <sup>a,\*</sup>, Jie Xu <sup>a</sup>, Like Huang <sup>b</sup>, Jing Zhang <sup>a</sup>, Jianjun Zhang <sup>b</sup>, Yuejin Zhu <sup>a,\*</sup>

<sup>a</sup> Department of Microelectronic Science and Engineering, Ningbo Collaborative Innovation Center of Nonlinear Hazard System of Ocean and Atmosphere, Ningbo University, Ningbo 315211, China

<sup>b</sup> College of Electronic Information and Optical Engineering, Nankai University, Tianjin 300071, China

\*Corresponding author at: Department of Microelectronic Science and Engineering, Ningbo Collaborative Innovation Center of Nonlinear Hazard System of Ocean and Atmosphere, Ningbo University, Ningbo 315211, China.

E-mail address: [huziyang@nbu.edu.cn](mailto:huziyang@nbu.edu.cn), [zhuyuejin@nbu.edu.cn](mailto:zhuyuejin@nbu.edu.cn).

### Highlights

1. Polymer assisted growth of high-quality perovskite films was demonstrated.
2. Polymer PMMA can retard nucleation and crystal growth of perovskite.
3. The interaction between the perovskite films and PMMA was addressed.
4. Planar-heterojunction solar cells with efficiencies of 15% were achieved.

**Abstract:** Long-chain insulating polymers dissolved in perovskite precursor solution can assemble the polymer scaffold acted as the function of TiO<sub>2</sub> porous layer to improve the quality of the perovskite films. Here, perovskite films with high electronic quality were prepared by mediating nucleation and crystal growth. Polymer post treatment can induce Lewis acid-base reaction with PbCl<sub>2</sub>, which alleviates the reaction velocity between PbCl<sub>2</sub> and CH<sub>3</sub>NH<sub>3</sub>I, and then retard perovskite crystallization. The interactions between the perovskite films and polymer with different concentration are addressed to interpret the function and evolution of the polymer long-chains during the annealing process. These solar cells exhibit efficiency more than 15% with small variation. Our work demonstrates the value of retarding

Download English Version:

<https://daneshyari.com/en/article/5441803>

Download Persian Version:

<https://daneshyari.com/article/5441803>

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