Short Communication

Low Temperature Deposition of Boron Doped P-type Si:H Window Layers for Amorphous Silicon Solar Cells

Zhihua Hu, Shurong Wang, Zhaohui Yao

Key Lab. of Advanced Technology & Preparation for Renewable Energy Materials, Ministry of Education, Solar Energy Research Institute, School of Energy and Environmental Sciences
Yunnan Normal University, Kunming, Yunnan, 650092, P.R.China

*E-mail: 1049173841@qq.com

doi: 10.20964/2021.06.39

Received: 26 February 2021 / *Accepted:* 6 April 2021 / *Published:* 30 April 2021

In this paper, boron doped Si:H p-layers were prepared at a low substrate temperature of 60°C by using a PECVD technique with varied a hydrogen gas dilution ratio of 50, 100 and 150. A detailed investigation was employed on as-deposited films by using Transmission and Raman spectra measurements. The crystalline fractions in volume of these films were estimated as ~16%, 52% and ~73% respectively. These p-layers had been incorporated into single junction a-Si:H solar cells with configuration of Glass/TCO/p-i-n/Al. It was found that a p-layer prepared with a hydrogen gas dilution ratio of 50 is more benefit for device performances. A dot cell with an area of 0.1256 cm² had been made and an energy conversion efficiency of 9.0 % has been achieved.

Keywords: P-I-N a-Si solar cells; p-type Si:H window layers; low temperature deposition

[FULL TEXT](#)

© 2021 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).