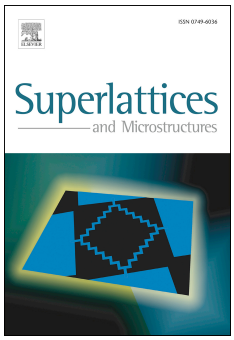
Accepted Manuscript



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PII: S0749-6036(18)30565-2

DOI: 10.1016/j.spmi.2018.04.013

Reference: YSPMI 5627

To appear in: *Superlattices and Microstructures*

Received Date: 25 March 2018

Accepted Date: 6 April 2018

Please cite this article as: M. Chávez Portillo, J. Alvarado Pulido, S. Gallardo Hernández, B.S. Soto Cruz, S. Alcántara Iniesta, R. Gutiérrez Pérez, O. Portillo Moreno, Voc enhancement of a solar cell with doped Li^+-PbS as the active layer, *Superlattices and Microstructures* (2018), doi: 10.1016/j.spmi.2018.04.013.

Voc enhancement of a solar cell with doped Li^+-PbS as the active layer

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Abstract: In this report, we investigate the fabrication of solar cells obtained by chemical bath technique, based on CdS as window layer and PbS and PbS-Li^+-doped as the active layer. We report open-circuit-voltage Voc values of ~392 meV for PbS and ~630 meV for PbSLi^+-doped, a remarkable enhanced in the open circuit voltage is shown for solar cells with doped active layer. Li^+ ion passivate the dangling bonds in PbS-metal layer interface in consequence reducing the recombination centers.

Keywords: Quantum confinement; PbS; Doped active layer; Chemical Bath

1. Introduction

PbS is a semiconductor material employed to convert solar energy into electricity, due to their unique optical properties like quantum confinement and multiexcitonic generation (MEG). Furthermore, PbS can achieve a strong quantum confinement effect when the crystallite dimensions are below the exciton Bhor (~18 nm) and such quantum confinement effect allows the band gap energy (E_g) tunability providing a way to control the photosensivity absorption from infrared to UV-vis regions. In this context, several growth techniques of thin films of PbS have been reported, such as: sol-gel [1], sputtering [2], SILAR [3] and chemical bath (CB) [4, 5]. Some of these techniques have the disadvantage that they operate in high vacuum and high temperature conditions or even in another