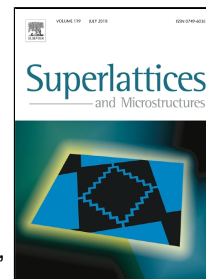


Accepted Manuscript

Anomalous enhancement of the absorption coefficient of GaAs in a p-n junction

Ling Sun, Lu Wang, Jie Liu, Ziguang Ma, Yang Jiang, Haiqiang Jia, Wenxin Wang, Hong Chen



PII: S0749-6036(18)31481-2

DOI: 10.1016/j.spmi.2018.08.019

Reference: YSPMI 5864

To appear in: *Superlattices and Microstructures*

Received Date: 18 July 2018

Accepted Date: 20 August 2018

Please cite this article as: Ling Sun, Lu Wang, Jie Liu, Ziguang Ma, Yang Jiang, Haiqiang Jia, Wenxin Wang, Hong Chen, Anomalous enhancement of the absorption coefficient of GaAs in a p-n junction, *Superlattices and Microstructures* (2018), doi: 10.1016/j.spmi.2018.08.019

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.

Anomalous enhancement of the absorption coefficient of GaAs in a p-n junction

Ling Sun^{1,2#}, Lu Wang^{1#}, Jie Liu^{1,2}, Ziguang Ma¹, Yang Jiang¹, Haiqiang Jia¹, Wenxin Wang¹, Hong Chen^{1*}

¹Key Laboratory for Renewable Energy, Beijing Key Laboratory for New Energy Materials and Devices, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing, 100190, China.

²University of Chinese Academy of Sciences, Beijing, 100049, China

*Corresponding author: hchen@iphy.ac.cn

#These authors contributed equally to this work.

Abstract

Absorption coefficient is not only an important parameter to describe the interaction of light and matters but also used to design solar cells and photodetectors, and it is considered as a constant for certain material. However, we found that the absorption coefficient of GaAs could be enhanced by a p-n junction. The photocurrent is almost the same when the thickness of depletion layer reduced from **3000 nm** to **100 nm** sandwiched between p-region and n-region. Without considering the scatterings and recombination of photon-generated carriers and the reflection of incident light, we got a **larger** absorption coefficient up to 10^5 cm^{-1} . The results can't be explained by established theories of the p-n junction and absorption coefficient. It may help to further understand the nature of the p-n junction and supply new thoughts for device design.

Keywords: GaAs, absorption coefficient, p-n junction

1. Introduction

Since the photovoltaic effect was discovered in 1839 by Edmond Becquerel[1], device applications based on photovoltaic conversion are emerging all the time,

Download English Version:

<https://daneshyari.com/en/article/10155694>

Download Persian Version:

<https://daneshyari.com/article/10155694>

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