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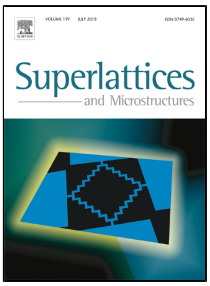

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Anomalous enhancement of the absorption coefficient of GaAs in a p-n junction

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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,