

عنوان مقاله:

Effect of Hydrostatic Pressure on Optical Absorption Coefficient of InGaN/GaN of Multiple Quantum Well Solar Cells

محل انتشار:

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خلاصه مقاله:

In this paper, a numerical model is used to analyze an optical absorption coefficient according to the electronic properties of InGaN/GaN multiple-quantum-well solar cells (MQWSC) under hydrostatic pressure. Finite difference techniques have been used to acquire energy eigenvalues and their corresponding eigenfunctions of InGaN/GaN MQWSC and the hole eigenstates are calculated via a 6×6 k.p method under the applied hydrostatic pressure. All symmetry-allowed transitions up to the fifth subband of the quantum wells (multi-subband model) and barrier optical absorption, as well as the linewidth due to the carrier-carrier and carrier-longitudinal optical (LO) phonon scattering, are considered here. A change in the pressure up to 10 GPa increases the intraband scattering time up to 38fs and 40fs for light and heavy holes, respectively, raises the height of the Lorentz function and reduces the excitonic binding energy. The multi-subband model has a positive effect on the optical absorption coefficient and increases it by 17%, contrary to the pressure function.

کلمات کلیدی:

Absorption Coefficient, Solar Cell, Scattering Time, Multi-Quantum Well

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