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Observation of weak carrier localization in green emitting InGaN/GaN multi-quantum well structure WEN-CHING CHAO, AN-TARYAMI MOHANTA, TSU-CHIANG YEN, WEI-SHENG CHEN, DER-JUN JANG, Department of Physics, National Sun Yat-sen University — Green emitting InGaN/GaN multi-quantum well samples were investigated using photoluminescence (PL) and time-resolved photoluminescence (TRPL) spectroscopy. Weak carrier localization with characteristic energy of ~ 12 meV due to an inhomogeneous distribution of In in the InGaN quantum well (QW) layer is observed. The temperature dependence of the PL peak energy exhibits S-shape phenomenon and is comparatively discussed within the framework of the Varshni's empirical formula. The full width at half maximum (FWHM) of the PL emission band shows an increasing-decreasing-increasing behavior with increasing temperature arising from the localized states caused by potential fluctuations. The radiative life time, τ_r , extracted from the TRPL profile shows $\sim T^{3/2}$ dependence on temperature above 200 K, which confirms the absence of the effect of carrier localization at room temperature.

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