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Correlating exciton localization with compositional fluctuations in InGaN/GaN quantum wells grown on the GaN (0001) and (1-101) surfaces DANIEL RICH, STANISLAV KHATSEVICH, Ben-Gurion University, XIN-GANG ZHANG, DANIEL DAPKUS, University of Southern California — We have used spatially and temporally resolved cathodoluminescence (CL) to study the carrier recombination dynamics of InGaN quantum wells (QWs) grown on GaN (0001) and (1-101)-oriented facets of GaN triangular prisms prepared by lateral epitaxial overgrowth in a MOCVD system. Recently, growth on non-[0001]-oriented crystal planes is being considered for creating more favorable parameters for devices, owing to significant reductions of the internal field that otherwise reduces the electron-hole oscillator strength for radiative recombination. The effects of In migration during growth on the resulting QW thickness and composition were examined. We employed a modified variable temperature time- resolved CL imaging approach that enables a spatial correlation between regions of enhanced exciton localization, luminescence efficiency, and radiative lifetime with the aim of distinguishing between excitons localized in In-rich quantum dots and those in the surrounding Ga-rich QW regions. A thermally activated nonradiative recombination model was invoked to explain a reversal in the spatial dependence of lifetime between cases of high and low temperatures, in which we show that nonradiative recombination is linked to an enhanced exciton dissociation at high temperatures.

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