

Abstract Submitted  
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**Site Selective CEES and Nearfield Optical Spectroscopy on Nd:GaN<sup>1</sup>** N. JHA, P. CAPEK, V. DIEROLF, Lehigh University, E. READINGER, G. METCALFE, H. SHEN, M. WRABACK, Army Research Laboratory — We perform spatially resolved CEES on Nd ions that are in-situ-doped into GaN epitaxial films on c-plane sapphire substrate grown by plasma assisted molecular beam epitaxy. For a wide range of concentration (up to 8%) we find in the emission a dominant incorporation site, which can be identified with good certainty as a substitutional ‘Ga’ site. While resonant excitation yields strong emission signals even at high temperatures, indicating good intrinsic quantum efficiency, above bandgap excitation of the dominant incorporation site is rather inefficient. The conclusion is further supported by the observation of additional weak peaks in the spectra attributed to above band-gap excitation of minority sites (with presumably better excitation efficiencies). For the majority site, confocal and NSOM imaging under selective excitation show changes in emission intensity, excitation and emission wavelength on a submicron length scale. These observations are consistent with an interpretation that the changes are due to fluctuations in Nd-concentration that create fluctuation in the local strain fields that are caused by the substitution of the small Ga ion by a larger Nd ion (0.62Å vs 0.99Å).

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