

Abstract Submitted  
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**Carbon defects as sources of the green and yellow luminescence bands in undoped GaN<sup>1</sup>** DENIS DEMCHENKO, MICHAEL RESHCHIKOV, Virginia Commonwealth University — In high-purity GaN grown by hydride vapor-phase epitaxy (HVPE), the commonly observed yellow luminescence (YL) band gives way to a green luminescence (GL) band at high excitation intensity. Based on hybrid functional calculations and experimental photoluminescence measurements, we propose that the GL band with a maximum at 2.4 eV is caused by transitions of electrons from the conduction band to the 0/+ level of the isolated C<sub>N</sub> defect. The YL band with a maximum at 2.1 eV, related to the transitions via the -/0 level of the same defect can be observed only for some high-purity HVPE samples. However, in less pure GaN samples (HVPE samples with larger O and C concentrations, as well as all MOCVD grown samples), no GL band is observed and another YL band with a maximum at 2.2 eV dominates the PL spectrum. The latter is attributed to the C<sub>N</sub>O<sub>N</sub> complex.

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