Abstract Submitted for the SES09 Meeting of The American Physical Society

Anomalous capacitance effects in GaN/Al_{0.026}Ga_{0.974}N structures¹ G. ROTHMEIER, L. BYRUM, N. DIETZ, A.G.U. PERERA, S. MATSIK, Georgia State University, I. FERGUSON, Georgia Institute of Technology, A. BEZINGER, H.C. LIU, National Research Council Canada — The effects of interface defect states on the capacitance characteristics of an n^+ GaN/Al_{0.026}Ga_{0.974}N/*i*GaN/ n^+ -GaN structure are reported. An anomalous high-frequency capacitance peak was observed in the capacitance-frequency (C-f) profiles. Using IR spectroscopy, the defect related absorption centers with activation energies of 125 ± 1 and 139 ± 2 meV were attributed to C-donor/N-vacancy and Si-donor states pinned to the n^+ GaN layer, respectively. Si defect states at the *i*GaN/ n^+ GaN interface were found to produce the high-frequency capacitance peak. The peak can result from resonance scattering due to the hybridization of localized Si-donor states in the band gap (with electronic levels above the conduction band minimum) and continuous conduction band states at the *i*GaN/ n^+ GaN interface.

¹Work supported in part by the US Air Force, US National Science Foundation and GSU MDBAF.

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Date submitted: 14 Aug 2009

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