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**Capacitance hysteresis due to interface defect states in $n^+$-GaN/$Al_{0.1}Ga_{0.9}N$ heterostructures**[1] L. BYRUM, G. ARIYAWANSA, R. JAYASINGHE, N. DIETZ, A.G.U. PERERA, S. MATSIK, Georgia State University, I. FERGUSON, Gerogia Institure of Technology, A. BEZINGER, H.C. LIU, National Research Council Canada — Capacitance-voltage-frequency measurements of $n^+$GaN/$Al_{0.1}Ga_{0.9}$N heterostructures are reported. A distinct capacitancestep and hysteresis were observed, and attributed to the abrupt change in electron occupation in Cdonor/Nvacancy defect states located just above the Fermi level (200 meV) at the heterointerface, with an activation energy of 149 $\pm$ 1 meV. With a forward scan direction, the defect states are initially empty. As the bias increases, the defect states will be pulled below the Fermi level, causing an abrupt change in trap state occupation and, thus, capacitance. As these defect states become occupied an accumulation region will form. When the scan direction is reversed, the defect states are now initially filled. The charge in the accumulation region leads to lower effective fields at the interface and, hence, a higher required voltage for the capacitance-step, which occurs as the defect states are pulled above the Fermi level and are abruptly emptied. The difference in initial defect trap state occupation between a forward and reverse scan direction results in the observed hysteresis.

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