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Influence of passivation on the transport study of AlGaN/GaN: A focus on high T Hall effect characterization. J. DANIEL[1], S. ELHAMRI, R. BERNEY, M. AHOUJJA, Dept.of Physics, University of Dayton, Ohio, W. MITCHEL, AFRL,Wright-Patterson AFB, Ohio, J. ROBERTS, P. RAJAGOPAL, J. COOK, E. PINER, K. LINTHICUM, Nitronex Corporation, Durham, NC — Hall effect measurements on two samples were used to study the impact of elevated temperatures (300-675 K) on the transport parameters of AlGaN/GaN grown on Si. The two samples had similar growth structures, except one sample (sample A) was passivated with SiN and the other (sample B) was not. The room T mobility and carrier density, n, for sample A were 1510 cm^2/Vs and 8.2 x 10^{12} $cm^{-2,}$ and for B were 1510 cm^2/Vs and 9.42 x 10^{12} cm^{-2}, respectively. Although these two parameters were similar at room T for the two samples, the T dependences of n were very different. Whereas n for sample A was found to be relatively insensitive to T, the carrier density for sample B showed a strong T dependence. Its n increased to 3.75x10^{13} cm^{-2} at 675 K. It is worth noting that the T dependence of n observed in sample B was confirmed on others samples with similar growth conditions. Unlike the results of the high Tstudy, low T Hall measurements did not show a strong difference between the two samples. Magnetoresistance measurements at 1.2 K in magnetic fields up to 8 T indicated the presence of Shubnikov-de Haas oscillations for sample A but not for sample B. However, after illumination oscillations were observed in sample B. While both samples were sensitive to illumination, its impact was observed to be much stronger in sample B than in sample A.

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