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Effects of electron radiation on the electron transport properties in AlGaN/GaN heterostructure MO AHOUJJA, S. ELHAMRI, R. BERNEY, Physics, University of Dayton, OH, M. HOGSED, Y.K. YEO, R. HENGEHOLD, AFIT, WPAFB, OH — The effects of electron irradiation on the electron transport properties in a $Al_{0.27}Ga0_{.73}N/GaN$ single heterostructure grown by radio-frequency plasma activated molecular beam epitaxy on sapphire substrates were investigated by variable temperature dependent Hall-effect. The Hall results show that both the two-dimensional carrier concentration and carrier mobility suffered a reduction of 13 % and 23%, respectively, at room temperature. This in turn led to about a 150 % increase in sheet resistivity. While sheet carrier concentration remains relatively constant with temperature before and after irradiation, the mobility is greatly affected at low temperatures. It is believed that at low temperatures, scattering by ionized defects is the most dominant effect. Hence, the 1.0 MeV electron radiation doses used in this investigation ($\sim$ 1x10^{17} cm^{-2}) and the accompanying defect introduction rates are relevant to HEMT device operation.

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