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The carrier property of $Al_xGa_{1-x}N/GaN$ nanowire fabricated by a dual-beam focused ion beam[1] JENN-KAI TSAI, Department of electronic engineering, National Formosa University, Yunlin, Taiwan, Republic of China., W.Y. PANG, Y.H. CHANG, IKAI LO, Department of Physics, Center for Nanoscience and Nanotechnology, National Sun Yat-Sen University, Kaohsiung, Taiwan, Republic of China. — In this study, the $Al_xGa_{1-x}N/GaN$ high electron mobility transistor structure was grown on GaN template substrate using a radio frequency plasma assisted molecular beam epitaxy. The undoped GaN template substrate was grown on c-sapphire substrate by metal organic vapor phase epitaxy system. The carrier property was performed by a Hall effect measurement. The mobility and carrier density obtained of the as-grown HEMT was 1814 cm^2/V s and 1.29x10^{14} cm^{-2}, respectively. The nanowire was patterned on the $Al_xGa_{1-x}N/GaN$ heterostructure by a dual-beam focused ion beam. The first step was to process a Hall bar pattern. The second step was to reduce the width of active channel. The wire width of 100 nm of nanowire was fabricated successfully. The carrier property of nanowire was evaluated at the different temperature from 4 to 300 K.

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