Fabrication and Characterization of AlGaN/GaN HEMTs

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ABSTRACT

Wide bandgap compound material, galliun nitride (GaN), has a huge advantage of power handling comparing to the convention smiconductor. In particular, the wide bandgap of GaN has higher breakdown field than GaAs or silicon (Si). On the other hand, GaN based HEMTs can be operated at much higher bias voltages, and produced much higher output power bias than other III-V devices. Recently, most of the development in GaN-based HEMT technologies have been focused on depletion-model AlGaN/GaN devices. AlGaN/GaN high-electron mobility transistors (HEMT) are excellent candidates for high-power and high-frequency applications due to their superior material properties, such as piezoelectric effect induced by the strain. AlGaN/GaN layer, and offers Two-Dimensional Electron Gas (2-DEG) of high electron mobility with existed electric concentration around without doping. We successfully fabricated Al0.25Ga0.75N/GaN HEMTs, and investigated the light effect on the device performance after conducting the typical device characterization by using HP4155A. We further discuss the optical influence of using Al0.25Ga0.75N/GaN HEMTs.

Keywords : AlGaN/GaN High Electron Mobility Transistors(HEMT) ; piezoelectric effect ; Two-Dimensional Electron Gas (2-DEG)

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