Faculty of Engineering
Tokushima University

Research on Gallium Nitride Electron Devices

Associate Professor Jin-Ping Ao

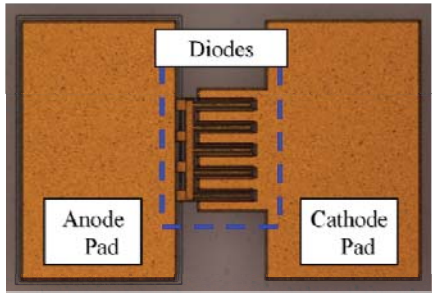

Fig. 1 GaN Schottky diode for microwave rectification

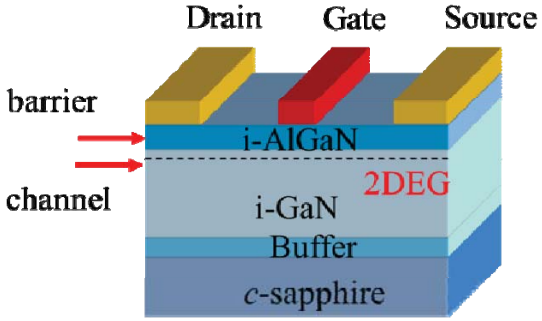

Fig. 2 A cross section of AlGaN/GaN HFET

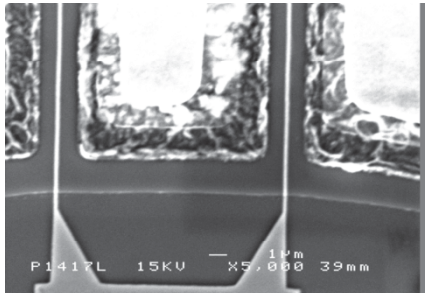

Fig. 3 Sub-micron gate AlGaN/GaN HFET

Content:

With the miniaturization of silicon transistors in the end of 20th century, there was rapid development in the computer information systems. The guiding principle is the scaling rule. With the decreasing of the device dimensions, high speed, low power consumption, high density integration, low price are spontaneously realized. To expand the potentials of the microelectronics to the application on communication, consumer electrical appliances, lighting and power electronics, it is necessary to achieve high voltage and high power. To maintain the high voltage and miniaturization compatibly, silicon technology is limited. It is necessary to introduce wide bandgap semiconductors. A prospective candidate is gallium nitride (GaN). GaN blue light emitting diodes have already become commercialized. It is also being developed to realize general lighting as a white source. In this laboratory, using the same material of GaN, transistors, diodes, chemical sensors and integrated circuits are being developed for the applications in microwave communication and power electronics. Recently, in detail, we are focusing on GaN Schottky diode for microwave rectification, high-frequency AlGaN/GaN HFET using electron-beam lithography, E-mode GaN MOSFET for power electronics and chemical sensor on AlGaN/GaN heterostructure

Keywords : wide bandgap semiconductor, electron device, sensor monolithic integrated circuit.

E-mail: jpao@ee.tokushima-u.ac.jp
Tel. +81-88-656-7442
Fax: +81-88-656-7442
HP : http://wwww.ao-lab.net