

Inductively Coupled Plasma Etching of GaN Mesa Structures for Microphotoluminescence

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Abstract

The wide bandgap group III-nitride semiconductors are highly required for the information technology. For the processing of these materials, dry etching techniques using high-density plasma have been developed due to their high bond strength between group III atoms and nitrogen. One such technique is the inductively coupled plasma (ICP) etching that is frequently used for the group III-nitrides. To achieve useful etch rates, high power plasma is required but the minimal damage is also important for the practical use. We used a step sequence of high-density-low-acceleration-power plasma etching with short etching times to minimize the damage to the mesa structures. The technique allowed us to achieve small mesa structures of micrometer size diameters. From these processed mesa structures, we could observe photoluminescence with a dependence on the mesa size. A focused laser beam was used for the excitation to examine the luminescence from single mesa.

Key words : GaN, inductively coupled plasma, ICP etching, micro PL, processing of GaN

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