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Formation of laser diode ridges by the dry-etching of Pd and AlGaN/GaN superlattices**Jae-Kwan Kim¹, Sung-Nam Lee², Min-Ju Park¹, Joon-Seop Kwak¹, Kyoung-Bo Kim³,
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Abstract

This study examined the dry etching characteristics of palladium and GaN/AlGaN superlattices using Cl₂/CHF₃ and Cl₂/Ar chemistry formed by an inductively coupled plasma system for the fabrication of ridges of laser diodes. Although the etch rates of n-GaN and AlGaN/GaN superlattices were similar using Cl₂/Ar chemistry, the etch rate of the latter was quenched using Cl₂/CHF₃ chemistry due to the formation of a non-volatile fluoride layer and/or high bond strength oxide. The ridge pattern was eroded when the Pd was etched at higher source powers, resulting in non-uniform etched features. In addition, Cl₂/Ar chemistry could not etch the Pd layer. Using a 2-step etching process combining Cl₂/CHF₃ chemistry for Pd with Cl₂/Ar chemistry for the AlGaN/GaN SLs, a ridge for the laser diodes was formed successfully with a vertical sidewall and a good etched surface morphology.

Keywords: Ridge, Laser Diodes, Dry-Etching, Cl₂ Plasma

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