Wet etching study of β-Ga_2O_3

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Recently, there are great interest in β-Ga_2O_3 for solar-blind deep ultraviolet (UV) detector and high-power electronics applications. Due to its wide bandgap of 4.9eV, the β-Ga_2O_3 based devices show excellent power density and visible light insensitivity, especially at high temperature and in harsh environment. The Baliga's and Johnson's figure of merit for β-Ga_2O_3 is far larger than other wide bandgap semiconductors such as GaN and SiC attributed from high critical field strength and reasonable field effect mobility. Wet etching process of semiconducting material is one of essential device fabrication steps, and has many advantages over dry etching in low cost, minimal surface damage, and good selectivity. Monoclinic β-Ga_2O_3 shows significantly different surface atomic arrangement and density depending on its crystal plane, which result in unique wet etching characteristics. In this study, wet etching behavior of β-Ga_2O_3 is investigated according to its crystal planes.

Keywords
β-Ga_2O_3, wet etching, crystal plane, dangling bond