Analysis of surface chemistry and doping concentrations on the biomolecular functionalization of GaN/Ga-In-N quantum wells

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The development of sensitive GaN biosensors necessitates the chemical functionalization of n-type GaN and p-type GaN surfaces. Silane molecules were adsorbed as thin films to investigate the degree of functionalizations on GaN surfaces based on optical fluorescence from biomolecular immobilization and film thickness, surface roughness and other surface properties estimations. Complete biomolecular functionalization and binding monolayer formation of organosilanes showcased the necessity of Mg doping for the construction of a better sensor platform. Increased Mg doping reduced surface functionalization of molecules and optimized dopant levels were reported.

Keywords: n-type GaN; p-type GaN; biosensor; chemical functionalization; protein adsorption; self-assembled monolayer

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