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Spectroscopic Ellipsometry Measurements of Wurtzite Gallium Nitride Surfaces as a Function of Buffered Oxide Etch Substrate Submersion[1] CHESTER SZWEJKOWSKI, COSTEL CONSTANTIN, James Madison University, JOHN DUDA, PATRICK HOPKINS, University of Virginia, OPTICAL STUDIES OF GAN INTERFACES COLLABORATION — Gallium nitride (GaN) is considered the most important semiconductor after the discovery of silicon. Understanding the optical properties of GaN surfaces is imperative in determining the utility and applicability of this class of materials to devices. In this work, we present preliminary results of spectroscopic ellipsometry measurements as a function of surface root mean square (RMS). We used commercially available 5mm x 5mm, one side polished GaN (3-7 μm)/Sapphire (430 μm) substrates that have a wurtzite crystal structure and they are slightly n-type doped. The GaN substrates were cleaned with Acetone (20 min)/Isopropanol(20 min)/DI water (20 min) before they were submerged into Buffered Oxide Etch (BOE) for 10s - 60s steps. This BOE treatment produced RMS values of 1-30 nm as measured with an atomic force microscope. Preliminary qualitative ellipsometric measurements show that the complex refractive index and the complex dielectric function decrease with an increase of RMS. More measurements need to be done in order to provide explicit quantitative results.

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