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Raman Scattering Measurements and Analyses of GaN Thin Films Grown on ZnO Substrates by Metalorganic Chemical Vapor Deposition

Metalorganic chemical vapor deposition (MOCVD) is a popularly used method of growing thin films of GaN on ZnO substrates, which pair well due to their structural and characteristic similarities. In this research, optical characterization of the surface quality of GZ sample films is measured by analyzing Raman scattering (RS) using a Renishaw inVia spectrometer fitted with a 532nm laser. Samples were grown in an improved double injection block rotating disc reactor. Multiple samples' spectra show broad peaks that correspond with the E_2 (high) and A_1 (LO) branches of GaN, and nicely fitted curves are observed for the characteristic E_2 (low) and E_2 (high) of ZnO. Gaussian fitting of the peaks is used to analyze the spectra data through Origin and Matlab software. The data confirms characteristic peaks for GaN and ZnO that agree with previous spectra of other GZ thin films. Many RS measurements were performed to confirm the crystalline quality of the sample for future characteristic testing.