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Characterization of “High Pressure Chemical Vapour Deposition” grown InGaN layers by IR reflectance spectroscopy INDIKA SENEVIRATHNA, MAX BUEGLER, RAMAZAN ATALAY, GOKSEL DURKAYA, JIELEI WANG, NIKOLAUS DIETZ, Physics & Astronomy Department, Georgia State University, Atlanta, GA 30303 — We present the experimental setup, experimental results and a model to simulate the gathered IR reflection spectra in order to gain access to the materials properties. In Detail we will present results on optical Properties of hexagonal InGaN epitaxial films. The films have been grown on GaN/Sapphire substrates by “High Pressure Chemical Vapor Deposition.” The Dielectric function, the free carrier concentration, the thickness, the optical phonons and the carrier mobility in the InGaN layers have been determined by simulating the experimental IR reflectance spectra. For the simulation we used a multi layer stack model and in each layer a combination of classical harmonic Lorentz oscillators and the Drude model. We simulated the spectra all over the transparent, the restrahlen and the free carrier absorption region. The free carrier absorption, Phonon related features as well as interference fringes can be observed in the experimental data and can be matched well with our model. The free carrier concentrations in the analyzed InGaN layers are in the mid 10^{18} cm^{-3} ranges.

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