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Optical and structural analysis of $In_{1-x}Ga_xN$ alloys grown by HPCVD GOKSEL DURKAYA, MAX BUEGLER, ENNO MALGUTH, Department of Physics & Astronomy, Georgia State University, WILL FENWICK, IAN FERGUSON, School of ECE, Georgia Institute of Technology,, NIKOLAUS DIETZ, Department of Physics & Astronomy, Georgia State University — The $In_{1-x}Ga_xN$ ternary alloy system has potential for development of high efficiency solar energy conversion and advanced optoelectronic device applications. $Ga_{1-x}In_xN/In_{1-x}Ga_xN$ hetero-structures of various compositions can be engineered to the responsive from UV to IR wavelength regime, so that devices based on such heterostructures can cover the whole visible spectrum. However, the growth of such ternary $In_{1-x}Ga_xN$ alloys is challenging. This contribution focuses on the structural and optical characterization of $In_{1-x}Ga_xN$ layers and heterostructures grown by 'high-pressure chemical vapor deposition (HPCVD), a growth technique that enables the stabilization of indium-rich $In_{1-x}Ga_xN$ alloys at elevated temperatures using 15 to 20 bar nitrogen overpressure. We will present the structural analysis of $In_{1-x}Ga_xN$ layers studied by Raman spectroscopy (RS), X-Ray Diffraction (XRD) and atomic force microscopy (AFM). The effects of composition and growth conditions on the layer surface topography and growth modes are studied by AFM.

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