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Structural studies on the phase stability of In_{1-x} Ga $_x$N layers[1]
GOKSEL DURKAYA, RAMAZAN ATALAY, MAX BUEGLER, MUSTAFA ALEVLI, Department of Physics & Astronomy, Georgia State University, Atlanta, GA, 30303, MUHAMMAD JAMIL, IAN FERGUSON, School of ECE, Georgia Institute of Technology, Atlanta, GA, 30332, NIKOLAUS DIETZ, Department of Physics & Astronomy, Georgia State University, Atlanta, GA, 30303 — The In_{1-x} Ga $_x$N ternary alloy system has potential for development of high efficiency solar energy conversion and advanced optoelectronic device applications. Ga_{1-x} In $_x$N / In_{1-x} Ga $_x$N hetero-structures of various compositions can be engineered to the responsive from UV to IR wavelength regime. However, the growth of such ternary In1-xGaxN alloys is challenging due to high lattice mismatch, interfacial fields and phase segregation. This contribution focuses on the phase stability of In_{1-x} Ga $_x$N layers grown by 'high-pressure chemical vapor deposition (HPCVD). We present the results of the structural and optical studies on the phase stability of In_{1-x} Ga $_x$N layers using Raman spectroscopy (RS), X-Ray Diffraction (XRD), Optical Transmission Spectroscopy (OTS) and Atomic Force Microscopy (AFM). The effect of growth parameters and conditions; V/III ratio, growth temperature and precursor injection scheme, on phase segregation of In_{1-x} Ga $_x$N layers and on metallic Indium adlayer formation on surfaces are presented. The effects of phase segregation on the surface topography are studied by AFM.

[1]Optical and structural analysis of In1-xGaxN alloys grown by HPCVD.

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