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Resonance Raman Scattering in InGaN J.W. AGER III, W. WALUKIEWICZ, W. SHAN, K.M. YU, S.X. LI, E.E. HALLER, Materials Sciences Division, Lawrence Berkeley National Laboratory, H. LU, W.J. SCHAFF, Department of Electrical and Computer Engineering, Cornell University — Resonance Raman studies of single phase $In_{1-x}Ga_xN$ epitaxial films with $0 < x < 0.63$ and free electron concentrations in the 10^{18} cm^{-3} range are presented. The A_1(LO) phonon scattering intensity is enhanced for excitation above the direct band gaps of the films. Examination of films with direct band gaps between 0.7 and 1.9 eV and laser energies from 1.96 to 2.71 eV show that the resonance is broad, extending to up to 2 eV above the direct gap. Multiphonon Raman scattering of the LO phonon up to $n = 5$ is also observed in alloy samples. Coupling of the electron plasmon to the LO phonon to form a longitudinal plasmon coupled (LOPC) mode, which is observed in the Raman spectra of n-type GaN, is not observed in $In_{1-x}Ga_xN$ for $x < 0.15$. These experimental results will be discussed in terms of the electron-phonon interaction in InGaN.

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