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Temperature dependence of the InGaPN conduction band structure K.I. LIN, T.S. WANG, J.S. HWANG — Material properties of III-N-V alloys, such as GaAsN, InGaAsN, and InGaPN, have been intensively studied, because a small amount of nitrogen (N) incorporation results in very large bandgap bowing and dramatic change in the band structure.[1,2] Recently, temperature dependence of the parameters, *i.e.* the localized states energy E_N introduced by an isolated N and the interaction potential V, of the band anticrossing (BAC) model in GaAsN epilayers has been reported.[3] These properties have never been studied for InGaPN. In this work, temperature-dependent photoreflectance (PR) measurements are employed to characterize the conduction band structure of $In_{0.54}Ga_{0.46}P_{1-y}N_y$ ($y = 0$ and 0.02) grown on GaAs substrates. The band gap and the upper subband E_+ are observed in InGaPN as predicted by the BAC model. To investigate the energetic positions of the features in the PR spectra, a Kramers-Kronig analysis is proposed. Based on these PR data and the BAC model, we find $E_N = 2.054$ eV and $V = 1.513$ eV at 293 K. With decreasing temperature, the energy of E_N shifts significantly to higher energies. Simultaneously, the interaction potential V between the N states and the host conduction band also rises to higher values. The thermal shifts of E_N and V are $dE_N/dT \approx -0.43$ meV/K and $dV/dT \approx -0.67$ meV/K, respectively. 1.APL **88**, 031907 (2006). 2.APL **89**, 192116 (2006). 3.APL **89**, 202105 (2006).

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