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Optical properties of InAsP alloys[1] S.G. CHOI, C.J. PALMSTROM, Chemical Engineering and Materials Science Dept., Univ. of Minnesota, Minneapolis, MN 55455, T.J. KIM, Y.D. KIM, Physics Dept., Kyung Hee Univ., Seoul 130-701, Korea, D.E. ASPNES, Physics Dept., North Carolina State Univ., Raleigh, NC 27695 — Optical properties of $InAs_xP_{1-x}$ ternary alloys grown by chemical beam epitaxy (CBE) on S-doped InP(100) substrates are presented. Room-temperature pseudodielectric function spectra from 1.5 to 6.0 eV were measured by spectroscopic ellipsometry. The E_0, E_1, $E_1+\Delta_1$, E_0', E_2, and $E_2+\delta$ interband critical point (CP) structures were observed in the spectra. By applying the parabolic-band critical point model to numerically calculated second-energy-derivatives of these spectra, accurate values of the CP parameters and their dependence on alloy composition x were obtained. The experimentally determined variation of the E_1 and E_2 CP energies and the spin-orbit splitting Δ_1 with alloy composition were in good agreement with the theoretical calculation based on the Van-Vechten-Berolo-Woolley (VV-B-C) model.

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Sukgeun Choi
University of Minnesota

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