Pressure dependence of optical transitions in ordered GaP/InP superlattices

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of freedom $t_{s,a}$

mixing with off-Γ states is rather weak, the pressure coefficient is very close to the binary average.

~ii! The pressure coefficients given in Table I correspond to *perfect* long-range order ~LRO parameter $h=1$!, where the admixture with off-Γ states is maximal. The pressure coefficients for lower degrees of order $0<h<1$! can be derived from:[10]

$$a(h) = a(0) + h^2[a(1) - a(0)]. \quad (4)$$

Approximating the pressure coefficient $a(0)$ of the random alloy with the average of the binaries ~Table II!, we obtain $a_\Gamma(0)=8.2$ meV/kbar and $a_X(0)=-2.0$ meV/kbar. This compares well with the previously measured pressure coefficients of the disordered $Ga_{0.5}In_{0.5}P$ alloy: $a_\Gamma(0)=8.8$,[3] 8.6 ± 0.6,[11] and 8.4 ± 0.2 ~Ref. 12! meV/kbar, and $a_X(0)=-2.0\pm0.2$ meV/kbar.[12] In all the four structures considered here we have $a_\Gamma(1)<a_\Gamma(0)$!, so from Eq. (4) it follows that the pressure coefficient of the conduction-band minimum ~CBM! *decreases* with increasing ordering.

~iii! The VBM$\rightarrow$CBM+1 transition distinguishes the L_{1c}-folding CuPt structure ~$a=4.0$ meV/kbar! from the remaining X_{1c}-folding superlattice structures ~a . $-$