APPENDIX

APPENDIX A

No	Parameter	Unit	Interpolation
1	Band gap in Γ-point, $E_{g\Gamma}$	meV	1350.0 -720.0y+120.0y^2
2	Band gap in X-point, E_{gX}	meV	2100.0 -720.0y+120.0y^2
3	Band gap in L-point, E_{gL}	meV	1900.0 -720.0y+120.0y^2
4	Spin-splitting Energy, E_{so}	meV	110.0+310.0y-90.0y^2
5	Kane Parameter, E_p	eV	20.7+2.6y
6	Γ-Electron Effective Mass, $m_{e\Gamma}$	m_o	0.080-0.039y
7	X-Electron Effective Mass, m_{eX}	m_o	0.33
8	L-Electron Effective Mass, m_{eL}	m_o	0.22
9	Heavy Hole Effective Mass, m_{vh}	m_o	0.6-0.218y+0.07y^2
10	Light Hole Effective Mass, m_{vl}	m_o	0.12-0.099y+0.030y^2
11	Split-off Hole Effective Mass, m_{vs}	m_o	0.21-0.01y+0.05y^2
12	Strain Deformation Potential, A_c	eV	-5.04
13	Strain Deformation Potential, A_v	eV	1.27
14	Strain Deformation Potential, B_v	eV	-1.7
15	Elastic Constant Ratio, C_{12}/C_{11}	-	0.56
16	Static Dielectric Constant, κ_o	-	12.35+1.62y-0.055y^2
17	Optical Dielectric Constant, κ_∞	-	9.52+2.06y-0.205y^2
18	Sellmeier Equation Coefficient, A_S	-	7.255+1.15y+0.489y^2
19	Sellmeier Equation Coefficient, B_S	-	2.316+0.604y-0.493y^2
20	Sellmeier Equation Coefficient, C_S	μ m^2	0.3922+0.396y +0.158y^2
21	Crystal Density, ρ	cm/s	4.791+0.575y +0.138y^2
22	Velocity of sound, s	10^5cm/s	5.2-0.372y-0.144y^2
23	Piezoelectric Constant, K_{pz}	-	0.012
24	Acoustic Deformation Potential for v-band, D_{cA}	eV	0.0127.95 -2.04+0.839y^2
25	Long-Wavelength Optical Deformation Potential, D_o	10^9V/cm	1.0
26	Short-Wavelength Optical Deformation Potential, D_∞	10^9V/cm	1.0
27	Long-Wavelength Optical Phonon Energy, $\hbar\Omega_o$	meV	24.0-2.84y+1.57y^2
28	Short-Wavelength Optical Phonon Energy, $\hbar\Omega_\infty$	meV	24.0-2.84y+1.57y^2

Table A Material constants for $Ga_xIn_{1-x}As_yP_{1-y}$

APPENDIX B

No	Parameter	Unit	Interpolation
1	Band gap in Γ -point, $E_{g\Gamma}$	meV	$1425.0+1155.x+370.0x^2$
2	Band gap in X-point, E_{gX}	meV	$1911.0+5.0x+245.0x^2$
3	Band gap in L-point, E_{gL}	meV	$1734.0+574.0x+55.0x^2$
4	Spin-splitting Energy, E_{so}	meV	$370.0+100.0x-100.0x^2$
5	Kane Parameter, E_p	eV	25.7-4.6x
6	Γ -Electron Effective Mass, $m_{e\Gamma}$	m_o	0.067+0.083x
7	X-Electron Effective Mass, m_{eX}	m_o	0.41-0.07x
8	L-Electron Effective Mass, m_{eL}	m_o	0.22+0.04x
9	Heavy Hole Effective Mass, m_{vh}	m_o	0.62+0.14x
10	Light Hole Effective Mass, m_{vl}	m_o	0.087+0.063x
11	Split-off Hole Effective Mass, m_{vs}	m_o	0.15+0.09x
12	Strain Deformation Potential, A_c	eV	-7.17+1.53x
13	Strain Deformation Potential, Av	eV	1.15+1.31x
14	Strain Deformation Potential, B_v	eV	-1.7+0.2x
15	Elastic Constant Ratio, C_{12}/C_{11}	-	0.45-0.03x
16	Static Dielectric Constant, κ_o	-	12.18-3.12x
17	Optical Dielectric Constant, κ_∞	-	10.89-2.73x
18	Crystal Density, ρ	cm/s	5.36-1.6x
19	Velocity of sound, s	10^5cm/s	2.69+0.29x
20	Piezoelectric Constant, K_{pz}	-	0.0617+0.0323x
21	Acoustic Deformation Potential for v-band, D_{cA}	eV	3.6-0.7x
22	Long-Wavelength Optical Deformation Potential, D_o	10^9V/cm	1.0
23	Short-Wavelength Optical Deformation Potential, D_∞	10^9V/cm	1.0
24	Long-Wavelength Optical Phonon Energy, $\hbar\Omega_o$	meV	$36.3+1.83x+17.1x^2-5.11x^3$
25	Short-Wavelength Optical Phonon Energy, $\hbar\Omega_\infty$	meV	29.0

Table B Material constants for $Al_xGa_{1-x}As$