

References

- [1] Y. Liu *et al.*, "Valence band engineering of GaAsBi for low noise avalanche photodiodes," *Nat. Commun.*, vol. 12, no. 1, 2021.
- [2] R. D. Richards, "Molecular beam epitaxy growth and characterisation of GaAsBi for photovoltaic applications," no. September, p. 197, 2014.

Supplementary Material

20 nm GaAs	320-560 °C
20 nm Al _{0.3} Ga _{0.7} As	320-590 °C
100 nm Al _x Ga _(1-x) As _(1-y) Bi _y	280-340 °C
300 nm Al _{0.3} Ga _{0.7} As	590 °C
UD GaAs Substrate	

Figure 1 Sample architecture for Al_xGa_(1-x)As_(1-y)Bi_y growth investigation. Capping growth temperature varied only for purpose of annealing investigation.

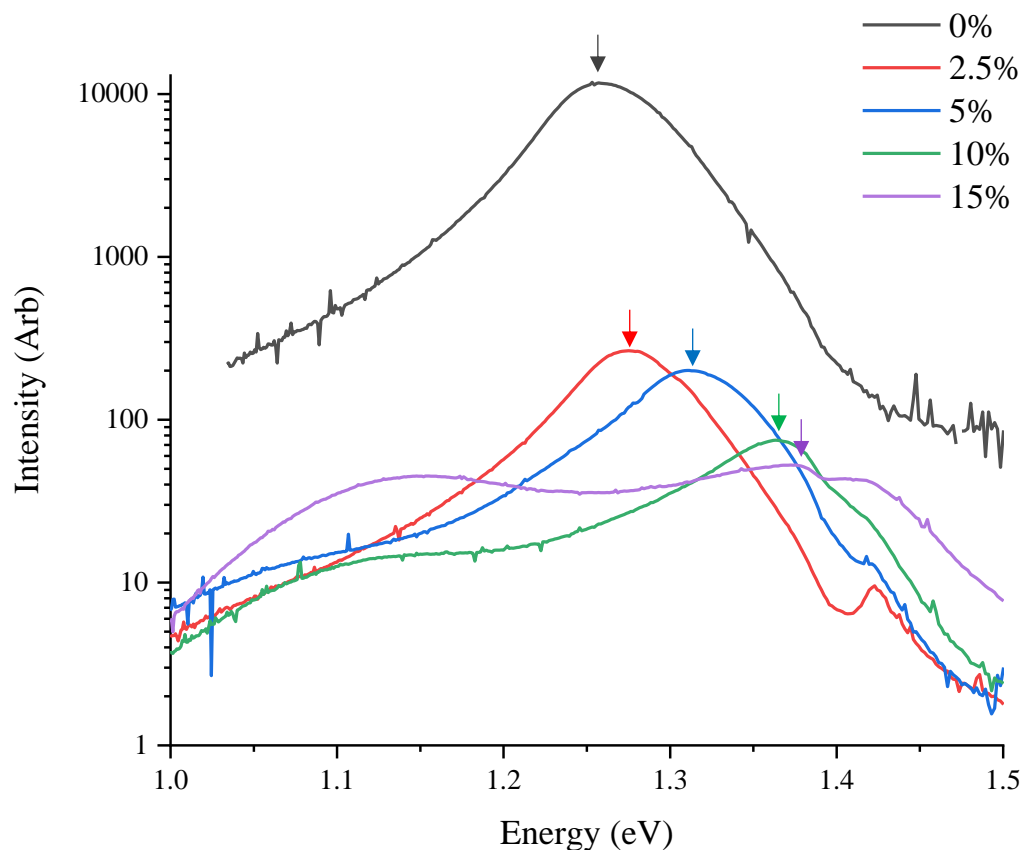


Figure 2 Room Temperature Photoluminescence Spectra of Al_xGa_(1-x)As_(1-y)Bi_y samples with varied Al contents between 0-15%. Bi content between 2.3-2.7% across the series with the main peak of interested marked.

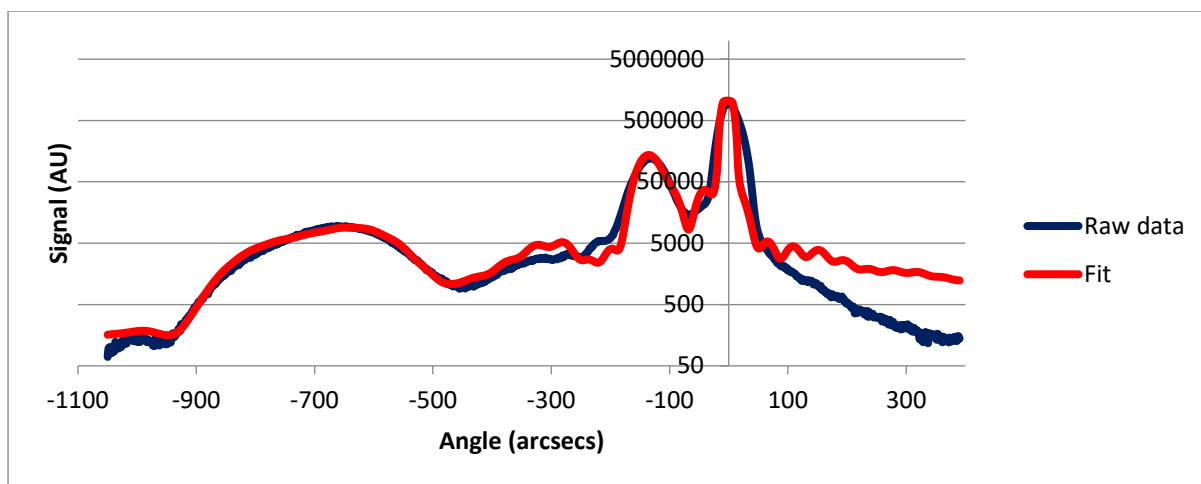


Figure 3 X-Ray Diffraction of $Al_{0.05}Ga_{0.95}As_{0.976}Bi_{0.024}$



Figure 4 Normaski microscope Images of sample surfaces A, B & C for $X=0.0, 0.05$ & 0.15 $Al_xGa_{(1-x)}As_{(1-y)}Bi_y$ alloys respectively with $300\mu m$ scale bar.