

1. Describe the potential processes for optical absorption in an amorphous material, such as Ge_2Se_3 .
2. Describe the processes involved in photoconductivity of a binary amorphous chalcogenide.
3. Describe a Tauc plot and the application to an amorphous material.

A Tauc plot show the transmission with respect to photon energy [1, 2]. Taking the slope of the curve and finding its intercept at either 0 or 10^4 gives the optical band gap. This approach can be used to compare optical band gaps between samples, under compression, at different pressures, at different concentrations, e.g. x in $\text{a-InGaZnO}_{4-x}\text{S}_x$ [2], etc.

References

- [1] R. Zallen (Ed.), The Physics of Amorphous Solids, John Wiley & Sons, Inc., Weinheim, Germany, 1983. doi:10.1002/9783527617968.
URL <http://doi.wiley.com/10.1002/9783527617968>
- [2] J. Kim, H. Hiramatsu, H. Hosono, T. Kamiya, Effects of sulfur substitution in amorphous InGaZnO_4 : optical properties and first-principles calculations, Journal of the Ceramic Society of Japan 123 (7) (2015) 537–541. doi:10.2109/jcersj2.123.537.