

Development of Functional Single Crystals for Laser Communication and Integrated Optics

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Abstract: *Within the past hundred years, the optical crystal area has passed through a rapid evolution- from the discovery of naturally occurring crystals to the creation of sophisticated synthetic materials specifically designed to meet the demands imposed by modern technology. Non- linear optical crystals have a great impact on information technology and industrial applications. The dielectric analysis is an important characteristic that can be used to fetch knowledge on the electrical and ionic properties of a material medium as a function of temperature and frequency. The second harmonic generation values of the single crystals are useful in optical communication and signal processing in integrated optics. The present paper deals with the growth and characterization of Thiourea based crystals namely Thiourea Cadmium Chloride (TCC), Thiourea Cadmium Bromide (TCB), and Thiourea Zinc Sulphate (TZS). The single crystals were grown by slow evaporation technique at room temperature. Powder XRD pattern reveals the single crystalline nature of the crystals. FTIR studies confirm the functional groups in the crystals. The optical transparency of the crystals was determined by UV- Visible studies. The grown single crystals were also subjected to dielectric and Non linear optical (NLO) Second harmonic generation (SHG) measurements. The dielectric and optical studies carried out reveal that the TCC, TCB, TZS crystals exhibit good optical quality and possible NLO applications.*

Keywords: NLO, XRD, SHG, dielectric studies