

Growth and Characterization of Bis-Thiourea Nickel Barium Chloride Single Crystals

Authors : Rakesh Hajiyani, Chetan Chauhan, Harshkant Jethva, Mihir Joshi

Abstract : Metal bis-thiourea type organo-metallic crystals are popular as non-linear optical materials. Bis-thiourea nickel barium chloride was synthesized and crystals were grown by slow aqueous solvent evaporation technique. The transparent and colorless crystals having maximum dimensions of 13 mm x 8 mm x 2.2 mm were obtained. The EDAX was carried out to estimate the content of nickel and barium in the grown crystals. The powder XRD analysis suggested orthorhombic crystal structure with unit cell parameters as: $a= 9.70 \text{ \AA}$, $b= 10.68 \text{ \AA}$ and $c= 17.95 \text{ \AA}$. The FTIR spectroscopy study confirmed the presence of various functional groups. The UV-vis spectroscopy study indicated that the crystals were transparent in the visible region with 90% transmittance level further optical parameters were studied. From the TGA it was found that the crystals remained stable up to 170 °C and then decomposed through two decomposition stages. The dielectric study was carried out in the frequency range of applied field from 500 Hz to 1 MHz. The variations of dielectric constant, dielectric loss were studied with frequency. It was found that the dielectric constant and the dielectric loss decreased as the frequency of applied field increased. The results are discussed.

Keywords : crystal growth, dielectric study, optical parameters, organo-metallic crystals, powder xrd, slow evaporation technique, TGA

Conference Title : ICOLS 2016 : International Conference on Optics, Lasers and Spectroscopy

Conference Location : Zurich, Switzerland

Conference Dates : January 12-13, 2016