

Thiourea: Single Crystal with Non Linear Optical Characteristics

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Abstract : During the last few decades, the growth of single crystals has attained enormous importance for both academic research and technology. Single crystals are pillars of modern technology. In recent emerging trends of photonics and optoelectronics technology, there has been increased need for organic and semi organic materials for Non-Linear Optical (NLO) applications. The paper dealt with the initiation of good single crystals of thiourea and metal doped thiourea. The authors have successfully grown thiourea (pure) and metal doped thiourea crystals using relatively simple and inexpensive slow evaporation of aqueous solution technique. Pure thiourea crystals were grown with different light intensities and frequencies as there growth conditions. Metals (Cu, Co, Ni, Fe) doped crystals were grown using a simple evaporation technique. The paper explains growth methods and associated grown parameters in detail. The average size of the crystal is varied in size from 40 mm x 1mm to 1.5 mm x 1.5 mm to 0.5 mm. Crystals obtained are hexagonal, tetragonal, and rectangular in shape with different optical qualities. All grown crystals are characterized using X-Ray Diffraction Analysis (XRD), Ultra Violet Visible analysis, and Fourier Transform Infrared Spectrometry. Their non-linear optical characteristics were determined by Second Harmonic Generation (SHG) and their Laser Dispersive analysis. The grown crystals are characterized using Nd:YAG laser and the highest conversion efficiency of the signal pass light are calculated. It shows 58 % of standard values for KDP crystals. All results are summarized in this work.

Keywords : crystal, metal-doped thiourea, non-linear optical, NLO, thiourea

Conference Title : ICC 2021 : International Conference on Crystallization and Crystallography

Conference Location : London, United Kingdom

Conference Dates : April 22-23, 2021