

Growth and characterization of semi organic NLO single crystal

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NLO (nonlinear optical materials) play a major role in the domain of photonic and photo electronic technologies. High second order optical nonlinearity, lower laser damage threshold belongs to the category of organic compounds[1] but of poor mechanical and thermal properties. Semi organic crystals possess the advantages of both organic and inorganic NLO materials[2]. These crystals have high mechanical strength and chemical stability as the organic ligand is bonded ionically with the inorganic host. The title compound of $[\text{Co}(\text{pic})_2(\text{H}_2\text{O})_2] \cdot 4\text{H}_2\text{O}$, cobalt (II) complex of picolinic acid (PCOB) has grown from slow evaporation solution growth technique at room temperature. The cell dimensions and crystal system were confirmed by single crystal X-ray diffraction (XRD) analysis[3]. The various functional groups of the synthesized material were analyzed by Fourier transform infrared (FT-IR) spectroscopy. The optical transparency of the resulting crystals was subjected to UV-Visible spectral study. The hydrated crystal is thermally stable and it loses its stability while getting dehydration using TG/DTA analysis. The mechanical properties like, Vicker's micro hardness number (Hv), stiffness constant (C11) and yield strength (σ) were evaluated using a Vickers micro hardness tester. The dielectric constant and dielectric-loss are higher at the lower frequencies, and saturates at the frequency the crystal is pure and perfect. The enhanced second-order nonlinearity of the centrosymmetric (PCOB) can be a potential material for transducer, optoelectronics and nonvolatile memory devices applications.

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