**Synthesis, Growth and Characterization of Acetophenone-4-Quinoline-D Chalcone Single Crystal: A Potential Nonlinear Optical Material**

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**Abstract:** Thenew potentially useful nonlinear optical (NLO) organic material Acetophenone-4-quinoline-D chalcone has been synthesized using claisen-schmidt condensation reaction method and single crystals were grown by slow evaporation solution growth technique. Powder x-ray diffraction (XRD) study was carried out to determine the structure of the compound. It was observed that the crystallite size varies from 10-10 to 10-9 with increase in angle, it may be due to compressive strain developed in the crystal. It has been observed that dislocation density, micro strain and distortion parameter changes randomly due to mismatch in the atoms or ions. The thermal stability of the compound was determined using differential scanning calorimetry (DSC) method. It was found that melting point of the crystal is found to be 150.4 °C. The UV-Visible absorption study of the crystal was carried out using UV-Visible spectrophotometer over the spectral range 300 - 1200 nm at room temperature. It was observed that the sample has good transparency window in the entire visible and near IR region. The second harmonic generation (SHG) efficiency of the crystal was recorded using powder technique using Nd:YAG laser and is found to be 1.5 times that of reference sample urea of identical particle size.

**Keywords**:Characterization, Growth from solution, Organic compounds, Nonlinear optical material