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# Nonlinear optical, Optical limiting and Dielectric Properties of Organic Cyclohexylammonium Acetate Single Crystal

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**Abstract:** We report the growth and nonlinear optical properties of cyclohexylammonium acetate (CYHAC) crystal. The functional groups and crystal structure were determined using FT-IR analyses and single crystal XRD (293 K). UV-Vis-NIR measures the cutoff wavelength (254 nm) and optical band gap (5.17 eV) of CYHAC crystal. TG-DSC spectrum shows the melting point (161 °C) and decomposition of the compound. Activation energy was calculated from dielectric studies as a function of frequency at different temperatures. Laser damage threshold of CYHAC is 5.23 GW/cm<sup>2</sup>. Nonlinear optical parameters were calculated using Z-Scan technique for this material and its optical limiting behavior were also tested, the value of limiting threshold and clamping output are 24.3 mW and 7.1 mW respectively.

**Keywords:** Crystal growth; Crystal Structure; Dielectrics; Optical materials and properties; Thermal analysis; Optical limiting behavior.

## 1. Introduction

The materials with high nonlinear optical response play a vital role in optical information processing, optoelectronic applications, integrated optics and waveguide device. Both organic and inorganic materials are still developed for the applications of optical switching and frequency doubling

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