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## Third order nonlinear optical and electrical properties of new 2-aminopyridinium 2-chloro 4-nitrobenzoate single crystals

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**ABSTRACT** New organic single crystals of 2-aminopyridinium 2-chloro 4-nitrobenzoate (2AP2CL4N) were grown by the slow evaporation technique at room temperature. Single crystal XRD confirmed that the crystal belongs to the triclinic system with the space group P1. Various functional groups present in the compound were confirmed by the FT-IR spectral analysis. UV-Vis studies showed that the crystal has a lower cutoff wave length at 399 nm. Dielectric studies were carried out at various temperatures. Nonlinear absorption coefficient ( $\beta$ ), nonlinear refraction ( $n_2$ ) and third order susceptibility ( $\chi^{(3)}$ ) were also evaluated for the grown crystal.

*Keywords:* Crystal growth, Nonlinear optics, X-ray diffraction, Z-scan.

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### 1. Introduction

The recent research on organic non-linear optical materials has shown that they have more advantages over the inorganic non-linear optical materials with regard to scientific and technical applications. These materials offer applications in high density optical data storage, color display, photonics, electro-optical amplitude modulation, ultra compact lasers, optical switching, optical logic, frequency shifting and optical parametric generation [1-5]. Compared to inorganic materials, organic materials possess high laser damage threshold, large hyperpolarizability ( $\beta$ ) and fast response to electro-optic devices, ease of device fabrication and flexibility of molecular design via proper synthetic method [6-10]. In particular,  $\pi$ -conjugated systems linking a donor (D) and acceptor (A) show a large NLO response and have been intensively investigated [11-13]. 2-aminopyridine is an organic heterocyclic molecule which is often used as a ligand in a metal complex and also as a model compound for understanding nucleic acid bases. Previously 2-aminopyridine–acid based crystals were grown by the slow evaporation technique and their properties were reported [14, 15]. Based on these facts in the

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