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# Synthesis, crystal structure, optical, thermal and dielectric studies of a potential novel organic material: L-histidinium fumarate Fumaric acid monohydrate single crystal

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## Abstract

L-histidinium fumarate fumaric acid monohydrate (LHFFA), a new amino acid based organic single nonlinear optical crystal has been successfully grown from aqueous solution by slow solvent evaporation method. The crystal structure was determined by single crystal X-ray diffraction analysis and it belongs to monoclinic system with the space group  $C_2$ . The thermal stability of the crystal has been investigated by means of thermogravimetric analysis and different thermal analysis. The result of UV-Vis study showed that the crystal was about 50% transparent in the visible region. The optical band gap of the grown crystal was also calculated. The dielectric response of the crystal with varying frequencies in the temperature region from 40°C to 80°C has studied. The crystal is subjected to Kurtz-Perry powder SHG test to prove its optical nonlinearity.

**Keywords:** Crystal structure; Crystal growth; optical materials and properties; Thermal analysis.

## 1. Introduction

Nonlinear optical (NLO) materials are expected to play a major role in the technology of photonics including optical information processing [1-4]. Amino acid based crystals exhibit excellent nonlinear and electrooptic properties. A mixture of amino acid L-alanine and fumaric acid has been recently reported to exhibit good NLO properties [5]. Recently, amino acids are

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