



## Growth and characterization study of pure and $C_4H_6O_5/C_2H_2O_4/Li_2SO_4$ doped L-Lysine single crystal for NLO applications

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### ABSTRACT

The Systematic studies of organic materials (L-Lysine) are doped and undoped of Malic acid ( $C_4H_6O_5$ ) / Oxalic acid ( $C_2H_2O_4$ ) / lithium sulphate ( $Li_2SO_4$ ) (LMOL) single crystals have been grown by a conservative slow evaporation process. The unit cell magnitudes were valued by the L-Lysine single crystal analysis of the XRD pattern. The L-Lysine crystal occupied in functional groups has been recognized by FTIR spectral studied. The optical characteristics of the L-Lysine crystal were studied by UV-Vis, NIR spectral investigation. The Vicker's hardness is investigated by the sample measured by mechanical stability, which is detected with a consignment differs linear by stiffness worth. The nonlinear study of L-Lysine crystal is obeyed to phase competition intelligent materials. The optical absorption spectrum of the LMOL doped and undoped crystals are transparent to the bandgap energy range of 5.78 eV and 6.10 eV. The nonlinear optical in III-order for the susceptibility of the crystals was established through the Z-scan method and it is originated with the direction of 104esu. Nonlinear optical limiting achievement of the crystal around 389 nm has been established by using laser ray then the doped and undoped LMOL crystals have character defocussing result. The crystal is analyzed of SHG in 2 times of nearly to more perform than conventional KDP crystal. It should be approaching in crystalline resources for energy transfer fabrication of optical limiting applications and tools should be the development of industrial.

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### 1. Introduction

Nowadays, modern life has improved the society and commercial, industrial day by day developing for scientific researchers have done in consume approximately 60% of the world's optical sensors device. It is almost impossible to offer a universal characterization of crystalline resources for energy transfer because the feeling of a single crystal is affected by changing favourites and specific characters of the civilization of humans living in different fabrications of NLO zones. An insufficient study was showing on

NLO satisfaction of energy transfer before to date; the main goal of the current study is to attract a contrast between the NLO parameters for evaluation of energy transfer of fabrication occupant of the effect materials.

Optical data storage (ODA), optical switches (OS), optical frequency conversion (OFC) and optical communication (OC) devices have extended for applications of optoelectronic by use of novelty in NLO techniques as reviewed by [1–6]. The organic large NLO coefficients of optical materials were associated with inorganic material, then which have approached to their deprived thermal, mechanical properties, the damage of threshold in low laser performed as [7]. NLO material of novel kinds of the hybrid system to solving the problems are were traveled since organic elements and developments inorganic by [8]. In a study for change metal dopant  $Co^{2+}$  have supplementary to the molar (%) for soaked

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