CHAPTER 9

SUMMARY

9.1 SUMMARY

This chapter presents an overview of the present investigation on a new class of semi organic materials. These materials have several positive features like easy synthesis, high thermal stability, optical transparency and moderate to strong phase-matchable SHG. Investigation of these materials has also revealed some important practical guidelines for the fabrication of molecular materials for SHG, Photonic device and biomedical applications.

The single crystal of some semi organic crystal has been grown by solution growth slow evaporation technique by using deionized water as a solvent. The single crystal X-ray analyses reveal the crystal structures and cell parameters. The powder X-ray diffraction study confirms the crystallinity of the grown crystals. The functional groups were confirmed by Fourier Transform Infrared spectral analysis. The UV-Vis-NIR spectrum of the grown crystal shows good transmittance in the entire visible region enabling its use in optical applications. By using UV Vis spectrometer the lower cut off wavelength was recorded for the grown crystals and the band gap energy was also found. Vickers micro hardness reveals that the hardness number Hv increases with increasing load exhibiting Reverse Indentation Size Effect and Meyer's index, n, Yield strength, and elastic stiffness constant

have been carried out by indentation method. The dielectric constant and dielectric loss measurements of the crystal at different temperatures and frequencies of the applied field are measured and calculated.

The green fluorescence emission of the crystal confirmed its fluorescence behavior. The antibacterial results revealed that newly synthesized crystal show higher activity than the ligand but markedly lower than the standard drug. From the SEM analysis the grown crystal shows stepped growth which may be the consequence of constant rate of evaporation of solvent at room temperature. The SHG measurement has confirmed the NLO property of the grown crystal.

9.2 SUGGESTION AND FUTURE WORK

The results of the present investigations allow ample scope for further investigations in these single crystals as outlined below:

- Other Growth methods like melt growth, SR method can be employed to get still bigger crystals of the grown crystal for possible industrial applications.
- Anti-bacterial and Anti-fungal studies can be extended.
- Suitable dopants can be incorporated to modify the NLO behavior of the crystals.
- Studies On the prospects of grown Crystals as bio compatible capping agents for nano particles for bio medical imaging and targeted drug delivery applications can be carried out.

- Growing good quality big size NLO crystals suitable for device application.

- Advanced microscopic techniques, such as AFM and TEM, can be used to characterize the grown samples.

- The etching behavior on the growth planes can be done using various organic solvents to estimate the dislocation density and lattice inhomogeneity and to identify the growth mechanism.