



Synthesis and Characterisation of Undoped and Methyl Orange (Dye) doped L-Alanine Acetate Single Crystal

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Abstract : The potential application of amino acid crystals, used in NLO applications leads to intensive investigation about the material. In the present work, L-alanine acetate and methyl orange (dye) doped L-alanine acetate crystal was grown by slow evaporation method. The samples were synthesized and purified by repeated re-crystallization process and the solubility of the sample was found at different temperatures. The cell parameters were calculated using Powder X-ray diffraction analysis and the functional groups were identified using the Fourier Transforms Infra-Red Spectroscopic (FTIR) studies. From UV-Vis-NIR spectral study, it is noted that the transmission in the lower cut-off wave length, reflecting the good transmittance property of the crystal in the entire visible region. The optical emission bands were estimated by the Photoluminescence Studies. The optical band gap was also calculated for the grown crystal. NLO property of the crystal is confirmed by Kurtz-Perry powder technique. The mechanical properties such as hardness value, yield strength and stiffness constant were estimated by the Vicker's Microhardness measurement. EDS analysis shows the elements present in the grown samples. From TG/DTA analysis, the decomposition point for methyl orange doped L-alanine acetate crystal is found to be at 290⁰ C which shows more thermal stability compared to that of undoped L-alanine acetate crystal.

Keywords: L-Alanine complex; dopant; NLO; XRD; Hardness; Dye; and Spectroscopy.

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