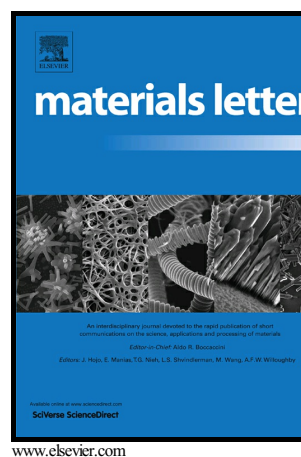


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G. Pasupathi, K. Uma, C. Ramachandra Raja, R. Manimekalai



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Influence of ethylene diamine tetra acetic acid on the performance of ferrous sulphate hepta hydrate-a non linear optical single crystal

G. Pasupathi^a, K. Uma^a, C. Ramachandra Raja^b, R. Manimekalai^{a*}.

^aPG & Research Department of Physics, AVVM Sri Pushpam College (Autonomous), Poondi, Thanjavur-613503.

^bPG & Research Department of Physics, Govt. Arts College,(autonomous), Kumbakonam-612001.

*Corresponding author:Mobile:(+91) 9942544718 E. mail: maniabi64@gmail.com

Abstract

Optically highly transparent and coloured single crystals of ethylene diamine tetra acetic acid doped with ferrous sulphate hepta hydrate ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$), a nonlinear material, FeEDTA, has been grown from aqueous solution by slow evaporation technique. The good quality single crystals were harvested within 25 days. The grown crystals were subjected to single crystal X-Ray Diffraction and powder X-Ray Diffraction. The recorded powder diffraction pattern confirmed the purity and crystalline nature of the as grown crystal. The wide transparency seen in the recorded UV-VIS-NIR spectrum proved the utility of the crystal in optoelectronics. The photoluminescence spectrum for the grown sample was also recorded. The second harmonic generation efficiency was ascertained by Kurtz and Perry powder technique. Its diamagnetic nature was confirmed by vibration spectrum magnetometer technique.

Keywords: Solution growth; IR analysis; X-ray diffraction; Optical properties; Nonlinear optical material.

1. Introduction

Nonlinear optics (NLO) is a pioneering field in science and technology, which has found wide applications in the field of telecommunication, optical parametric generation and optical storage devices etc. The organic nonlinear optical crystals have been intensively investigated due to their high second order nonlinearities, flexibility of molecular design, high damage resistance to optical radiation, rapid response to electro-optic effect. For the efficiency of second order nonlinearities in organic molecular crystals two properties are important in addition to noncentrosymmetric property such as strong π electron delocalization and intramolecular charge transfer stimulated by the presence of electron donor and the electron acceptor groups as compared to inorganic NLO counterparts [1]. They play vital role in second harmonic generation (SHG), frequency mixing, electro-optic modulation, optical

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