Studies on crystal growth, vibrational, optical, thermal and dielectric properties of new organic nonlinear optical crystal: Bis (2, 3-dimethoxy-10-oxostrychnidinium) phthalate nonahydrate single crystal

P. Krishnan, K. Gayathri, P.R. Rajakumar, V. Jayaramakrishnan, S. Gunasekaran, G. Anbalagan

PII: S1386-1425(14)00451-X
DOI: http://dx.doi.org/10.1016/j.saa.2014.03.040
Reference: SAA 11873

To appear in: *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*

Received Date: 3 December 2013
Revised Date: 17 March 2014
Accepted Date: 20 March 2014

Please cite this article as: P. Krishnan, K. Gayathri, P.R. Rajakumar, V. Jayaramakrishnan, S. Gunasekaran, G. Anbalagan, Studies on crystal growth, vibrational, optical, thermal and dielectric properties of new organic nonlinear optical crystal: Bis (2, 3-dimethoxy-10-oxostrychnidinium) phthalate nonahydrate single crystal, *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy* (2014), doi: http://dx.doi.org/10.1016/j.saa.2014.03.040

Studies on crystal growth, vibrational, optical, thermal and dielectric properties of new organic nonlinear optical crystal: Bis (2, 3-dimethoxy-10-oxostrychnidinium) phthalate nonahydrate single crystal

P. Krishnan[a], K. Gayathri[a], P.R. Rajakumar[b], V. Jayaramakrishnan[c], S. Gunasekaran[d], G. Anbalagan[a*]

[a*]Department of Physics, Presidency College, Chennai-600 005, India

[b] Department of Chemistry, Government Arts College, Chidamdaram-608 002, India

[c]Department of Physics, PSG College of Arts and Science, Coimbatore- 641 014, India

[d]St. Peter's University, Avadi, Chennai-600054, India

*Corresponding author: anbu24663@yahoo.co.in (G. Anbalagan)

Telephone No: +91-44-28544894

Abstract

In this paper, we report the synthesis, growth and characterization of a new organic NLO single crystal of Bis (2, 3-dimethoxy-10-oxostrychnidinium) phthalate nonahydrate, for the first time. The single crystal XRD study reveals that the crystal belongs to monoclinic system. The molecular structure and the nature of the vibrations were identified by vibrational and NMR spectroscopic studies. The UV absorption edge was found to be 330 nm with a wide optical transmittance window covering the visible region. The crystal exhibits physicochemical stability upto 90.56ºC.Various thermodynamic parameters were calculated from the TG data. The Kurtz powder second harmonic generation revealed that the SHG efficiency of the grown crystal was about 2.8 times that of KDP and was found to be phase matchable. The measured low value of birefringence indicates its suitability for NLO devices. The dielectric behavior of the grown crystal was analyzed for different frequencies at different temperatures.