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Authors: S.P. Ramteke, Mohd Anis, M.I. Baig, Mohd Shkir, V. Ganesh, G.G. Muley



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Eye-catching modification in external morphology, photoluminescence and SHG efficiency of $\text{NH}_4\text{H}_2\text{PO}_4$ crystal: A consequence of influential presence of tartaric acid

S.P. Ramteke^a, Mohd Anis^{a*}, M.I. Baig^b, Mohd Shkir^{c,d}, V. Ganesh^{c,d}, G.G. Muley^a

^aDepartment of Physics, Sant Gadge Baba Amravati University, Amravati-444602, Maharashtra, India

^bProf Ram Meghe College of Engineering and Management, Amravati-444701, Maharashtra, India

^cAdvanced Functional Materials & Optoelectronic Laboratory (AFMOL), Department of Physics, College of Science, King Khalid University, P.O. Box 9004, Abha-61413, Saudi Arabia

^dResearch Center for Advanced Materials Science (RCAMS), King Khalid University, P.O. Box 9004, Abha-61413, Saudi Arabia

Abstract

The frequent demand of excellent quality $\text{NH}_4\text{H}_2\text{PO}_4$ (ADP) crystal is encouraged for photonic device fabrication hence present communication is focused to grow the tartaric acid (TA) influenced $\text{NH}_4\text{H}_2\text{PO}_4$ (ADP) crystal and investigate the role of TA that enabled remarkable modification in morphology and optical properties of ADP crystal. The TA influenced ADP single crystal has been grown by slow solvent evaporation method at room temperature. The pure and TA influenced ADP crystal samples were subjected to powder X-ray diffraction analysis to determine the crystalline phase and evaluate the structural parameters of respective crystal. The exceptional transformation in external morphology of ADP crystal due to presence of TA has been systematically evaluated. The frequency doubling phenomenon i.e. second harmonic generation efficiency of pure and TA influenced ADP crystal has been experimentally determined by means of Kurtz-Perry powder test and observed decrease in SHG efficiency of TA influenced ADP crystal has been discussed. The influence of TA on photoluminescence nature of ADP crystal has been investigated within wavelength range of 350-700 nm.

Keywords: Crystal growth, Inorganic material, Optical studies, Luminescence, X-ray diffraction

1. Introduction

In current technological era ammonium dihydrogen phosphate ($\text{NH}_4\text{H}_2\text{PO}_4$, ADP) with d_{36} coefficient of magnitude 1.38×10^{-9} esu is still extensively studied and demanded crystal [1]. Over the period of few decades

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