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Synthesis, Growth, Spectral, Optical, Thermal, and Non-Linear Optical Applications of an Inorganic Single Crystal: Potassium Dihydrogen Orthophosphate- Sodium Chloride Single Crystal

S. Jeeva, K. Arulaabaranam, S. Chithra, K. Selvam, G. Mani*

PG & Research Department of Physics, Arignar Anna Government Arts College - Cheyyar- 604 407, Tamil Nadu, India.

Abstract: An inorganic nonlinear optical substantial of a single crystal ofPotassiumdihydrogen phosphate - Sodium chloride [PDPSC] is synthesized by slow evaporation method at room temperature. The blended material is exposed to single- crystal X-ray diffraction analysis to classify the atomic unit cell fundamental parameters. As grown crystal to ascertain the fundamental functional groups find by Fourier transform infrared spectrum. The fingerprint Raman spectra of the grown crystal is quality and impurity has been discussed. Optical absorption studies illustrate low absorption in the entire UV and visible region with a lower cut off wavelength of 240 nm and there by optical band gab energy E_g is calculated to be 5.126 eV. The Surface morphology of the crystallized salt also examines studies with different magnification. Grown crystal elemental compositions were identified by energy dispersive X-ray spectroscopy. Fingerprint techniques of Raman spectroscopy also added to examine the crystalline quality and the functional group of the materials. The Kurtz powder SHG was confirmed using Nd:YAG laser with fundamental wavelength of 1064 nm. The relative second harmonic efficiency of the compound found to be 1.61 times less than that of KDP. Thermal stability of the grown crystal vividly studied by thermo gravimetric analysis and differential scanning calorimetric techniques measurements. The Photoluminescence spectrum exhibited three peaks (427 nm, 620 nm, 759 nm) study at certain energy can be viewed as transition energy from the grown crystal.
Keywords: Optical, Structural, Thermal Properties, Morphological Studies, NLO.

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