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19-21, MAY 2021



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Department of Electronics and Communication Engineering (ECE)  
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## Effects of Chrysoidine Y on Structural, Functional and Optical properties of Potassium Dihydrogen Orthophosphate single crystals

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### Abstract

Doping different organic and inorganic substances in KDP single crystals have been carried out for a long period of time to analyse the influence of impurities on the crystal structure, rate of growth and optoelectronic properties of the KDP crystals. Organic impurities are of particular interest considering they can enhance the characteristics of the KDP single crystals. Doping of organic dyes created a vast change in the non-linear optical properties of the KDP crystals. Single crystals of pure and Chrysoidine Y doped Potassium dihydrogen orthophosphate (KDP) are grown using the slow evaporation method at room temperature. The grown crystals are harvested after the time period of 25 to 30 days. The grown crystals are characterized using powder XRD, FTIR and UV-Visible analysis. The studies on the grown crystals clearly indicate the effects of dopant on KDP single crystals. The XRD peaks of pure and chrysoidine Y doped KDP single crystals are identical but only vary on their intensities and there are no changes in the crystal structure. The absorbance and transmittance spectra for the grown crystals are plotted using UV-visible spectrum analysis and their optical band gap energy is calculated. The vibrational assignments of the grown crystal are analyzed using the FTIR spectrum. Elastic stiffness constant for the grown crystal is also calculated. Doping of dye in KDP leads to the development of new photonic materials by coupling the optical properties of both KDP and dye.

**Key words:** KDP, Chrysoidine Y, XRD, UV-visible, FTIR, crystal growth, single crystal



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# 6th International Conference on Nanoscience and Nanotechnology ICONN 2021



## 6th International Conference on Nanoscience and Nanotechnology

(Virtual Conference)

February 01-03, 2021

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## 6<sup>th</sup> International Conference on Nanoscience and Nanotechnology



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Springer Nature

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# Effect of Crystal Violet and Malachite Green on L-Lysine Potassium Dihydrogen Orthophosphate (LLKDP) single crystals

Gabriya L. R.<sup>1</sup>, A. Darlin Mary<sup>2</sup>, J. Johnson<sup>2</sup>

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**Abstract:** Potassium dihydrogen orthophosphate single crystal exhibits excellent electro-optical and nonlinear optical properties. When amino acids are used as the dopant these properties are enhanced, with organic dyes they are enhanced further and has a wide range of applications. In the present study two different organic dyes (Crystal Violet and Malachite Green) are doped in L-Lysine Potassium Dihydrogen Orthophosphate single crystals. Optically good quality single crystals of crystal violet and malachite green doped L-Lysine Potassium dihydrogen orthophosphate were grown by slow solvent evaporation method. Crystal structure is determined by using powder XRD analysis. The optical energy band gap of the crystal is determined by using UV-visible spectrum. The vibrational assignments of the crystals were analyzed and reported using FTIR spectrum. The mechanical behaviour of the crystal is analyzed using Vickers microhardness studies.

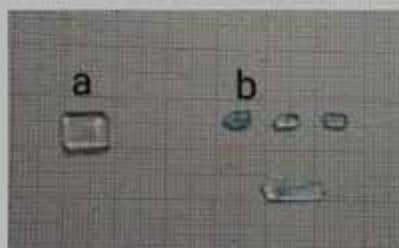


Fig.1. Image of the grown crystal (a- crystal violet doped LLKDP, b- malachite green doped LLKDP)

1485

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## **Antibacterial activities of Zinc Doped Magnesium Ferrite**

### **Nanoparticles with Combustion method**

T.C..Bessy<sup>1</sup>, M.R.Bindhu<sup>2\*</sup> and J.Johnson<sup>1</sup>

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<sup>2</sup> Department of Physics, Sree Devi Kumari Women's College, Kuzhithurai-629163, Tamilnadu, India.

\*To whom correspondence should be made. Email: bindhufm@gmail.com ; Tele:04651260344.

**Abstract :** In this paper, Magnesium Zinc Ferrite ( $Mg_{0.4-x}Zn_xFe_2O_4$ , where  $x = 0.2, 0.4$  and  $0.6$ ) nanoparticles were successfully fabricated by combustion method. The prepared samples were characterized by XRD, FTIR, UV, SEM, EDAX and TEM. The antibacterial properties of the nanoparticles were studied in detail and the results are discussed. From the XRD spectrum it is confirmed that the prepared samples have cubic spinel structure with crystallite size in the range of 13-15 nm. IR absorption bands confirm the formation of spinel structure. Surface morphology of the samples have been investigated using SEM and confirmed the spherical shape of prepared samples in agglomeration. From the UV spectrum, the optical band gap was calculated which ranges from 5.2 – 4.6 eV. TEM micrographs confirm the nano crystalline nature of combustion derived ferrite nanoparticles with average particle diameter of 7-28 nm. The antibacterial studies confirm that the prepared nanoparticles are more toxic to pseudomonas aeruginosa having a maximum zone of inhibition of 25 mm.





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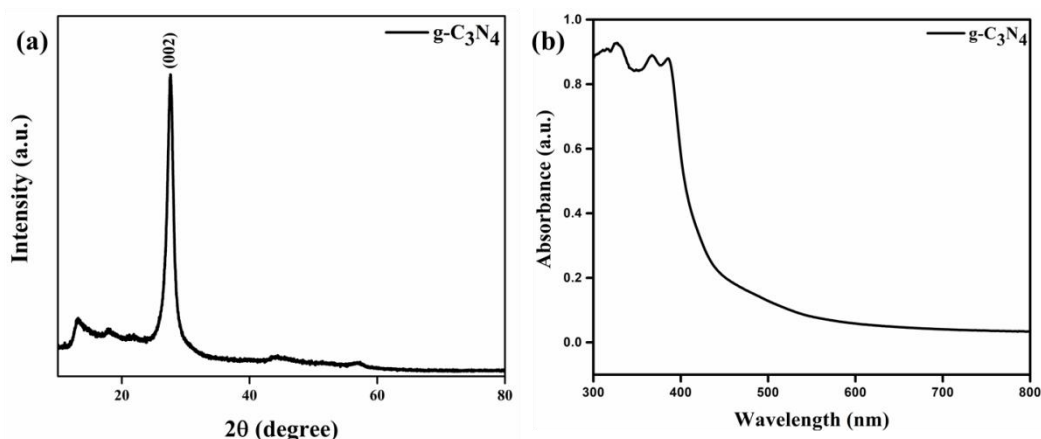


Figure. 1(a) shows the as prepared XRD pattern for g-C<sub>3</sub>N<sub>4</sub>, (b) absorption spectra of g-C<sub>3</sub>N<sub>4</sub>

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### Characterization of Potassium nitrate doped Nickel Thiourea Sulphate Single crystals

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**Abstract:** Research on Semiorganic nonlinear optical materials grow in recent years. Organic materials have low mechanical strength and poor physico-chemical stability. As a result, nowadays research is focused on semiorganic NLO materials to obtain superior NLO crystals by combining the advantages of organic and inorganic materials. The thiourea molecule is an interesting matrix modifier due to its large dipole moment and ability to form extensive network of hydrogen bonds. Semiorganic crystal has high-optical nonlinearity of a purely organic ion combined with favourable mechanical and thermal properties of an inorganic counter ion. In the present work, Nickel thiourea sulphate doped with potassium nitrate is explained. The crystal structure, spectroscopic and mechanical properties are discussed. The doped crystal belongs to the orthorhombic crystal system. The functional groups associated with the doped crystals are found by FTIR spectral studies. The mechanical properties of the doped crystals is found by Vicker's microhardness studies. Due to the doping of inorganic material, the mechanical properties of crystals can be improved compared to the pure crystals. Crystals with improved mechanical properties are used in commercial purposes.

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# ABSTRACT PROCEEDINGS

## <sup>h</sup> Biennial International Group Theory Conference – 2021 (6BIGTC-2021)

(A Virtual Conference)  
04<sup>th</sup> – 06<sup>th</sup> March 2021



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## Separation Axioms on $\hat{g}^{**}$ s-Closed Sets

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### Abstract

Topology is the branch of Mathematics which was introduced by Johann Benedict Listing in 19<sup>th</sup> century and its purpose is to investigate the ideas of continuity, within the frame work of Mathematics. The authors introduce a new class of sets namely,  $\hat{g}^{**}$ s-closed sets. We define  $\hat{g}^{**}$ s-closed sets by "A subset of a topological space  $(X, \tau)$  is called a  $\hat{g}^{**}$ s-closed sets if  $scl(A) \subseteq U$ , whenever  $A \subseteq U$  and  $U$  is  $\hat{g}^{**}$ -open". In this paper we introduce the concept of separation axioms using  $\hat{g}^{**}$ s-closed sets namely  $\hat{g}^{**}s - T_0$ ,  $\hat{g}^{**}s - T_1$  and  $\hat{g}^{**}s - T_2$  spaces and also, we discuss various properties of these spaces.

**Keywords:**  $\hat{g}^{**}$ s-closed set;  $\hat{g}^{**}s - T_0$ ,  $\hat{g}^{**}s - T_1$ ;  $\hat{g}^{**}s - T_2$  spaces.

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6BIGTCGM31

## Fibonacci Heat Equation Generated by Two and Three Dimensional Difference Equation

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### Abstract

In this paper we define three of solutions is heat equation generated by two and three dimensional difference equation we need to have applied q-difference operator called generalized three dimensional difference operator for a real valued function. Also we derive some theorems Fibonacci Sequence, Numerical solution and examples.

### Keywords:

Generalized partial difference equation; Numerical solution; Partial difference operator; Two and Three dimensional heat equation and Fibonacci Sequence.

6BIGTCGM38

## Discrete Laplace Transform of Trigonometric, Exponential and Hyperbolic Functions

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### Abstract

Generalized Laplace Transform (GLT) is applicable in the field of Digital Signal Processing which has revolutionized many areas in science and engineering such as space, medical, commercial, military, industrial and communication. In this paper, we defined a GLT obtained by an Inverse Difference Operator and we derived Laplace Transform of Exponential, Trigonometric and Hyperbolic Functions.

**Key words:** Inverse Difference Operator; Generalized Laplace Transform; Exponential; Trigonometric and Hyperbolic Functions.



## Extorial Function and its properties in Difference Operator

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### Abstract

In this paper developing certain properties of the newly defined extorial function,we derive the value for difference operator using the extorial function and also find higher difference operator value using extorial function and the negative index extorial function.Suitable examples are inserted to illustrate the main results.

**Key words:** Difference operator,Extorial function,Difference equation.