

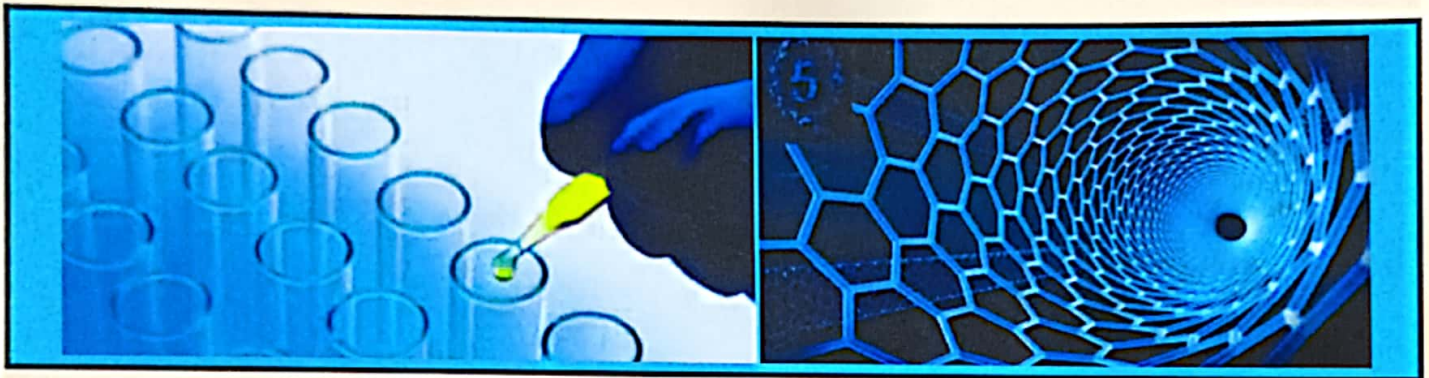
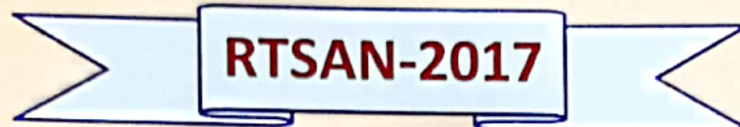


Rayat Shishan Sansthas

# Dada Patil Mahavidyalaya, Karjat

Dist- Ahmednagar. (M.S.)

NAAC Reaccredited with **A Grade**



National Level Seminar

On

**RECENT TRENDS IN SYNTHESIS AND APPLICATIONS OF NANOMATERIALS**



Sponsored by

Planning and Development Board, Savitribai Phule Pune University, Pune

Organized by

**DEPARTMENT OF PHYSICS**

ISBN978-93-8299552-4

8th - 9th December 2017

## INDEX

| Sr. No. | Title of Paper   | Page No. |
|---------|--|----------|
| 1       | Environment And Nanotechnology: A Review<br><b>Mohamed Rizwan Khan</b>   | 1-4      |
| 2       | Graphene : A 2-Dimensional Wonder Material with Dimensionless Opportunities, <b>Akash Deep Mishra</b>  | 5-13     |
| 3       | Growth and Characterizations of Pure and L-Alanine Doped Zinc Tris-Thiourea Sulphate Single Crystals<br><b>M.A.Patil, G.R.Achalkar, P.S. Kadam, M.R. Raut</b>                      | 14-21    |
| 4       | Nanotechnology: A Review on Silver Nanoparticles<br><b>Khodade H. H.*, Nalwade A. R. **, Bolbhat S. N. ***</b>   | 22-31    |
| 5       | Characterization of Spin Coated (Co, Cu, Ni, Zn) Ferrite Thin Films<br><b>Pardeshi A.R., Raut A.D., Vidhate K.R.</b>   | 32-35    |
| 6       | ICT: An innovative Teaching and Learning Process<br><b>S.G.Thube, V.M.Nikale, Y.A.Pathak, M.A.Patil</b>  | 36-39    |
| 7       | Growth And Characterization Of Pure and $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ DOPED Tartaric Acid Single Crystals<br><b>Y.A.Pathak, R.S. Kharade, M.B. Kurumkar, S.S.Kale,</b> | 40-46    |
| 8       | Investigation of Substrate Temperature of Spray Deposited CdTe Thin Films.<br><b>V.M.Nikale, S.G.Thube, Y.A.Pathak, S. S. Mhaske</b>   | 47-54    |
| 9       | Metal and Metal Oxide Nanoparticles and Immobilization of Cells and Enzymes for Life Sciences Applications<br><b>Patil I M, Patil.M.A*,Shinde.R.J, Shaikh.S.A, Jamdade.G.Z</b>     | 55-58    |



**GROWTH AND CHARACTERIZATION OF PURE AND  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  DOPED  
TARTARIC ACID SINGLE CRYSTALS**

Y.A.Pathak, R.S. Kharade, M.B. Kurumkar, S.S.Kale

Department of Physics, Dada Patil Mahavidyalaya, Karjat.

**Abstracts:**

Copper sulphate pentahydrate ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ) is an inorganic compound and tartaric acid is a good nonlinear material. So  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  doped tartaric acid single crystal shows properties of semi organic NLO materials. Molecular formula of tartaric acid is  $\text{C}_4\text{H}_6\text{O}_6$  and structural formula  $\text{HO}_2\text{CCH}(\text{OH})\text{CH}(\text{OH})\text{CO}_2\text{H}$ . The effect of dopants on various properties of single crystals are of great interest from both solid state science as well as technological points of view. In the present work, pure and  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  doped tartaric acid single crystals were grown by slow evaporation technique. The grown crystals were subjected to various characterizations like XRD, UV-Visible spectroscopy, FTIR spectroscopy. Use of XRD technique for determining the size of the nanoparticles, using a Debye Scherrer formula. FTIR is used to find out the functional group, internal structure of the molecule and the nature of chemical bonds of the compound which are present in the crystal from UV-Visible absorption spectra. Band gap of pure crystal 4.9 eV decreased by doping of  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  in pure crystal.

**Keywords:** Tartaric acid, copper sulphate pentahydrate, crystal growth.

**Introduction:**

Solid, liquid and gases are three physical states of matter. Those solids which have regularities in atomic and molecular structure are known as crystals. The properties of crystals are hardness, cleavage, optical properties, heat conductivity, electrical conductivity. Tartaric acid is a good organic nonlinear optical material and it belongs to the monoclinic system with space group  $P_21$ . Copper sulphate pentahydrate ( $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ) is an inorganic compound. So  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  doped tartaric acid single crystal shows properties of semiorganic NLO material. It gains importance over organic and inorganic NLO materials because of their large polarizability and wide transmission window. Extensive investigation in this direction resulted in the discovery of a new phase match semi-organic NLO crystals. Its interesting optical applications make tartaric acid crystals such as optical switches, optical communications, optical data storage, optical modulators etc.

Today many different methods such as-

- solid growth
- liquid growth
- vapour growth

Are used to grow pure and  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$  doped tartaric acid crystals by slow evaporation method