

1. PERSONAL REFERENCE:



Name : **Dr. Phalguni Gupta**

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Date of Birth : **23rd May 1966**

Institution Address : **Associate Professor,
Department of Physics,
Dinabandhu Andrews College
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Kolkata-700084**

2. ACADEMIC QUALIFICATION:

- ❖ Successfully completed **Ph.D (Sc.)** at the Dept. of Material Science, Indian Association for the Cultivation of Science (IACS), Calcutta as Junior/Senior Research Fellow under CSIR scheme and have worked there for four years on the study of compound semiconductors in Thin Film Form. Degree was awarded by Javavpur University.
 - ✓ **Topic- "Preparation and characterization of II-VI semiconductor thin films**
 - ✓ **Dated: May'1991 to April'1995**
- ❖ Completed **Master of Science** in Physics with specialization in Solid State Physics from Calcutta University in 1989

- ❖ Completed **Bachelor of Science (Hons)** in Physics from Calcutta University in **1987**.
- ❖ Passed **Higher Secondary School Certificate (XIIth)** from West Bengal Council of Higher Education in **1984**.
- ❖ Passed **All India secondary School Examination (Xth)** from Central Board of Secondary Education in **1982**.

3. Doctoral Research

“Preparation and characterization of II-VI semiconductor thin films”
Under Supervision of :

✓ **Prof. A.K. Pal**

A small synopsis:

In 1991 I have joined the Dept. of Material Science, Indian Association for the Cultivation of Science (IACS), Calcutta as Junior Research Fellow under CSIR scheme for my doctoral research and have worked there for four years on the study of compound semiconductors in Thin Film form. This includes the preparation and characterization of mainly II-VI compound semiconductors, viz., Zn and Cd chalcogenides and their ternary alloy systems which are very important materials for opto-electronic device applications such as LEDs and LASERs in the visible region of electromagnetic spectrum. They also find wide applications as window layer in Solar Cells with CuInSe₂ and CdTe as absorber layers. Considering the great potential of these materials we have thoroughly studied them and have tried to optimize their deposition or synthesis parameters so to obtain the best results.

Preparation: Among several other deposition techniques we have employed the following for thin film preparation of different materials.

- a) Vacuum Thermal Evaporation
- b) Hot-wall Evaporation for Binary systems
- c) Two-zone Hot-wall Evaporation for Ternary systems
- d) Three source Vacuum Evaporation for CuInSe₂ films
- e) Electrodeposition in Chemical bath for CdTe
- f) Sputtering (DC, RF, Magnetron) for metal coating

For vacuum we have used oil diffusion pump with liquid nitrogen trap and have obtained a vacuum $\sim 10^{-6}$ torr.

Characterization: Since the materials are important for electro-optic applications a detailed characterization of their electrical and optical properties have been carried out. Then the results have been correlated with the morphology and microstructural properties which are very important for polycrystalline thin films.

- a) Phase analysis were carried out by X-ray Diffraction study (XRD), Transmission Electron Microscopy (TEM), Fourier Transform IR analysis (FTIR)
- b) Surface properties are very important for the polycrystalline thin films and hence surface analysis was carried by Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM)
- c) Optical characterisations were carried out in UV-VIS-NIR Spectrophotometer by studying reflection, transmission and absorption spectra at different wavelength regions. Sharp transition at higher energy

regions gives information about semiconductor bandgap; from band tailing we have determined information about grain boundary effects and have evaluated grain boundary parameters such as barrier potential, trap state density, carrier concentration, length of depletion region etc. From the oscillation in the transmission spectra at lower energy region we have determined thickness of the film indirectly.

- d) Photoconductivity and Thermally stimulated current (TSC) measurement at different spectral regions reveal different localized states, deep levels, grain boundary trap states etc.
- e) Detailed electrical characterization was carried out through DC conductivity measurement by Van-Der-Pauw Four Probe Technique at a wide range of temperatures (77-600K) giving detail of localized state activation energy determination.

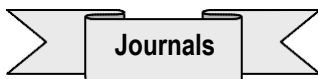
4. EMPLOYMENT RECORD:

- ❖ Presently working as **Associate Professor** in the Department of Physics of Dinabandhu Andrews College West Bengal, India from November 2000
- ❖ Served as **Lecturer** in the Department of Physics, Alipurduar College, West Bengal, India from May 1999 to November 2000.
- ❖ Served as **Lecturer** in the Department of Physics, Ananda Chandra College Jalpaiguri, West Bengal, India from December '1997 to January '1999.

5. Awards

- ❖ Qualified in the National Eligibility Test (**NET**) under CSIR scheme for Junior Research Fellowship and Lecturership in December 1990.
- ❖ Qualified for the Graduate Aptitude test in Engineering(**GATE**) in February 1990

6. LIST OF PUBLICATIONS:



- ❖ Optical properties of $\text{Zn}_x\text{Cd}_{1-x}\text{Se}$ films, *Thin Solid Films*, 260 (1995) 75-85, **P. Gupta**, B. Maiti, A.B. Maity, S. Chaudhuri and A.K. Pal
- ❖ Photoconductivity and Thermoelectric power of $\text{Zn}_x\text{Cd}_{1-x}\text{Se}$ films, *Jpn. J. Appl. Physics*, 34 (1995) 4658-4665, **P. Gupta**, B. Maiti, S. Chaudhuri and A.K. Pal

- ❖ Surface morphology and optical properties of ZnS:In films, *Materials Chemistry and Physics*, 39 (1995) 167-173, B. Maiti, **P. Gupta**, A.B. Maity, S. Chaudhuri and A.K. Pal
- ❖ Grain boundary effect in polycrystalline ZnTe films, *Thin Solid Films*, 239 (1994) 104-111, B. Maiti, **P. Gupta**, S. Chaudhuri and A.K. Pal
- ❖ ZnS-ZnTe alloy films: preparation and properties, *Thin Solid Films*, 227 (1993) 66-73, **P. Gupta**, B. Maiti, S. Chaudhuri and A.K. Pal
- ❖ CdTe-ZnTe alloy films: preparation and properties, *Journal of Materials Science* (1991) 66-73, **P. Gupta**, D Bhattarcharya, S. Chaudhuri and A.K. Pal

7. MEMBERSHIP OF SCIENTIFIC AND PROFESSIONAL SOCIETIES:

- ❖ Life Member of the Indian Science Congress Association (L 19423).
- ❖ Life Member of the Institute of Science, Education and Culture.