

Research Reports

1. On going Project activity:

1. Project Title: Fabrication and characterization of metal phthalocyanine functionalized 2D heterostructure for optoelectronic and photocatalytic applications.	DST No: EEQ/2022/001082
2. PI (Name &Address): Dr. Supriya Mondal Assistant Professor (Dept. of Physics) Government General Degree College, Chapra Hatkhola road, shikra, Nadia, West bengal-741123 Email: supriyajuphy@gmail.com Mob: +919647668467	Date of Birth: 20-Apr-1991
3. Broad area of Research: Condensed Matter Physics and Materials Science (Physical Sciences) 3.1 Sub Area: X-Ray & Crystallography & Optoelectronic properties of Nano Materials Approved Objectives of the Proposal: <ul style="list-style-type: none"> • To synthesize the 2D nanostructures such as graphene, MOS_2 and WS_2 by chemical method with desired morphology. • To prepare metal phthalocyanine nanostructures such as copper phthalocyanine (CuPc), nickel Phthalocyanine (NiPc), manganese phthalocyanine (MnPc) with desired morphology by hydrothermal, solvothermal and thermal evaporation techniques followed by annealing. • To functionalize the 2D nanostructures with the metal phthalocyanine by chemical method. • To fabricate the MPC-2D heterostructure based device by thermal evaporation technique and chemical method. • To improve device performance by controlling various process parameters such as annealing temperature and appropriate functionalization in order to achieve a higher rectification ratio in photodiodes, degradation efficiency as photo catalyst, and a higher quantum efficiency in electroluminescence devices. 	
Date of Start: 09-Mar-23	Total cost of Project: 28,33,886 INR
Date of completion: 08-Mar-2026	Expenditure as on :31.03.2024 Capital – 377600 INR General – 729149 INR

2. Ph.D. Supervision activity:

Administrative works are progressing for registration in Ph.D program.

3. Research Institute visit:

List of Academic Visits at Various Research Institutes and Universities

Name of the institute with address	Visited by (Students/ Faculty)	Name of the department	Period of the visit (DATE)	Academic year	Purpose of the visit	Funded by
Swami Vivekananda Research Center, Ramakrishna Mission Vidyamandira, Belur Math, Howrah 711202,	Research scholar & Faculty Member	Department of Industrial Chemistry and Applied Chemistry,	Once in a week	2022-23,2023-24	Material Synthesis & Characterization	Self & SERB-DST
<u>Indian Association for the Cultivation of Science</u> Kolkata,700032 India,	School of Materials Sciences,	School of Materials Sciences,	Once in a month	2022-2023,2023-24	Data Measurement	Self & SERB-DST

4. SERB-DST_EEQ Scheme 2023-26 of Govt.of India for Govt. General Degree College, Chapra Govt. of West Bengal

Govt. General Degree College,Chapra has been providing the quality efforts towards promotion of research in the campus during last two years. Departments of Physics, Govt. General Degree College,Chapra has received Research and Development grant supported by Science and Engineering Research Board(SERB), under the EEQ Scheme, Govt. of India in 2023-26 to procure equipments for infrastructure up gradation of research laboratories.

4.1: Details of the Grant:

Science and Engineering Research Board(SERB)-Department of Science & Technology (DST) , Govt. of India has sanctioned Rs. 28.34 lakhs (aprox) for procurement of equipments and strengthening of infrastructure facility of college for student's academic improvement and research purpose (Sanction Order Number and Date: EEQ/2022/001082 dated 07.03.2023). The major facilities are continued to create under the SERB-EEQ support for basic and Advance (Nano) science laboratories, networking and computational and infrastructural facilities.

4.2: Equipments Purchased:

1. UV-Vis Spectrometer



4.4: Benefits:

- Equipment facility is made available to students to fulfill their academic needs.
- SERB-EEQ sponsored facilities are utilized by the Research Associate students working in the Dept. of Physics for their research works.
- One student from Dept. of Physics was placed in the Research Associate for the Scheme of SERB-EEQ program and reputed Research Institutes having been benefitted from the SERB sponsored facility.
- Faculty members and School students participated in National/International/Provincial Seminar/Conference/Workshop arising from work done using the SERB sponsored facility:

Sl. no.	Title of the Seminar/Conference/Workshop	No. of participants
1.	Exploring the wonders of science:A journey into the Basic Physics by Govt.General Degree College,Chapra, West Bengal , held on, 6 th February 2024.	Hatkhola School Student, Faculty member, college Student

Dr. Supriya Mondal, Assistant Professor, Dept. of Physics, Govt. General Degree College, Chapra

Informal Collaborations with the following groups in Solid State Physics & Nano Physics :

- **UK GHARAI RESEARCH GROUP**, Department of Industrial Chemistry and Applied Chemistry, Swami Vivekananda Research Center, Ramakrishna Mission Vidyamandira, Belur Math, Howrah 711202, for 6 years (since the year 2018).

Work done: Opto-electronic Properties of Nano-Materials . Performed large number of experiments using Photoluminescence, UV-Vis Spectrometer, TCSPC at RKMVM, Belur.

Publications:

Research papers published in collaboration with high impact factors research publications:

- 1) Pure white light emission from a rare earth-free intrinsic metal–organic framework and its application in a WLED.
Tuhina Mondal, **Supriya Mondal**, Saptasree Bose, Debabrata Sengupta, **Uttam Kumar Ghorai** and Shyamal K. Saha, *J. Mater. Chem. C*, **2018**, **6,614**
 - 2) White light emitting lanthanide based carbon quantum dots as toxic Cr (VI) and pH sensor
Tapas Kumar Mondal , **Supriya Mondal** , **Uttam Kumar Ghorai** , Shyamal K. Saha
Journal of Colloid and Interface Science **553 (2019) 177–185**
-
- **Prof. S. K. Saha Lab Group**: School of Materials Sciences, Indian [Association for the Cultivation of Science](#) Kolkata,700032 India, for 7 years (since the year 2017)
- Work done: Opto-electronics Properties of 2D materials**
- Research papers published in collaboration with high impact factors.
- Photo-induced conductivity in 2, 6-diaminopyridine functionalized graphene oxide containing Eu²⁺ for optoelectronic applications,
Supriya Mondal, Abhisek Gupta, Bikash Kumar Shaw, **Shyamal K Saha**
Optical Materials **73 (November 2017), 555-562**
 - Photoluminescence and photo-induced conductivity in 2D siloxene nanosheet for optoelectronic applications (*Journal of Colloid and Interface Science* **562 (2020) 453–460**) **Supriya Mondal**, Tapas Kumar Mondal , Yan-Kuin Su and **Shyamal K. Saha**
 - White light emitting Lanthanide based carbon quantum dots as toxic Cr (VI) and pH sensor (*Journal of Colloid and Interface Science* **553 (2019) 177–185**)
Tapas Kumar Mondal, **Supriya Mondal**, *Uttam Kumar Ghorai*, *Abhisek Gupta* and **Shyamal K. Saha**

