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ANSHU BAIYA

Pronouns - she/her

Objective

Motivated to work and to learn, keen to explore new things. I strive to be a part of a system where I can implement my chemical knowledge that I have acquired so far with responsibility and diligence, thereby aiding in the success of the chemical society.

Academic Details

Ph.D (Dept of Chemistry) | August 2024 -2029 | University of Massachusetts Amherst
Supervisor: Prof. James P Walsh

Major: Chemistry

Research Project | June 2023-July 2024 | Indian Institute of Technology, BHU(Varanasi) |

M.Sc. | July 2021-May 2023 | Indian Institute of Technology, BHU(Varanasi) |
Major: Chemistry

IIT JAM | Oct-June 2021 | Rank: AIR 637
Major: Chemistry

B.Sc. | July 2017-Sept 2020 | Chaudhary Bansi Lal University, Bhiwani |
Major: Chemistry, Physics, Mathematics

XII | 2016-2017 | Haryana State Open Board of Schooling |
Major: Biology

XII | 2016 | Sunrise Sr. Sec School, Bawani Khera |
Major: Chemistry, Physics, and Mathematics

Scholastic Achievements

- Secured **All India Rank-637** (among 15,000 candidates) in **IIT-Joint Admission Test (JAM)** in Chemistry**['21]**
- Qualified for the all-India level **GATE Examination in Chemistry in 2023.**
- Qualified all India level**, Indian Marine University Common Entrance Test in 2016.**

- Qualified Ayurvet Limited Company Interview for R & D Trainee Position in 2023
- 2nd Position in Inter School Science Quiz in 2012
- Freelancing teaching from June 2023 to July 2024

Courses & Certificates

Certificate of DFT modelling of Advanced Materials

Area of Interest

Investigating novel phases in Metal carbides, delafossite-type oxides, focusing on their structural stability, electronic properties, and potential applications. Utilizing high-pressure synthesis and characterization techniques to explore new compositions and functionalities within this class of materials.

Research Experiences (Projects and Internship)

Ph.D Project: **[Fall 24 - Ongoing]**
Supervisor : Prof. James P Walsh, University of Massachusetts Amherst

1.Title- *Hydrothermal synthesis of $CuVO_2$ to produce phase-pure crystals and high-pressure study by using DAC*
Abstract: $CuVO_2$ is an intriguing delafossite ternary oxide material that exhibits a PBE band gap of approximately 1.0 eV and therefore holds significant potential for photocatalytic and optoelectronic applications. Despite this, it has remained relatively underexplored, primarily due to the limited availability of viable synthesis routes. To date, only a single procedure has been reported for the synthesis of $CuVO_2$ delafossite nanosheets. In this context, we aim to employ a modified hydrothermal synthesis approach, using carefully selected experimental parameters to obtain phase-pure single crystals and to investigate their potential high-pressure phase transitions using our in-house diamond anvil cell setup**.** We are also interested in high-pressure study of magnetically frustrated system.

MASTERS PROJECT **[Jul'21 - May'23]**

- **Supervisor: Prof. Y.C. Sharma Head of Dept.,** **Indian Institute of Technology BHU (Varanasi),** Uttar Pradesh
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- **Title:** *Removal of Orange G dye from wastewater using mesoporous activated carbon*.

  Abstract: The experimental procedure involves synthesizing mesoporous activated carbon by pyrolyzing corn husk at high temperatures, followed by impregnation with H_3PO_4 to enhance its adsorption properties. The physicochemical characteristics of the activated carbon are analyzed using techniques such as scanning electron microscopy (SEM), Fourier-transform infrared spectroscopy (FTIR), and Brunauer-Emmett-Teller (BET) surface area analysis. To evaluate the efficiency of the activated carbon material, batch adsorption experiments are conducted by varying initial dye concentration, contact time, pH, and adsorbent dosage. The adsorption capacity and kinetics of Orange-G onto the activated carbon are determined, and the experimental data are fitted into various isotherm and kinetic models. Preliminary results demonstrate that the mesoporous activated carbon derived from corn husk impregnated by H_3PO_4 exhibits promising adsorption properties towards Orange- G dye. The adsorption capacity of the material is influenced by factors such as pH and adsorbent dosage. Further optimization of operating parameters will be conducted to enhance the removal efficiency. This project contributes to the development of a sustainable, low-cost method for removing Orange-G dye from water, using abundant agricultural waste. The findings of this study can be applied to wastewater treatment processes, promoting a cleaner, safer environment.

  Research Project:

I have been working with my senior on follow-up for my master's project, which aims to utilize the surface properties of H_3PO_4-impregnated activated carbon derived from cornhusk biowaste to improve the adsorption capacity of other organic dyes from wastewater.

Technical Skills

LABORATORY SKILLS

- X Ray diffraction XRD, UV-Visible Spectroscopy, FT-IR, Sonication, SEM, MicroED, Crystal hunting
- Chromatography (Column Chromatography), NMR
- Hydrothermal Autoclave, Tubular Furnance, Large Volume Press

SOFTWARE SKILLS

- **Operating systems:** Windows
- **Softwares:** Chemdraw | Origin | MS-OFFICE | Grammarly | VASP | Dioptas | CrysAlisPro | VESTA | OVITO | PyMol

Publications

Research Article- No Publication.

Workshop/ Training/Seminars

Hands-on Training Program in Synthesis and Characterization of Nanomaterials (15-17 July)
SATHI-Banaras Hindu University

Participated in an intensive training program focused on synthesis and characterization techniques of nanomaterials. Acquired practical experience in various synthesis methods such as chemical vapor deposition (CVD), sol-gel, and physical vapor deposition (PVD).

This program overviewed the characterization of nanomaterials through techniques such as scanning electron microscopy (SEM), transmission electron microscopy (TEM), and X-ray diffraction (XRD).

Demonstrated strong analytical skills by analyzing and interpreting data obtained from the characterization process.

Positions of Responsibilities

Team leader of inter-college science quiz **Oct 2020**

Volunteered for the training and placement cell **March 2023**

Online/offline tutor **July 2022**

Extracurricular Activities

Sports	1st position in the 100-meter Inter-school Summer Games.
Volunteering	· Volunteered **Youth Red Cross Society, Bhiwani** · Volunteered Teaching in **Manisha Malviya Child Welfare Organization**
Hobbies	| Traveling | Cooking | Reading |
Teaching	Home tuition Subject Matter Expert in Chemistry at platform **Chegg India Pvt. Ltd**

Languages

English |Hindi |Punjabi