

Roushan Nigam Shaw

Curriculum vitae

I am an aspiring scientist passionate about rectifying humanity's past mistakes and helping to create a **sustainable future** for future generations. My zeal drives me to actively learn and apply chemical engineering and electrochemistry principles in green hydrogen production, carbon capture and utilization, and battery technology. I dream about how integrating AI and computational material science would make us a type 2 civilization.

EDUCATION

Masters in Chemical Engineering (M.Chem.Engg)

Institute of Chemical Technology (ICT), Mumbai

August 2023 to present

Bachelor of Engineering in Chemical Engineering (B.E)

M S Ramaiah Institute of Technology, Bengaluru

August 2019 to May 2023

RESEARCH EXPERIENCE

Research assistant | Institute of Chemical Technology | Mumbai

September 2023 to present

Development of novel electro-catalysts to promote oxygen evolution reaction and suppress chlorine evolution in saline water.

- Currently exploring electrocatalysts that effectively block chlorine evolution and promote oxygen evolution simultaneously in saline water electrolysis.

Research assistant | M S Ramaiah Institute of Technology |

Bengaluru

March 2021 to May, 2023

Development of novel electro-catalysts for electro-chemical green hydrogen production

- Synthesized and evaluated the performance of Ba²⁺ substituted lanthanum cobalt nickelate nanocrystals as an anode material for oxygen evolution reaction in alkaline water electrolysis.

Industrial report on the Production of 200 tons/year of NPK fertilizer using nitro phosphate route

- Minor project on a detailed NPK fertilizer production through nitro phosphate route, evaluated its thermodynamic feasibility, performed material and energy balance, designed required industrial equipment, created a plant layout, and completed a cost estimation of the plant.

Preparation and characterization of Barium Lanthanate nanocrystals.

- Carried out the synthesis of Barium Lanthanate nanocrystals using combustion synthesis. Carried out the various types of material characterization of the synthesized materials.

Synthesis and characterization of hydroxyapatite nanoparticles and its surface complexation modeling to remove fluoride from drinking water.

- Prepared Hydroxyapatite nanocrystals using combustion synthesis and precipitation methods. Carried out a defluoridation experiment of contaminated water as well.

INTERNSHIP

Summer research intern | CSIR – National Chemical Laboratory | Pune

September 2022 – October 2022

A Density Functional Theory (DFT) and molecular dynamics (MD) study on solvation of monovalent halogen anions and alkali metal cations in water

- Used DeMon2k (a quantum chemistry software package) to calculate the interactions and solvation energy of a water system of anions and cations.

PUBLICATIONS

- Improving the Activity for Oxygen Evolution Reaction by Tailoring the Oxidation States of Transition Metals in the Ba^{2+} -substituted $\text{LaCo}_{0.5}\text{Ni}_{0.5}\text{O}_3$ -type Perovskite Oxides for Alkaline Water Electrolysis (proof-reading the manuscript)
- Shaw, R. N. R., Sankannavar, R., Madhu, G. M., Sarkar, A., Subramanian, K. R. V., & George, R. (2022). Storage of electricity generated from renewable sources using electrochemical energy conversion devices. In IOP Publishing eBooks.
<https://doi.org/10.1088/978-0-7503-3711-3ch3>

CONFERENCES

- I presented the findings of my undergraduate research project at the **International Conference of Women in Electrochemistry (ICWEC)** - 2023 held at the Indian Institute of Science (IISc), Bengaluru.

SKILLS

General: Expert proficiency with MS Office. Experienced with Linux and Windows.

Programming & Machine learning: Python, JavaScript, MATLAB, C/C++, MySQL, Scripting (Bash). Experienced with TensorFlow. Basic proficiency in Cuda programming.

Computational Chemistry: Basic proficiency in computational chemistry software like Quantum ESPRESSO, Demon2k, Gaussian, and Schrodinger.

Process simulation: Proficient with process simulators like Aspen HYSYS and Aspen Plus and basic proficiency in computational fluid dynamics tools like ANSYS Fluent, Autodesk CFD, and SimScale.

Mechanical designing: Adept in AutoCAD Fusion 360 and SolidWorks.

ACHIEVEMENTS

- Awarded the **best project award** for outstanding undergraduate project by the Ramaiah Alumni Association.
- Received **funding of ₹5000** from the Karnataka State Council for Science and Technology (KSCST) to carry out my undergraduate research project
- **Runner-up** of chemical engineering technical quiz held during a Technical Fest of Dayanand Sagar College of Engineering, Bengaluru.

TRAINING AND CERTIFICATES

- I completed multiple courses on Python, deep learning, and JavaScript offered by various institutes on Coursera.



- Workshop on Process intensification.