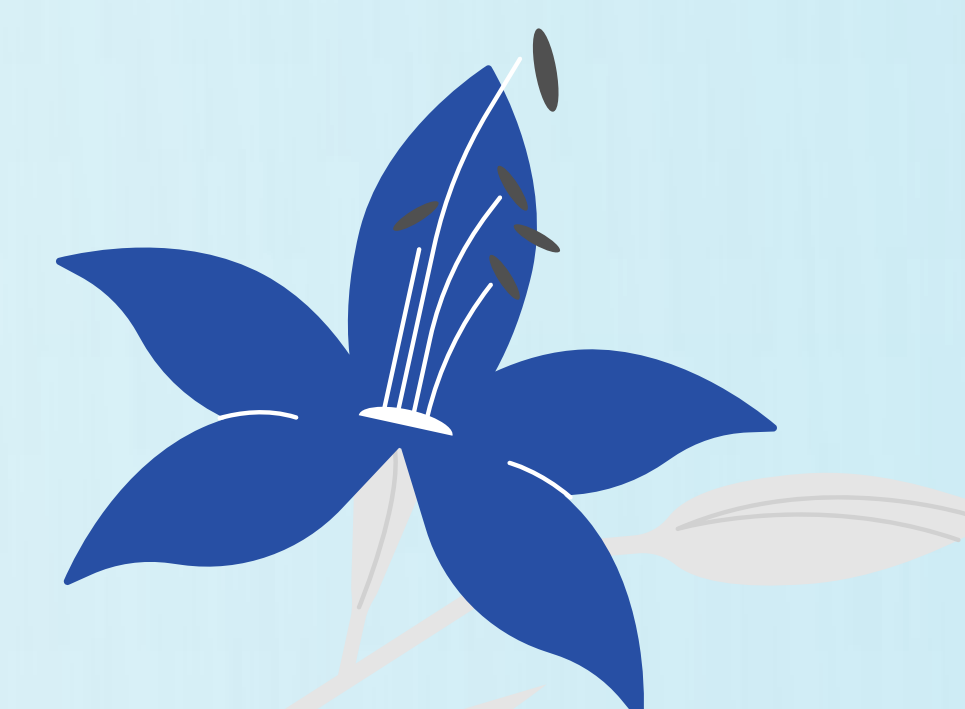
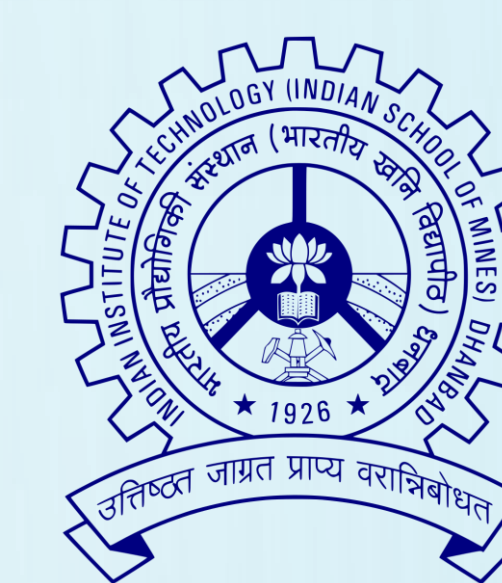




# ANNUAL REPORT-2024

## ARTIFICIAL PHOTOSYNTHESIS GROUP



### New Addition



Ms. Tanushree Dutta Joined as a PhD Student



Dr. Topi Ghosh joined as a Postdoc



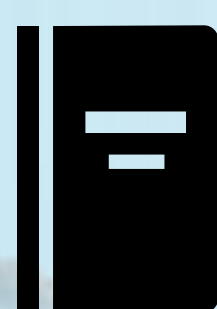
### PhD Awarded



Dr. Sk Samim Akhter



Dr. Aman Mishra



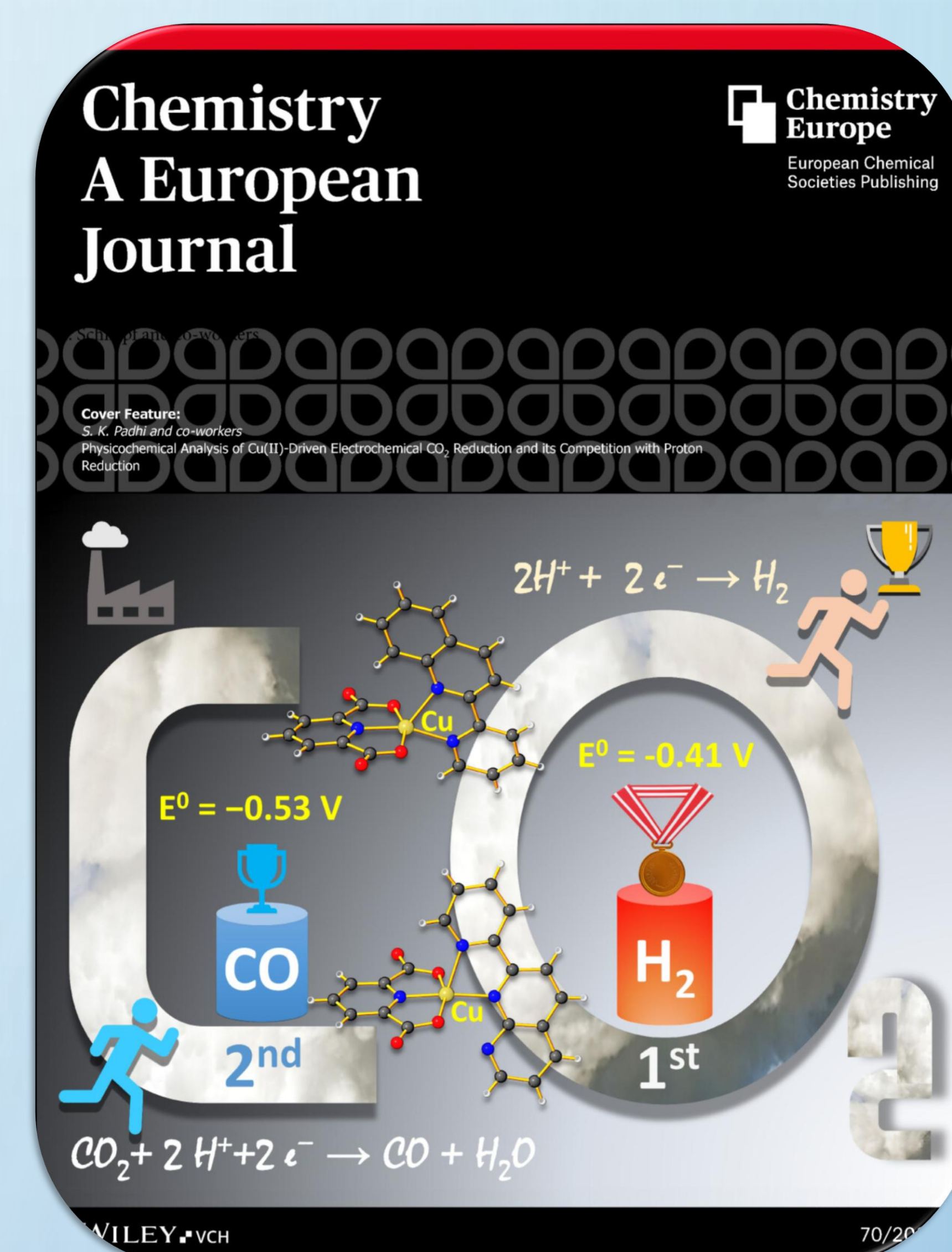
### Intellectual Properties (PATENTS) from the Group

- Natarajan, T.; and Padhi, S. K.\*, A catalyst for green hydrogen generation, a process for the Preparation thereof and the use thereof for green hydrogen generation from ammonia. Indian Patent Application no. 202431070872, Filed on 19<sup>th</sup> Sept. 2024. (Status: Published)
- Mishra, A.; and Padhi, S. K.\*, A process for the preparation of methanol by the hydrogenation of bicarbonate and carbon dioxide (CO<sub>2</sub>) captured from air. Indian Patent Application no. 202431048509, Filed on 25<sup>th</sup> June 2024. (Status: Published)
- Mishra, A.; and Padhi, S. K.\*, A process for the hydrogenation of carbon dioxide (CO<sub>2</sub>) to methanol. Indian Patent Application no. 202431048508, Filed on 25<sup>th</sup> June 2024. (Status: Published)



### Publications from the Group

- Akhter, S. Sk.; Srivastava, D.; Mishra, A.; Patra, N.; Kumar, P.; Padhi, S. K.\*, Cover Feature: Physicochemical Analysis of Cu(II)-Driven Electrochemical CO<sub>2</sub> Reduction and its Competition with Proton Reduction. *Chem. Eur. J.* 2024, 30, e202487004.
- Akhter, S. Sk.; Srivastava, D.; Mishra, A.; Patra, N.; Kumar, P.; Padhi, S. K.\*, Physicochemical Analysis of Cu(II)-Driven Electrochemical CO<sub>2</sub> Reduction and its Competition with Proton Reduction. *Chem. Eur. J.* 2024, 30, e202403321.
- Mishra, A., and Padhi, S. K.\* Harnessing Ruthenium and Copper Catalysts for Formate Dehydrogenase Reactions, *Chem. Rec.* 2024, e202400172. (Invited Article for the special issue on "Catalytic Transformation of Small Molecules")
- Raj, M., and Padhi, S. K.\* Decoding the Catalytic Potential of Dinuclear 1<sup>st</sup>-Row Transition Metal Complexes for Proton Reduction and Water Oxidation, *Chem. Rec.* 2024, e202400170. (Invited Article for the special issue on "Catalytic Transformation of Small Molecules")
- Mishra, A.; Srivastav, D.; Raj, D.; Patra, N. and Padhi, S. K.\*, Formate Dehydrogenase Activity by a Cu(II)-based Molecular Catalyst and Deciphering the Mechanism by DFT studies, *Dalton. Trans.*, 2024, 53, 1209-1220.
- Maity, N.; Mishra, A.; Mishra, A.; Barman, S.; Padhi, S. K., Panda, B. B., Jaseer, E. A.; and Javid, M., Tuning Pd to Ag ratio to enhance synergistic activity of fly ash supported PdxAg<sub>y</sub> bimetallic nanoparticles, *ACS Omega.*, 2024, 9, 1020-1028.



### Placement of the Group Members and Alumni



Dr. Jully Patel joined as Assistant Professor, Lebanon Valley College, Pennsylvania, USA



Dr. Ejaz Ahmad, joined as Assistant Professor, Patliputra University, BIHAR



Dr. Manaswini Raj, joined as Assistant Professor Presidency University, Bangalore



Dr. Aditi Vatsa, joined as R&D Chemist in SAM ENVIRO, Nasik



Dr. Karunamay Majee, Joined as Assistant professor, Galgotias University, INDIA



Dr. Aman Mishra, Joined as a Postdoc in LUND University, Sweden



### Visits and Outreach



- At LUND University, SWEDEN with Prof. Ebbe Nordlander



- At Southern Denmark University, with Prof. Christine Joy Mckenzie



### R&D Projects sanctioned

- OVERSEAS GRANT: (Mobility Grants for Internationalisation: India): Electrocatalytic and photoelectrocatalytic reduction of protons or carbon dioxide, STINT, INDIA Initiation Grant, SWEDEN, Oct 2024-2027 Oct.



• Degree Award Party of Dr. Sk Samim Akhter and Dr. Aman Mishra

