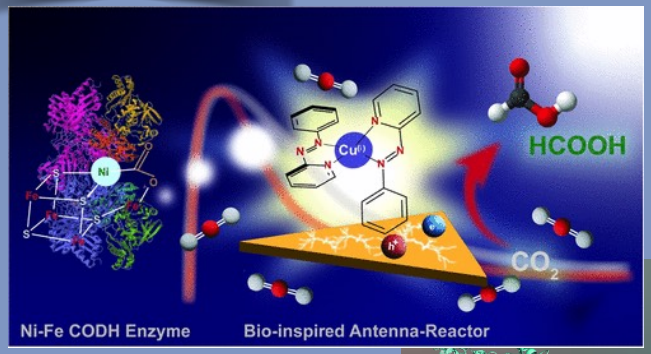
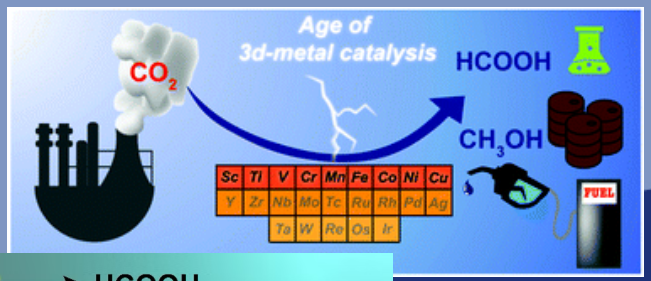
第97回有機元素化学セミナー / The 97th Organoelement Seminar Series

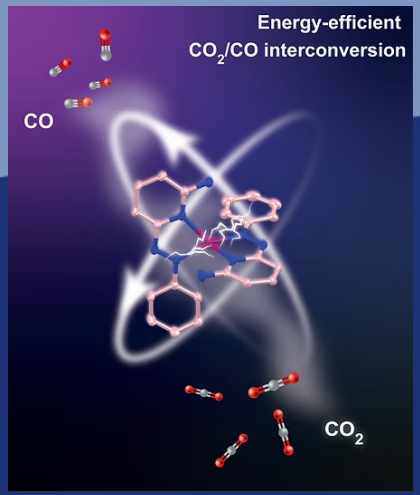
Prof. Arnab Dutta
(IIT Bombay, India)

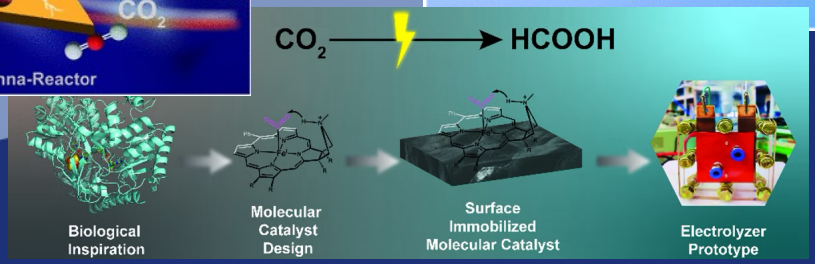
website URL: https://www.arnabdutta-bioinorganic-lab.com/

"Unraveling Multielectron CO2 Reduction Mechanisms through Direct Observation of Reactive Intermediates by EPR Spectroscopy"









We are pleased to inform you that Arnab Dutta will be delivering a seminar at our institution. Dr. Dutta is recognized for his work in molecular electrocatalysis, particularly in the development of catalysts for CO_2 conversion and energy-relevant reactions. In this seminar, he will present recent advances in mechanistic studies of CO_2 reduction, focusing on the direct observation of reactive intermediates using EPR spectroscopy. He will discuss how these insights help elucidate multielectron reaction pathways and inform the design of more efficient catalytic systems.

16:00-17:30, May 15th (Fri.), 2026@Room WL1-301 (Lecture Theater, West Bld. 1, Science Tokyo)
Host: Yuma Morimoto (Sch. of Sci.) (yuma.morimoto@chem.sci.isct.ac.jp)

Curriculum Vitaé: Arnab Dutta

1. **Name and full correspondence address:**

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3. **Date of Birth:** 23rd June, 1984

4. **Qualifications:**

Degree	Institution	Year	Division/Class
B.Sc.	Presidency College, Kolkata; University of Calcutta (C.U.)	2002-2005	First (65%)
M.Sc.	IIT Bombay	2005-2007	First (CPI 9.45/10)
Ph D.	Arizona State University	2007-2012	First (CPI 3.94/4)

5. **Research Interest**

Arnab Dutta's research focuses on developing molecular and materials-based solutions for clean energy and carbon management. His group designs bio-inspired and earth-abundant catalysts for green hydrogen generation, CO_2 capture and conversion, water oxidation, and related small-molecule activation. Combining inorganic/organometallic chemistry with electrochemistry and spectroscopy, they elucidate mechanistic pathways and structure–activity relationships to guide catalyst design. A key emphasis is translating fundamental insights into device-relevant systems, including electrolyzers, coupled capture-conversion platforms, and integrated CCUS prototypes tailored to industrial conditions, with the broader goal of enabling sustainable, scalable technologies for a circular and low-carbon energy future. Arnab has also acted as a Co-Founder, Director and CTO of UrjanovaC Pvt. Ltd., a start-up that led the translation of IIT Bombay-origin CCUS into scalable, water-based capture-to-mineralisation systems that convert flue-gas/direct-air CO_2 into stable carbonates, enabling practical decarbonization for hard-to-abate industries. UrjanovaC has earned major accolades multiple national/international innovation awards since 2023, including Avinya'25 - Energy Startup Challenge (organized by the Ministry of Petroleum and Natural Gas).

6. Employment Experience

S. No.	Position & Organization	Nature of job	Period
1	Associate Professor, IIT Bombay (IITB)	Associate Professor	May 2021-
2	Assistant Professor, IIT Bombay (IITB)	Assistant Professor	March 2020-May 2021
3	Assistant Professor, IIT Gandhinagar (IITGN)	Assistant Professor	2015-March 2020
4	Postdoctoral associate, Pacific Northwest National Laboratory, Richland, WA, USA	Postdoctoral researcher	2012-2015

7. Honors & Awards

India-Japan Circulation of Talented Youths in Science Program (LOTUS) with Prof. Y. Ohki, Kyoto University *2025*

Class of 1973 Excellence in Research Award *2024*

Open Air Carbon Removal Challenge, Open Air Collective *2023*

Early Research Achiever Award, IIT Bombay *2023*

Selected as the leading Early-Career Researchers in Organic and Inorganic Chemistry by American Chemical Society *2023*

Member, Indian Young Academy of Science (INYAS) *2022*

Lead Mentor, XPRIZE Carbon Removal Competition Award Winner *2021*

Young Faculty Award, IIT Bombay 2020

Excellence in Research Award, IITGN 2019

Shastri Indo-Canadian Institute Research Grant 2017

Ramanujan Fellowship, SERB-DST, India 2016

Excellence in Research Fellowship, IIT Gandhinagar 2015

M. T. Thomas Award for outstanding post-doctoral achievement, Pacific Northwest National Laboratory 2015

Outstanding Performance Award, Fundamental and Computational Sciences Directorate, Pacific Northwest National Laboratory 2014

3rd place winner of student poster award at *International Conference of Bio-inorganic Chemistry (ICBIC 15)* 2011

Science Foundation of Arizona Scholarship 2007-2009
Arizona State University

Institute Silver Medal, *Prof. A.B. Biswas Memorial Prize* and *Shri Prakash Krishnan Award* in Indian Institute of Technology (IIT) Bombay for being the most outstanding student in the Master of Science in Chemistry 2007

Burjor Godrej Scholarship for Academic Excellence in Institute of Technology (IIT) Bombay 2006

8. Teaching

Course	Role	Institution/Year
CH 547/Organometallic Chemistry	Instructor	IIT Bombay, 2022-2024
CH 410/Bio-inorganic Chemistry	Instructor	IIT Bombay 2020-2024
CH 105/Inorganic Chemistry	Instructor	IIT Bombay 2020-2022
CH 827/Special Topics in Inorganic Chemistry	Instructor	IIT Bombay, 2020-2021
CH 510/Main group & transition metal chemistry	Instructor	IIT Gandhinagar, 2015 IIT Gandhinagar, 2017 IIT Gandhinagar, 2018
CH 517/Bioinorganic Chemistry	Instructor	IIT Gandhinagar, 2016 IIT Gandhinagar, 2018 IIT Gandhinagar, 2019
CH 202/General Chemistry Laboratory	Instructor	IIT Gandhinagar, 2016 IIT Gandhinagar, 2017 IIT Gandhinagar, 2018
CH 522/Transition metal chemistry	Instructor	IIT Gandhinagar, 2016 IIT Gandhinagar, 2017
CH 523/Symmetry & point group	Instructor	IIT Gandhinagar, 2016
CH 201/General chemistry	Instructor	IIT Gandhinagar, 2017 IIT Gandhinagar, 2017 IIT Gandhinagar, 2018
CH 521/Advanced chemistry laboratory	Instructor	IIT Gandhinagar, 2017 IIT Gandhinagar, 2018 IIT Gandhinagar, 2019
CH 508/Inorganic chemistry laboratory	Instructor	IIT Gandhinagar, 2019
CH 615/Electrochemistry	Instructor	IIT Gandhinagar, 2019
FP 101/Foundation program	Coordinator	IIT Gandhinagar, 2016

9. Publications:

Journal Articles

1. S. Maity, L. Seikh, C. Das, G. K. Lahiri, **A. Dutta***, Ru complexes for CO2 activation, ***Journal of Physics: Energy,*** 2026, Just Accepted.

2. R. Biswas, M. Pal, A. Roy, A. Banerjee, **A. Dutta***, Metal-Complex-Assisted Surface Reconstruction of MnO2 Nanorods for Hydrogen Evolution Reaction Under a Wide Range of pH, ***ACS Applied Nano Materials***, 2026, Just Accepted.

3. H. Sahu, R. Biswas, A. Roy, M. Madaan, A. Panda, R. Bonthapally, V. K. Malik, **A. Dutta***, M. Sharma*, Magnetically Coupled Intergranular Interactions and Synergistic Effects on Oxygen Evolution Reaction in Ferrimagnetic-Antiferromagnetic Heteronanostructures, ***ACS Applied Nano Materials***, 2026, Just Accepted.

4. V. Trivedi, V. Vishal*, **A. Dutta*,** S. Bhattacharya*, Bio-Inspired Flow Field Design for Enhanced Mass Transport in CO2 Electrolyzers: A Multiphysics Modeling Approach, ***ACS Omega***, 2026, Just Accepted.

5. S. Ghorai, S. Saha, R. Biswas, A. Saini, S. Barik, S. Guria, A. Kumar, D. Tewary, A. Dutta*, Enzyme-Inspired Molecular Design Unlocks Efficient and Selective Ammonia Electrosynthesis from Nitrate in Water, ***Angewandte Chemie International Edition***, 2026, Just Accepted.

6. T. Kaushik, A. Chowdhury, M. Pal, S. Ghosh Dastidar, T. Dolkar, V. Trivedi, R. Biswas, S. Guria, V. Vishal, K. Mondal, A. Datta*, **A. Dutta***, Plasmonic Gold Antenna−Copper Molecular Complex Reactor Assembly for Exclusive CO2 to Formate Conversion under White Light Irradiation, ***Journal of the American Chemical Society***, 2026, 148, 6, 6309–6323.

7. S. Ganguly, P. Basera, K. Das, S. Saha, **A. Dutta**, A. Sharma, G. Jayamurugan, S. Ahmed, C. Loha, S. Ghosh*, Quantum Confinement vs. Mesoporosity in SnO2: Oxygen Vacancies Dictate Dominant Formate Selectivity in Hybrid CO2 Electrolysis with Unprecedented 480 mV Energy Savings, ***Journal of Materials Chemistry A***, 2026, Just accepted.

8. A. Karmakar, B. B. Kamble, S. Karim, **A. Dutta**, T. H. Kim, A. K. Satheesan, S. Kundu*, Store or Catalyze? The M–O Bond Decides, ***Journal of Materials Chemistry A***, 2026, Just accepted.

9. S. Kar, S. Maity, R. Chakraborty, S. Khan, A. Saini, T. Pain, **A. Dutta***, and S. Kar*, Cobalt(III) Corrolato Complexes with Tailored Secondary Spheres: Catalytic Implications for Water Oxidation, ***Inorganic Chemistry***, 2026, Just accepted.

10. M. Pal, R. Biswas, V. Trivedi, A. Saini, **A. Dutta***, Green Hydrogen Production by Alkaline Seawater Electrolyzers: A Journey from Lab-Scale Research to Industrial Applications, ***Journal of Materials Chemistry A***, 2026, 14, 6106 - 6144.

11. P. Singha[†], P. Bhandari[†], T. Kaushik, M. Das, **A. Dutta***, A. Datta*, Photosensitization of a Molecular Catalyst by CuInS2 Nanocrystals with ZnS shell: Interplay of Electron Transfer Dynamics and Surface Modification, ***ACS Applied Materials & Interfaces***, 2026, 18, 1, 1140–1151. ([†]These two authors have contributed equally)

12. A. Karmakar[†], S. Karim[†], R. Biswas, **A. Dutta***, Structure-Activity Correlation in Layered Double Hydroxides: Facilitating Oxygen Evolution through the Lattice Oxygen Mechanism, ***Journal of Materials Chemistry A***, 2026, 14, 2084-2101. ([†]These two authors have contributed equally)

13. S. Sen, P. Kumar, S. Pattanayak, C. Das, **A. Dutta***, M. Ghosh*, Proton Reduction by Amino Acid-Based Iron Complexes: Impact of Proton Residue Concentration at Catalyst Sites, **Chemistry An Asian Journal**, 2025, Just accepted.

14. A. Kumar, V. Trivedi, A. Sharma*, **A. Dutta***, An Economical and Low-energy Consuming Electroflocculation Prototype for Efficient Microalgae Harvesting, **Journal of Environmental Chemical Engineering**, 2025, 13, 6, Volume 13, 119946.

15. C. Das, A. Saini, P. Bhandari, L. Seikh, P. Majumder, R. Biswas, S. Ghosh, A. Datta, G. K. Lahiri, **A. Dutta***, Merging Light Harvesting and Catalysis: External Photosensitizer-free CO2-to-CO Conversion by a Copper-phenanthroline-pyrene Complex, ***ACS Catalysis***, 2025, 15, 17856–17870.

16. S. Saha, Y. Kharwar, S. Ghorai, H. V. Annadata, S. Karim, **A. Dutta***, A Heterogenised Molecular Electrocatalyst for Round-the-Clock Green Hydrogen Production by Solar-Electrolyser and Zinc-Air

Batteries, ***Angewandte Chemie International Edition***, 2025, 64, 50, e202516482.

17. A. Kumar, B. Rajeshwaree, A. Sharma, P. Majumder, V. Vishal, A. Dutta*, Carbon dioxide to Bicarbonate Conversion Using Synthetic Zinc-based Metal Complex for Improved Carbon Fixation and Biomass Productivity in Chlorella vulgaris, **Journal of Environmental Chemical Engineering**, 2025, 13, 5, 119016.

18. P. Majumder*, A. Dutta*, Closed-Loop Carbon Management Strategies for Climate and Energy-Resilient India, **iScience**, 2025, 28, 10, 113509.

19. V. Trivedi, B. Rajeshwaree, R. Biswas, M. Kashyap, S. Bhattacharya*, **A. Dutta***, Crafting Sustainable CO2 Electrolyzers, **Cell Reports Physical Science**, 2025, 6, 9, 102790.

20. V. Thakar, M. Barman, **A. Dutta***, R. Banerjee*, Lead-Free Tin-Based Halide Perovskites: A Bifunctional Catalyst for Oxygen Evolution and Oxygen Reduction Suitable for Sustainable Energy Applications, **Small**, 2025, Just Accepted.

21. R. Singh, S. Panja, B. Pal, P.Manna, C. Nandi, S. Ghorai, **A. Dutta*** and D. Maiti*, Facile oxidative amination with imidazole and L-histidine coordinated cobaloximes, **Chemical Communications**, 2025, Just Accepted.

22. A. Saini, P. Majumder, **A. Dutta***, The Evolution of Hydrogen Production Catalysts from Enzymes to Artificial Bio-Hybrid Systems, **Journal of The Electrochemical Society of India**, 2024, 73, 177-194.

23. H. Rawool, A. Saini, S. Dey, C. Das, **A. Dutta***, P. Ghosh*, Electrochemical Screening of Nickel, Copper, and Manganese meso-Aryl Dipyrrinato Complexes Probing Electrocatalytic Hydrogen Evolution, **Chemistry An Asian Journal**, 2025, Just accepted.

24. S. P. Shelake; A. Iqbal; M. Pal; S. Ghorai; S. D. Kshirsagar; N. R. Indla; R. Thapa; A. V. S. Sainath*; **A. Dutta***; U. Pal*, Pyridine homopolymers axial ligation on cobaloxime for efficient hydrogen production, **Small**, 2025, Just accepted.

25. A. Kumar, A Sharma, P Majumder, V Vishal, **A Dutta***, Chemical and microalgal conversion of carbon dioxide into fuels and materials: A review, **Environmental Chemistry Letters**, 2025, 23, 1209-1229.

26. S. Mondal, S. S. Deshpande, S. K. De, T. Ghosh, Y. Kharwar, S. Patra, B. Karmakar, **A. Dutta**, S. Chakraborty, D. Senapati*, Dynamic Strain-Engineered Au–Ag Alloy Nano-Seed Network for Enhanced Electrochemical Oxygen Reduction and High-Performance Alkaline Membrane H2 Air Fuel Cells, **Small**, 2025, Just accepted.

27. N. A. Shah, T. Dolkar, S. Karim, J. Ishrat, C. Das, S. Das, A. S. Roy, K. Bhattacharyya, and **A. Dutta***; pH-modulated Activation of Pendant Amine Leading to Rapid Electrocatalytic H2 Production by a Molecular Copper Complex in Acidic Water, ***Inorganic Chemistry Frontiers***, 2025,12, 6178-6190.

28. S. Mishra, T. Dolkar, A. Pareek, R. Maji, **A. Dutta*** and S. Ghosh*, Heavier Chalcogenate-Bridged Manganese Carbonyl Complexes: Synthesis, Reactivity and Electrochemical Investigation; **Chemistry an Asian Journal**, 2025, e202401820.

29. V. Trivedi, S. Jain, R. Biswas, S. Ghosh Dastidar, K. Mandal, S. Bhattacharya*, V. Vishal*, **A. Dutta***, An Exclusive CO2-to-CO Converting Single-stack Electrolyzer Driven by a Biomass-derived N-doped Carbon-based Bimetallic Electrocatalyst, ***Journal of Material Chemistry A***, 2025, 13, 13378-13390.

30. B. Rajeshwaree, A. Banerjee, A. Saini, P. Majumder, V. Vishal*, **A. Dutta***, Bio-inspired Catalyst-driven Efficient CO2 Capture and Subsequent Mineralization in Aqueous Media under Practical Conditions, ***Carbon Capture Science & Technology***, 2025, 100417. (Part of 2024 IChemE & CCST Young Investigators special issue)

31. I. Ali, Gulafshan, V. D. Singh, **A. Dutta**, D. S. Pandey*, Efficacy of Redox–Active Cu(II) Dipyrrin Complexes toward Electrochemical Reduction of CO_2, ***Inorganic Chemistry***, 2025, 64, 12, 5893–5903.

32. S. Chatterjee*, N. Chakravorty, P. Devi, R. Dhaka, R. Singh, **A. Dutta**, S. Maheswary, P. Kumar, C. Roy Chaudhuri, The Landscape of Postdoctoral Research in India: Opportunities, Challenges, and

Recommendations, ***Proceedings of the Indian National Science Academy***, 2025, Just accepted.

33. S. Panja, A. Pan, S. Biswas, C. Das, A. Guha, R. Y. Nimje, T. G. Murali Dhar, A. Gupta, A. Mathur, **A. Dutta***, L. Roy*, D. Maiti*, Pallada-Electrocatalysis Enables Distal Regioselective and Atroposelective Olefination Reactions, ***Angewandte Chemie International Edition***, 2025, e202422876.

34. D. Das, M. Pal, M. Sarma, A. Pathak, J. Bahadur, H. V. Annadata, Y. Kharwar, S. Kancharlapalli, **A. Dutta*** and K. Sudarshan*, Unraveling the efficacy of defect engineered mesoporous Ni-Co spinel oxide nanowires as energy-efficient electrocatalyst for oxygen reduction reaction and fuel cell applications, ***Journal of Materials Chemistry A***, 2025, 13, 9402-9417.

35. M. Barman, R. Biswas, M. Pal, **A. Dutta***, A comprehensive review of metal-air batteries: Mechanistic aspects, advantages and challenges, ***Catalysis Today***, 2025, Volume 451, 1 May 2025, 115229.

36. A. Saini, A. Yerbulekova, C. Das, Y. P. Kharwar, A. Wertz, P. Majumder, H. Shafaat*, **A. Dutta***, A designed metalloprotein-driven electrolyzer operational in seawater, ***ACS Catalysis*****,** 2025, 15, 3, 2620–2629.

37. I. Singh, A. Upadhyay, A. Mandal, S. Saha, Pragya, L. Pradhan, M. Nayak, **A. Dutta**, A. K. Agrawal, S. Mukherjee, S. Banerjee*, Fe(II)-photo-antibiotics for potential antibacterial, antibiofilm, and infective wound healing applications in rat model, ***Journal of Medicinal Chemistry***, 2025, 68, 4, 4453–4465.

38. A. K. Yadav, V. Singh, S. Acharjee, S. Saha, R. Kushwaha, **A. Dutta**, B. Koch*, S. Banerjee*; Sonodynamic Cancer Therapy by Mn(I)-tricarbonyl Complexes via Ultrasound-triggered CO Release and ROS Generation; ***Chemistry A European Journal***, 2025, e202403454.

39. S. Karim, N. Tanwar, S. Das, R. Ranjit, A. Banerjee, Gulafshan; A. Gupta, A. Kumar*, **A. Dutta***, Shaping the Future of Green Hydrogen Production: Overcoming Conventional Challenges with Molecular Catalysts, Immobilization, and Scalable Electrolyzers, ***ACS Catalysis***, 2025, 15, 1073-1096.

40. P. Jain, R. Biswas, L. Saikia, **A. Dutta**, O. P. Thakur, S. Shankar*, Production of cost-effective green energy using Mn/Gd co-substituted cobalt ferrites hydroelectric cells and their oxygen evolution reaction, ***Journal of Alloys and Compounds***, 2025, 1010, 177419.

41. S. Saha, S. Mitra, Y. P. Kharwar, H. V. Annadata, S. Roy, **A. Dutta***, A Molecular Catalyst-driven Sustainable Zinc-Air Battery Assembly, ***Small***, 2024, 2411021.

42. S. Ghorai†, S. Karim†, S. Saha, **A. Dutta***, Cobalt-based Molecular Electrocatalyst-Mediated Green Hydrogen Generation: A Potential Pathway for Decarbonising Steel Industry, ***Energy and Climate Change***, 2024, Just Accepted. (†These authors contributed equally)

43. A. Banerjee, S. Jain, S. Ghosh Dastidar, R. Biswas, S. Das, K. Mondal, V. Vishal, G. K. Lahiri, **A. Dutta***, Microwave-Assisted Fabrication of Copper Oxide/N-Doped Carbon Nanocatalyst for Efficient Electrochemical CO2 Conversion to Liquid Fuels, ***Small***, 2024, 2406765.

44. S. Ganguly, P. Basera, S. Ahmed, S. Shaha, **A. Dutta**, C. Loha, S, Ghosh*, Trace Ru incorporation boosted Co2P nanorods for superior water electrolysis and substrate paired electrolysis toward value added chemicals in alkaline medium, ***Small***, 2024, 2405056.

45. G. Sabharwal, K. C. Dwivedi, C. Das, T. R. K. Rana, **A. Dutta***, Gopalan Rajaraman*, Maravanji S. Balakrishna*, Detailed mechanistic studies on PNN-palladium pincer complex catalyzed Suzuki-Miyaura cross-coupling reaction proceeding through a PdII/PdIII/PdIV catalytic cycle, ***Journal of Catalysis***, 2024, 440, 115825.

46. C. Das†, S. Karim†, S. Guria, T. Kaushik, S. Ghosh, **A. Dutta***, Electrocatalytic conversion of CO2 to formic acid: A journey from 3d-transition metal-based molecular catalyst design to electrolyzer assembly, ***Accounts of Chemical Research,*** 2024, 57, 20, 3020–3031. (†These authors contributed equally)

47. A. Paik, C. Das, S. Paul, A. Biswas, S. Mehta, A. Mondal, B. Maity*, **A. Dutta***, S. Rana*, Effect of redox-active quinoline on the reactivity and mechanism of hydrogen evolution reaction (HER) with pentadentate polypyridyl-quinolyl ligand coordinated cobalt complexes, ***ACS Catalysis***, 2024, Just accepted.

48. A. Ali†, D. Prakash†, A. Saini†, C. Das, N. A. Shah, **A. Dutta***, Bimetallic Copper Complexes for Electrocatalytic Bidirectional O2/H2O Conversion in Aqueous Solution, ***ChemCatChem***, 2024, Just accepted. (†These authors contributed equally)

49. C. Das, S. Ghosh, R. Biswas, G. K. Lahiri. **A. Dutta***, A ligand-modulated photostable Mn(I)-carbonyl complex for preferential conversion of CO2 to CO in water, ***Chemical Communications***, 2024, 60, 10492 - 10495. (Selected as front cover figure)

50. Gulafshan, S. Karim*, Y. P. Kharwar, T. Aziz, S. Saha, S. Roy, **A. Dutta***, Green H2 Generation from Seawater Deploying a Bifunctional Hetero-Interfaced CoS2-CoFe-Layered Double Hydroxide in an Electrolyzer, ***Small***, 2024, 2406431.

51. S. Mishra, T. Dolkar, A. Pareek, R. Bonthapally, D. K. Maity*, **A. Dutta***, S. G. Ghosh*, Beyond S and Se: Electrocatalytic Hydrogen Production by Tellurolate-Bridged Co(III)-Mn(I) Heterodinuclear Complexes, ***Inorganic Chemistry***, 2024, 63, 36, 16918–16927.

52. P. Rani, R. Biswas, **A. Dutta***, P. Alegaonkar*, A Hierarchical CoTe/MnO2/BN Ternary Composite Exhibiting Energy-Efficient O2 Evolution in Water, ***Energy & Fuels***, 2024, 38, 17, 16809–16819.

53. K. Kukreti, A. Roy, R. Biswas, S.Das Adhikari, M. Himanshu, R.P. Singh, **A. Dutta**, M.P. Sharma, K.L. Yadav, K. Yadav*, Role of oxygen vacancy enriched m-BiVO4/t-BiVO4 isotype heterojunction for enhanced photocatalytic degradation of rhodamine B dye and in ferroelastic to paraelastic phase transition, ***Surfaces and Interfaces***, 2024, 52, 104932.

54. Abhishek B., Jayarama A., A. S. Rao, S. S. Nagarkar, **A. Dutta**, S. P. Duttagupta, S. S. Prabhu, R. Pinto, Challenges in photocatalytic hydrogen evolution: Importance of photocatalysts and photocatalytic reactors, ***International Journal of Hydrogen Energy***, 2024, 81, 1442-1466.

55. C. Das†, S. Ghosh†, A. Guha, P. Majumder, G. K. Lahiri, **A. Dutta***, Photocatalytic CO2 to CO Conversion by an Elusive Mn(II)-Based Molecular Catalyst, ***Crystal Growth & Design***, 2024, 24, 15, 6463–6471. (†These authors contributed equally)

56. D. Phapale, V. Sharma, A. Saini, S. Sharma, P. Kumar, R. Kumar, M. Shanmugam, A. Draksharapu, **A. Dutta***, E. J. L. McInnes, D. Collison, G. Rajaraman*, and M. Shanmugam*, Capturing the Elusive [RuV═O]+ Intermediate in Water Oxidation, ***ACS Catalysis***, 2024, Just accepted.

57. R. Kushwaha, A. Upadhyay, S. Saha, A. K. Yadav, A. Bera,* **A. Dutta** and S. Banerjee*, Cancer phototherapy by CO releasing terpyridine-based Re(I) tricarbonyl complexes via ROS generation and NADH oxidation, ***Dalton Transactions***, 2024, 53, 13591-13601.

58. S. Das, S. Jain, A. Banerjee, **A. Dutta***, A two-dimensional Cu-based nanosheet producing formic acid via glycerol electro-oxidation in alkaline water, ***ChemPlusChem***, 2024, e202400317.

59. S. Panja, C. Nandi, S. Guria, A. Pan, C. Das, S. Das, S. Ghorai, **A. Dutta***, D. Maiti*, Expedited Proton Relay in Enzyme-Inspired Cobaloximes Facilitates Organic Transformations, ***Chemistry A European Journal***, 2024, 30, 49, e202401785.

60. T. Kaushik†, S. Ghosh†, T. Dolkar, R. Biswas, **A. Dutta***, Noble metal plasmon-molecular catalyst hybrids for renewable energy-relevant small molecule activation, ***ACS Nanosciences Au***, 2024, Just Accepted. (†These authors contributed equally)

61. M. Pal, R. Biswas, S. Barman* and **A. Dutta***; Strategic Ni-doping improved electrocatalytic H2 production by Bi3O4Br in alkaline water; ***Energy Advances***, 2024, 2024, 3, 1562 - 1570.

62. S. Das Adhikari, A. Roy, P. Kour, K. Kukreti, M. Himanshu, R. P. Singh, R. Biswas, M. Kaur, P. Chand, A. Upadhyaya, Sudesh, **A. Dutta**, and K. Yadav*; Bifunctional layered g-C3N4 incorporated NiSe2 nanocomposites as a highly efficient photocatalyst and electrode material for supercapacitor applications; ***Journal of Energy Storage***, 2024, 92, 112205.

63. S. Ganguly, J. Kaishyop, T. S. Khan, SK T. Aziz, **A. Dutta**, C; Loha, S. Ghosh*, Selective Facet Engineering of Ni12P5 Nanoparticle for Maximization of Electrocatalytic Oxidative Reaction of Biomass Chemicals, ***ACS Sustainable Chem. Eng.,*** 2024, 12, 19, 7374–7381.

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Current Researchers' strength	Researchers graduated
Post-Doc: 2, Ph.D.: 13, M.Sc.: 3	**Post-Doc: 9, Ph.D.: 7, M.Sc.:25, M.Tech.: 6**