CURRICULUM VITAE

Prof. Akshaya Kumar Samal, Ph.D., D.Sc. (Ongoing)

Anisotropic Nanomaterial Lab

Centre for Nano and Materials Sciences (CNMS), Jain University

Jain Global Campus, Ramanagar-562112, Bangalore, India

Web: https://cnms.jainuniversity.ac.in/Faculty-Akshaya.htm

Webpage: http://aksamal.wixsite.com/anlab

Email: aksamal@gmail.com, Mob: +91 9777056086

EDUCATION

Ph. D.: Chemistry, Indian Institute of Technology Madras, India, 2010

Thesis title: Synthesis, Characterization, and Properties of One-Dimensional Nanostructures

Research Advisor: Professor T. Pradeep

M. Sc.: Chemistry, Sambalpur University, Orissa, India, 2001

Major: Physical Chemistry, Remarks: 1st Class

B. Sc.: Utkal University, Orissa, India, 1999

Subjects: Chemistry (Major). Remarks: 1st Class with distinction

PROFESSIONAL EXPERIENCE

- Professor: March 2024- till now
- Associate Professor: May 2021- Feb. 2024
- Assistant Professor: July 2017- April 2021

  Centre for Nano and Materials Sciences (CNMS), Jain University, Bangalore
- Postdoctoral Fellow: April 2013- June 2017

  Research Advisor: Prof. Jean-Marie Basset

  King Abdullah University of Science and Technology, Thuwal, Saudi Arabia
- Postdoctoral Fellow: September 2011- September 2012

  Research Advisor: Prof. Luis M. Liz Marzan, University of Vigo, Spain
- Research Associate: August 2010-August 2011

  Research Advisor: Prof. T. Pradeep, IIT Madras, India

- Research Scholar: August 2005-July 2010

  Research Advisor: Prof. T. Pradeep, IIT Madras, India
- Project Assistant: January 2005-July 2005

  Project Coordinator: Prof. T. Pradeep, IIT Madras, India
- Project Assistant: August 2003-March 2004

  Project Coordinator: Prof. B. K. Patel, IIT Guwahati, India

RESEARCH OUTPUT

Article published: 90+, Submitted: 4, Preparation: 5

Book Chapter: 8, Patent: 5; 1 (US), 3 (Indian, Published), and 1 (Indian, Filed)

h-index: 28, i10-index: 54, and Citation: 3370

Project Funding: ~1.38 Cr as PI and 48.5 L as Co-PI

Postdocs: 3, 2 (Ongoing)

Ph.D.: 5, Awarded: 3, Ongoing: 2

M.Sc. Awarded: 5, Intern: 6, Ongoing: 2

https://scholar.google.com/citations?user=pW8Kpc4AAAAJ&hl=en

https://www.scopus.com/authid/detail.uri?authorId=15925878800

https://orcid.org/0000-0002-7623-3711

RESEARCH INTEREST

- Design and fabrication of anisotropic nanostructures and their diverse applications in catalysis, energy, and environmental remediation.
- Remediation of emerging contaminants at the trace level using anisotropic nanostructures as the substrate through surface-enhanced Raman scattering (SERS).
- Shape-dependent anisotropic nanostructures of the electrochemically active facet(s) for hydrogen production through water splitting.
- A detailed study on shape-dependent chemistry and reactivity at different surface planes, edges, and corners at the nanoscale.

TEACHING EXPERIENCE

- Teaching M.Sc. students (Physical Chemistry) at the Centre for Nano and Material Sciences (CNMS), Jain University, from July 2017 to till now.

- Laboratory classes for undergraduate students, physical chemistry practical-I in the Dept. of Chemistry at IIT Madras for four semesters.

AWARDS

- Research Peace Award 2019-2020, RULA Award powered by the World Research Council.
- Secured 94.77 *percentile* in the prestigious national level examination, Graduate Aptitude Test in Engineering (GATE) 2004, with all India rank 170.
- Junior and Senior Research Fellowship from IIT Madras to pursue Ph.D.

RESEARCH

Independent Research:

- The shape-dependent nanostructures such as cubes, nanorods, octahedra, decahedra, etc., using seed-mediated synthesis for the detection and degradation or complete removal of emerging pollutants, including per Per- and poly-fluoroalkyl substances, dyes, and pesticides in the contaminated water.
- Design and fabrication of low-cost composite anisotropic nanostructures of electrochemically active facet(s) for high-efficiency water splitting (OER/HER).
- The engineered anisotropic nanostructures for various catalytic applications, including single-atom catalysis.

Postdoctoral Research:

- Utilization of greenhouse gases (CH_4 & CO_2) to produce hydrogen (H_2) /syngas and CO_2 for value-added products such as methanol and dimethyl ether.
- One-pot and surfactant-free synthesis of bimetallic nanoparticles of M-Sn (M = Ru, Rh or Ir) for hydrogenolysis of esters.
- Design and fabrication of shape-controlled synthesis of bimetallic catalysts for hydrogen production.
- Synthesis of Au@Ag core-shell spherical, decahedral, and star-shaped nanoparticles for efficient surface-enhanced Raman scattering (SERS) substrates.
- Tomographic investigation of bimetallic alloys and core-shell nanocubes.

Doctoral Research:

- Synthesis of tellurium nanowires and gold nanorods by wet-chemical method.

- Synthesis of metal tellurides such as silver telluride, lanthanum, and platinum tellurides using tellurium nanowires as the template.
- Reactivity of metal ions such as Hg^{2+}, Pb^{2+}, Cd^{2+}, and Zn^{2+} with silver telluride nanowires and formation of hybrid nanowires through cation exchange.
- Resistivity and Seebeck coefficient measurements of silver telluride.
- Properties such as SERS of tellurides using crystal violet as the analyte.
- One-pot synthesis of gold nanorods with and without seed particles and the role of $NaBH_4$ in the seedless synthesis.
- Studies involved different techniques such as TEM, SEM, EDAX, Raman, XRD, DSC, XPS, ICP-OES, UV-Vis. spectroscopy, and fluorescence spectroscopy.

RESEARCH FUNDINGS

Sl. No	Title of the Project	Sponsoring Agency	Year	Role	Value (Lakhs)	Status
1	Controlled facet engineering to develop anisotropic electrocatalysts for effective water splitting	Science and Engineering Research Board (DST-SERB)	2022-2025	PI	67.00*	Approved
2	Development of engineered transition metal oxide doped oxygenated carbon-based tertiary treatment unit for leather industry wastewater treatment	Department of Science and Technology (DST)	2023-2025	Co-PI	48.49	Ongoing
3	Anisotropic nanomaterials for the treatment of per- and polyfluoroalkyl substances (PFAS)	Jain University, Bangalore	2022-2023	PI	2.00	Ongoing
4	Controlled Synthesis of Anisotropic Nanomaterials for Detection of Pesticides	Vision Group on Science and Technology	2019-2020	PI	5.00	Completed

		(VGST), Karnataka				
5	Design and Controlled Fabrication of Anisotropic Nanoparticles for Catalysis and Sensing Applications	Science and Engineering Research Board (DST-SERB)	2019-2022	PI	60.61	Completed
6	Size-Controlled Bimetallic Nanoparticles for CO_2 to Methanol and Dimethyl ether	Jain University, Bangalore	2017-2020	PI	3.00	Completed

* The exact amount can be mentioned only after receipt of the sanction order.

INDUSTRIAL ENGAGEMENT

- NDA with **Reliance Industry, India,** for nanomaterial research work.
- NDA (about to happen soon) with **Merck - Living Innovation, India,** for nanomaterial research work.

LIST OF PUBLICATIONS

1. Deep Eutectic Solvent Engineered Dendritic Fibrous Nano-silica Catalyst for Sustainable Fixation CO_2 into Value-Added Product at Atmospheric Conditions, S. C. Alla, A. Sudhakaran, O. B Bembalge, **A. K. Samal**, R. E. Torrejos, M. N. F. Norrrahim, A. H. Jadhav, *J. Hazard. Mater*. 2024. (Submitted)
2. Large-area ultrathin $Co(OH)_2$ nanosheets: A bifunctional electrode material for charge storage and water oxidation, P. B. Jagdale, S. A. Patil, A. Sfier, N. Barman, A. Iqbal, S. Royer, R. Thapa, **A. K. Samal,** D. Ghosh, M. Saxena, A. H. Jadhav, *ACS Appl. Energy Mater.* 2024. (Submitted) IF = 6.4
3. Transformative Dynamics: Self-Assembly of Iron Oxide Hydroxide Nanorods into Iron Oxide Microcubes for Enhanced PFAS Remediation, N. Rhakho, M. Saxena, A. H. Jadhav, A. Altaee, **A. K. Samal**, *Langmuir.* 2024. (Under Review) IF = 3.9
4. Anisotropic Cu_2O Nanostructures: A Promising Remediation for Per- and Polyfluoroalkyl Substances, N. Rhakho, S. Jena, S. Yadav, M. Saxena, A. H. Jadhav, A. Altaee, **A. K. Samal**, *J. Water Process. Eng.* 2024. (Under Review) IF = 7.0

5. Mitigating PFAS Contaminants in Water: A Comprehensive Review of Remediation Strategies, N. Rhakho, S. Yadav, J. Mallama, A. Altaee, M. Saxena, A. H. Jadhav, **A. K. Samal**, *J. Environ. Chem. Eng.* 2024. (Under Review) IF = 7.7
6. Agri-Waste Derived Electroactive Carbon-Iron Oxide Nanocomposite for Oxygen Reduction Reaction: A Experimental and Theoretical Study, P. B. Jagdale, S. R. Manippady, R. Anand, G. Lee, **A. K. Samal**, Z. Khan, M. Saxena, *RSC Adv.,* 2024, 14, 12171-12178. IF = 3.9 Research link
7. Iron Slag/Activated Carbon-Electrokinetic System with Anolyte Recycling for Single and Mixture Heavy Metals Remediation, F. M. Hamdi, A. Altaee, L. Alsaka, I. Ibrar, M. AL-Ejji, J. Zhou, **A. K. Samal**, A. H. Hawari, *Sci. Total Environ.* 2024, 172516. IF = 9.8 Research link
8. Recent Advances in the Fixation of CO_2 into Quinazoline and Benzimidazole, R. Dhanusha, S. Puneeth Kumar, A. Sudhakaran, A. Biradar, **A. K. Samal**, O. B. Bembalge, A. H. Jadhav, *Energy Fuels*, 2024 (In Press). IF = 5.3
9. Advancements and Perspective of Environmentally Sustainable Technologies for Electrochemical Selective Conversion of CO_2 to Methanol. A. Sudhakaran, C. Singh, A. V. Biradar, **A. K. Samal**, N. Chaudhari, A. H. Jadhav, *Cat. Rev.* 2024 (In Press). IF = 10.9
10. Nickel Engineered In-Situ Graphitization of Carbon Derived from Bagasse: A Robust and Highly Efficient Catalyst for Oxygen Evolution Reaction and Water Remediation, S. Akhila, S. A. Patil, S. R. Manippady, A. H. Jadhav, **A. K. Samal**, R. S. Devan, M. Saxena, *J. Clean. Prod.* 2024, 451, 142002. IF = 11.1 Research link
11. Hollow CeO_2 Nanospheres as Catalyst for the Conversion of Aromatic Diamines to Benzimidazoles, S. Puneeth Kumar, C. Singh, S. Alla, S. Gholap, **A. K. Samal**, N. Chaudhari, A. H. Jadhav, *ACS Appl. Nano Mater.* 2024, 7, 3, 2956-2970. IF = 5.9 Research link
12. Shape and Size Dependent Nanostructures for Environmental Applications, B. Baral, A. Altaee, K. Simeonidis, **A. K. Samal**, *Front. Chem.*, 2024, 12, 1362033. IF = 5.5 Research link
13. Engineered Ionic Liquids Supported on Activated Carbon as a Sustainable and Selective Catalyst for Viable Fixation of CO_2 into Valuable Chemicals, S. C. Alla, D. Prasad, S. Kusuma, **A. K. Samal**, N. K. Chaudhari, J. G. Seo, A. H. Jadhav, *Chem. Eng. J.*, 2024, 481, 148239. IF = 15.1 Journal link

14. Hybrid and Enhanced Electrokinetic System for Soil Remediation from Heavy Metals and Organic Matter, F. M. Hamdi, N. Ganbat, A. Altaee, **A. K. Samal**, I. Ibrar, J. Zhou, A. O. Sharif, *J. Environ. Sci.,* 2024, 147, 424-450. IF = 6.9 Journal link
15. Fabrication of All-Solid-State Supercapacitor Based on In-Situ Grown Tellurium Nanotubes Decorated Cobalt Magnesium Telluride Microtubes, P. Bhol, P. B. Jagdale, M. Saxena, A. H. Jadhav, **A. K. Samal,** *ChemSusChem,* 2023. IF = 8.4 Journal link
16. Gravity-Driven Composite Cellulose Acetate/Activated Carbon Aluminium-Based Hydrogel Membrane for Landfill Wastewater Treatment, E. Karbassiyazdi, A. Altaee, A. Razmjou, **A. K. Samal**, H. Khabbaz, *Chem. Eng. Res. Des.*, 2023, 200, 682-692. IF = 3.9 Journal link
17. Facile one-pot synthesis of 2-substituted benzimidazole derivatives under mild conditions by using engineered MgO@DFNS as a heterogeneous catalyst, S. Puneeth Kumar, N. Chaudhari, **A. K. Samal**, R. Thapa, E. Siddharthan, A. H. Jadhav, *RSC Adv.,* 2023, 13, 32110-32125. IF = 3.9 Journal link
18. Octahedral Pd_3Cu_7 Catalysts on Diverse Support Materials for Efficient Hydrogen Evolution: Theoretical Investigation and Mechanistic Perspective, S. Swain, A. Iqbal, S. A. Patil, R. Thappa, M. Saxena, A. H. Jadhav, **A. K. Samal**, *ACS Appl. Mater. Interfaces,* 2023, 15, 50134–50147. IF = 9.5 Journal link
19. Designing Pd_xCu_y Octahedra Alloy Nanocatalysts Supported on Solid Substrates for Solvent-free Sonogashira Cross-Coupling Reaction: Rational Optimization of Metal Precursors, S. Swain, A. M. Antony, S. A. Patil, **A. K. Samal**, *Mater. Today Nano* 2023, 24, 100416. IF = 10.3 Journal link
20. 2D MXenes as the Promising Candidate for Surface-Enhanced Raman Spectroscopy (SERS): State-of-art, Recent Trends, and Future Prospects, A. Patra, Bhavya M. B., G. Manasa, **A. K. Samal**, C. S. Rout, *Adv. Funct. Mater.,* 2023, 33, 2306680. IF = 19 Journal link
21. Iron Slag Permeable Reactive Barrier for PFOA Removal by The Electrokinetic Process, N. Ganbat, F. M. Hamdi, I. Ibrar, A. Altaee, L. Alsaka, **A. K. Samal**, J. Zhou, A. H. Hawari, *J. Hazard. Mater.* 2023, 132360. IF = 13.6 Journal link
22. Detection of PFAS via Surface Enhanced Raman Scattering: Future Perspectives, Bhavya, M. B., S. Yadav, S. R. Jena, N. Rhakho, A. Altaee, M. Saxena, **A. K. Samal,** *Sustain. Chem. Environ.* 2023, 3, 100031. Journal link

23. Functionalized Silver Nanocubes for the Detection of Hazardous Analytes through Surface-Enhanced Raman Scattering: Experimental and Computational Studies, Bhavya M. B., Ramya P. B, A. Tripathi, H. Gautam, N. S. John, R. Thapa, G. Hegde, R. G. Balakrishna, M. Saxena, A. Altaee, **A. K. Samal,** *ACS Sustain. Chem. Eng.* 2023, 11, 29, 10605–10619. IF = 8.4 Journal link
24. A Machine Learning Approach for Prediction of Reverse Solute Flux in Forward Osmosis, I. Ibrar, S. Yadav, A. Altaee, A. Braytee, **A. K. Samal**, S. M. Javaid, A. H. Hawari, *J. Water Process. Eng.* 2023, 54, 103956. IF = 7 Journal link
25. Investigation of Ethanol-Phenol Interactions Used in Steam Reforming Process: Molecular Level Understanding through Experimental and Theoretical Studies, B. Mohanty, B. R. Das, **A. K. Samal**, P. K. Misra, *Sustain. Chem. Environ.* 2023, 2, 100006. Journal link
26. Trimetallic Oxide Foam as an Efficient Catalyst for Fixation of CO_2 into Oxazolidinone: An Experimental and Theoretical Approach, S. Puneeth Kumar, D. Prasad, N. Chaudhari, **A. K. Samal**, R. Thapa, E. Siddharthan, A. H. Jadhav, *ACS Appl. Mater. Interfaces*, 2023, 15, 18, 21994–22011. IF = 9.5 Journal link
27. Desalination by the Forward Osmosis: Advancement and Challenges, N. Abounahia, I. Ibrar, T. Kazwini, A. Altaee, **A. K. Samal**, S. J. Zaidi, A. H. Hawari, *Sci. Total Environ.* 2023, 886, 163901. IF = 9.8 Journal link
28. Design and Fabrication of $Cobalt_x$ $Nickel_{(1-x)}$ Telluride Microfibers on Nickel Foam for Battery type Supercapacitor and Oxygen Evolution Reaction Study, P. Bhol, S. A. Patil, N. Barman, E. S. Erakulan, R. Thapa, M. Saxena, A. Altaee, **A. K. Samal,** *Mater. Today Chem.* 2023, 30, 101557. IF = 7.3 Journal link
29. Design and Fabrication of Nickel Lanthanum Telluride Microfibers for Redox Additive Electrolyte-Based Flexible Solid-State Hybrid Supercapacitor, P. Bhol, P. B. Jagdale, N. Barman, R. Thapa, M. Saxena, **A. K. Samal,** *J. Energy Storage,* 2023, 65, 107286. IF = 9.4 Journal link
30. Computational and Experimental Design of the Octahedral PdFe Alloy Nanocatalyst for Hiyama Cross-Coupling and Environmental Pollutant Degradation, S. Swain, V. Kandathil, G. M. Karim, U. N. Maiti, S. A. Patil, **A. K. Samal,** *ACS Appl. Nano Mater.* 2023, 6, 3254–3267. IF = 5.9 Journal link

31. 2D Zinc Oxide–Synthesis, Methodologies, Reaction Mechanism, and Applications, S.A. Patil, P. B. Jagdale, A. Singh, R.V. Singh, Z. Khan, **A. K. Samal**, M. Saxena, *Small,* 2023, 19, 2206063. IF = 13.3 Journal link
32. Stable Engineered Trimetallic Oxide Scaffold as a Catalyst for Enhanced Solvent-Free Conversion of CO_2 into Value-Added Products, D. Prasad, P.M. Srinivasappa, N.A. Raju, **A. K. Samal**, and A. H. Jadhav, *Energy Fuels*, 2023, 37, 1187-1206. IF = 5.3 Journal link
33. Green Synthesis of Palladium Nanoparticles Immobilised on Graphitic Carbon Nitride as a Sustainable Nanocatalyst for the Reduction of Nitroarenes and Removal of Fluorinated Substances, G. S. Harini, N. Rhakho, V. Kandathil, K. Manjunath, A. M. Shirahatti, R. B. Dateer, **A. K. Samal,** S. A. Patil, *Catal. Lett.,* 2023. IF = 2.8 Journal link
34. Investigation of the effect of surfactant on the electrokinetic treatment of PFOA contaminated soil, N. Ganbat, A. Altaee, J. L. Zhou, T. Lockwood, R. A. Al-Juboori, F. M. Hamdi, E. Karbassiyazdi, **A. K. Samal**, A. Hawari, H. Khabbaz, *Environ. Technol. Innov.*, 2022, 28, 102938-102952. IF = 7.1 Journal link
35. Experimental and Theoretical Study on Reverse Osmosis - Dual Stage Pressure Retarded Osmosis Hybrid System, N. Al-Zainati, S. Subbiah, S. Yadav, A. Altaee, P. Bartocci, I. Ibrar, J. Zhou, **A. K. Samal**, F. Fantozzi, *Desalination*, 2022, 543, 116099. IF = 9.9 Journal link
36. Sodium Docusate as a Cleaning Agent for Forward Osmosis Membranes Fouled by Landfill Leachate Wastewater, I. Ibrar, S. Yadav, A. Altaee, J. Safaei, **A. K. Samal**, S. Subbiah, G. Millar, P. Deka, J. Zhou, *Chemosphere*, 2022, 308, 136237. IF = 8.8 Journal link
37. A Comprehensive Study on Heterogeneous Single Atom Catalysis: Current Progress and Challenges, S. Swain, M. Saxena, A. Altaee, **A. K. Samal**, *Coord. Chem. Rev.* 2022, 470, 214710. IF = 20.6 Journal link
38. Surface Modification of Nanofiltration Membrane with Kappa-Carrageenan/Graphene Oxide for Leachate Wastewater Treatment, S. Yadav, I. Ibrar, A. Altaee, **A. K. Samal**, J. Zhou, *J. Membr. Sci.* 2022, 659, 120776-120784. IF = 9.5 Journal link
39. A Unique Bridging Facet Assembly of Gold Nanorods for the Detection of Thiram through Surface-Enhanced Raman Scattering, Bhavya M. B., Ramya P. B, A. Tripathi., S. Yadav, N. S. John, R. Thapa, A. Altaee, M. Saxena, **A. K. Samal,** *ACS Sustain. Chem. Eng.* 2022, 10, 22, 7330-7340. IF = 8.4 Journal link
40. Updated Review on Emerging Technologies for PFAS Contaminated Water Treatment, T. Tazwin, S. Yadav, I. Ibrar, R. A. Al.Juboori, L. Singh, N. Ganbat, E. Karbassiyazdi, **A. K.**

Samal, S. Subbiah, A. Altaee, *Chem. Eng. Res. Des.* 2022, 182, 667-700. IF = 3.9 Journal link

41. Cobalt-Iron Decorated Tellurium Nanotubes for High Energy Density Supercapacitor, P. Bhol, S. Swain, A. Altaee, M. Saxena, **A. K. Samal,** *Mater. Today Chem.* 2022, 24, 100871-100883. IF = 7.3 Journal link
42. Identification of Starch with Assorted Shapes Derived from the Fleshy Root Tuber of Phoenix Sylvestris: Extraction, Morphological and Techno-Functional Characterization, A. K. Biswal, S. Mishra, M. B. Bhavya, **A. K. Samal,** R. Merugu, M. K. Singh, P. K. Misra, *J. Food Meas. Charact.* 2022, 16, 1688–1701. IF = 3.4 Journal link
43. Recent developments in state-of-the-art silica-modified catalysts for the fixation of CO_2 in epoxides to form organic carbonates, N. A. Raju, D. Prasad, P. M. Srinivasappa, A. V. Biradar, S. S. Gholap, **A. K. Samal**, B. M. Nagaraja, A. H. Jadhav, *Sustain. Energy Fuels* 2022, 6, 1198-1248. IF = 5.6 Journal link
44. Evaluation of Machine Learning Algorithms to Predict Internal Concentration Polarization in Forward Osmosis, I. Ibrar, S. Yadav, A. Braytee, A. Altaee, A. H. Zadeh, **A. K. Samal**, J. L. Zhou, J. A. Khan, P. Bartocci, F. Fantozzi, *J. Membr. Sci.* 2022, 646, 120257-120270. IF = 9.5 Journal link
45. High-Performance Mild Annealed CNT/GO-PVA Composite Membrane for Brackish Water Treatment, S. Yadav, I. Ibrar, A Altaee, **A. K Samal**, E. Karbassiyazdi, J. Zhou, P. Bartocci, *Sep. Purif. Technol*. 2022, 285, 120361-120369. IF = 8.6 Journal link
46. Preparation of Fouling Resistant and Highly Perm-Selective Novel PSf/GO-Vanillin Nanofiltration Membrane for Efficient Water Purification, S. Yadav, I. Ibrar, **A. K. Samal**, A. Altaee, S. Déon, J. Zhou, N. Ghaffour, *J. Hazard. Mater*. 2022, 421, 126744-126755. IF = 13.6 Journal link
47. Facet Dependent Catalytic Activity of Pd Nanocrystals for the Remedy of Organic Pollutant: A Mechanistic Study, S. Swain, B. M. Shenoy, P. Bhol, S. Yadav, S. R. Jena, G. Hegde, A. Altaee, M. Saxena, **A. K. Samal**, *Appl. Surf. Sci.* 2021, 570, 150775-150784. IF = 6.7 Journal link
48. Co-Decorated Tellurium Nanotubes for Energy Storage Applications, P. Bhol, S. Swain, S. Jena, K. Bhatte, C. S. Rout, M. Saxena, A. H. Jadhav, **A. K. Samal**, *ACS Appl. Nano Mater.* 2021, 4, 9008-9021. IF = 5.9 Journal link

49. Feasibility of H_2O_2 cleaning of forward osmosis membrane treating landfill leachate, I Ibrar, S. Yadav, N. Ganbat, **A. K. Samal**, A. Altaee, J. L Zhou, T. V. Nguyen, *J. Environ. Manage.* 2021, 294, 113024-113031. IF = 8.7 Journal link
50. Heterostructures of 2D materials-quantum dots (QDs) for optoelectronic devices: Challenges and opportunities, S. Yadav, S. R. Jena, Bhavya M. B., A. Altaee, M. Saxena, **A. K. Samal**, *Emergent Mater.* 2021, 4, 901–922. Journal link
51. Graphene-Based Membranes for Water and Wastewater Treatment: A Review, P. Bhol, S. Yadav, A. Altaee, M. Saxena, P. K. Misra, **A. K. Samal**, *ACS Appl. Nano Mater.* 2021, 4, 4, 3274–3293. IF = 5.9 Journal link
52. Catalytic activity of Au@Cu_2O core-shell nanostructure for the organic pollutant remediation, S. R. Jena, M. B. Bhavya, M. Sai Rashmi, P. Bhol, S. Swain, M. Saxena, P. K. Misra, **A. K. Samal,** *J. Phys. Chem. Solids* 2021, 152, 109935-109944. IF = 4 Journal link
53. Femtomolar detection of thiram via SERS using silver nanocubes as an efficient substrate, M. B. Bhavya, R. Prabhu, B. M. Shenoy, P. Bhol, S. Swain, M. Saxena, N. S. John, G. Hegde and **A. K. Samal,** *Environ. Sci.: Nano* 2020, 7, 3999-4009. IF = 7.3 Journal link
54. Feasibility of brackish water and landfill leachate treatment by GO/MoS_2-PVA composite membranes, S. Yadav, I. Ibrar, A. Altaee, **A. K. Samal**, R. Ghobadi, J. Zhou, *Sci. Total Environ.* 2020, 745, 141088. IF = 9.8 Journal link
55. Treatment of biologically treated landfill leachate with forward osmosis: Investigating membrane performance and cleaning protocols, I. Ibrar, S. Yadav, A. Altaee, **A. K. Samal**, J. L Zhou, T. V. Nguyen, N. Ghanbat, *Sci. Total Environ.* 2020, 744, 140901. IF = 9.8 Journal link
56. Gold Nanorods as an Efficient Substrate for the Detection and Degradation of Pesticides, M. B. Bhavya, S. Rashmi, M. Saxena, Ramya Prabhu B, Neena S. John, R. Geetha Balakrishna, **A. K. Samal,** *Langmuir* 2020, 36, 7332-7344. IF = 3.9 Journal link
57. Organic Fouling in Forward Osmosis: A Comprehensive Review, S. Yadav, I. Ibrar, S. Bakly, D. Khanafer, A. Altaee, V. C. Padmanaban, **A. K. Samal**, A. H. Hawari, *Water* 2020, 12, 1505-1540. IF = 3.4 Journal link
58. Controlled Synthesis of Palladium Nanocubes as an Efficient Nanocatalyst for Suzuki-Miyaura Cross-Coupling and Reduction of p-Nitrophenol, S. Swain, M. B. Bhavya, K. Vishal, P. Bhol, **A. K. Samal**, S. A. Patil, *Langmuir* 2020, 36, 5208-5218. IF = 3.9 Journal link

59. Modern Chemical Routes for the Controlled Synthesis of Anisotropic Bimetallic Nanostructures and their Application in Catalysis, P. Bhol, Bhavya M. B., S. Swain, M. Saxena, **A. K. Samal**, *Front. Chem.* 2020, 8, 357-383. IF = 5.5 Journal link
60. Partially Graphitized Iron-carbon Hybrid Composite as Electrochemical Supercapacitor Material, M. S. Rashmi, A. Singh, C. S. Rout, **A. K. Samal**, M. Saxena, *Chem. Electro. Chem.* 2020, 7, 1928-1934. IF = 4 Journal link
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100. A chapter "Fate of Nanoparticles in Soil and Water" in the book "**Nanoparticles as Sustainable Environmental Remediation Agents**" Royal Society of Chemistry, 2023, Page 144-162, ISBN: 978-1-83916-532-0.

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10. *Activity of Different facets of Pd Nanostructures for the Efficient Treatment of Nitro and Dye Molecules*, S. Swain, and **A. K. Samal**, International conference on advanced materials and mechanical characterization (ICAMMC-2021), organized by SRM Institute of Science and Technology, Dec. 2-4, 2021.
11. *Design and Synthesis of Faceted Pd Nanocrystals for the Remediation of Environmental Pollutants*, S. Swain, and **A. K. Samal**, 20th National Conference on Surfactants, Emulsions and Biocolloids (NATCOSEB-2021), organized by department of chemistry, Indian Institute of Technology Guwahati, held on Dec. 9-11, 2021.
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15. *Facile fabrication of Co-capped tellurium nanowire for supercapacitor application*, P. Bhol, K. Bhatte, C. S. Rout, M. Saxena, and **A. K. Samal**, International Conference on Recent Trends in 2D Nanomaterials: Synthesis Properties and Applications organized by Centre for Nanoscience and Nanotechnology, Amity University Maharashtra, Mumbai, Feb. 24-26, 2021. (Best Poster Award)
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17. *Synthesis and fabrication of cobalt tellurium mixed metal telluride for pseudocapacitors*, P. Bhol, and **A. K. Samal**, 7th International Conference on Advanced Nanomaterials and Nanotechnology (ICANN-2021), organized by the IIT Guwahati, Assam, Dec. 14-17, 2021.
18. *Comparative Catalytic Activity of Octahedral PdFe alloy nanostructures for Hiyama Cross-Coupling Reaction*, S. Swain, and **A. K Samal**, International virtual conference on recent innovations in chemical sciences (RICS 2022), organized by Department of Chemistry, Periyar University, Salem, Tamilnadu, March 24-25, 2022.
19. *One-pot synthesis of Cu_2O nanostructures for the adsorption and degradation of fluorinated substances*, N. Rhakho, and **A. K. Samal**, International Virtual Conference on Recent Innovations in Chemical Sciences (RICS) organized by Periyar University, Salem, Tamil Nadu, March 24-25, 2022.

20. *Co-Fe-decorated tellurium nanotubes for high energy density supercapacitor,* P. Bhol, and **A. K. Samal**, International virtual conference on Recent Innovations in Chemical Sciences (RICS-2022), organized by the Department of Chemistry, Periyar University, Chennai, March 24-25, 2022.
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22. *Sustainable Synthesis of Cu_2O nanostructures for the adsorption and degradation process of fluorinated substances*, N. Rhakho, and **A. K. Samal**, International Conference for Chemical Sciences Academia, Industry and Society Interfaces (ICCS) organized by Jyoti Nivas College Bangalore, June 23-25, 2022. (Best Poster Award)
23. *Computational and Experimental Design of Octahedral PdFe Alloy Nanocatalyst for Hiyama Cross-Coupling and Environmental Pollutant Degradation,* S. Swain, and **A. K. Samal**, International conference on recent advancements in chemistry (FMKMCC-2022) organized by Department of Chemistry, Field Marshal K.M Cariappa College, Madikeri Nov. 23, 2022. (Best Oral Award)
24. *Design and fabrication of nickel lanthanum telluride microfibers for redox additive electrolyte-based flexible solid-state supercapacitor*, P. Bhol, and **A. K. Samal**, National conference on "Through the Instruments", organized by the Department of Chemistry, Shri Shivayogi Murughendra Swamiji Arts, Science and Commerce College, Dec. 22, 2022.
25. *Self-Assembled Iron Oxide Microcubes for the Removal of Per- and Poly-Fluorinated Compounds*, N. Rhakho, and **A. K. Samal**, Nano Materials and Sustainable Applications (NANO-SA-2023) organized by Institute of Chemical Technology at Aurangabad, Maharashtra, Jan. 10 - 11, 2023.
26. *An Expedient Route for the Synthesis of Palladium Nanoparticles Decorated on Graphitic Carbon Nitride as a Versatile Nanocatalyst for Cross-Coupling Reaction, Antimicrobial Activity and Removal of Water Pollutant*, H. G. Sampat Kumar, **A. K. Samal**, S. A. Patil, Sri Jayachamarajendra college of engineering, JSS technical institutions campus, Mysuru, Feb. 28, 2023.

27. *Redox additive electrolyte-based flexible solid-state supercapacitor performance of nickel lanthanum telluride microfibers*, P. Bhol, and **A. K. Samal**, 7th International Conference on Nanoscience and Nanotechnology (ICONN-2023), organized by the Department of Physics and Nanotechnology, SRM Institute of Science and Technology, Chennai, March 27-29, 2023.
28. *To a minimum ex-situ decoration of octahedral $Pd_{0.2}Cu_1$ on hBNNs/GONs/ZrO_2 substrates for Hydrogen evolution reaction: Theoretical and mechanistic aspects,* S. Swain, and **A. K. Samal**, 7th International Conference on Nanoscience and Nanotechnology (ICONN-2023), organized by the Department of Physics and Nanotechnology, SRM Institute of Science and Technology, Chennai, March 27-29, 2023.
29. *Transformative Dynamics: Self-Assembly of Iron Oxide Nanorods into Microcubes for Enhanced PFAS Remediation,* N. Rhakho, and **A. K. Samal**, International Conference on Molecular Matter (ICMM), IIT Madras, Dec. 16-18, 2023. (Best Poster Award)

Invited Talks:

1. *Anisotropic Nanostructures for Catalysis, Energy, and Environment*, Fakir Mohan University, Balasore, Odisha, Aug. 19, 2020.
2. *Shape Dependent Nanostructures for Catalysis and Environmental Remediation*, Jackson State University, USA, Sept. 18, 2020.
3. *Design and Fabrication of Anisotropic Nanomaterials for the Environment*, Refresher Course, Sambalpur University, Dec. 13, 2021.
4. *Design and Fabrication of Anisotropic Nanomaterials for the Environmental Applications*, BMS College Students Visit, March 22, 2022.
5. *Metal Anisotropic Nanostructures and its Importance in Chemical Reactions*, Reliance Industry, R & D Center, July 22, 2022.
6. *Low-Dimensional Nanostructures*, Merck, R & D Center, Nov. 29, 2023.

THESIS (MASTERS/Ph.D.) SUPERVISION

Ph.D. Students: 5, 3 (Awarded), and 2 (ongoing)

Name	Thesis title	Status
Monika K N	Facet engineering of electrocatalysts for hydrogen/oxygen evolution reactions	Ongoing

Novuhulu Rhakho	Anisotropic nanostructures for the remediation of emerging pollutants	Ongoing
Swarnalata Swain	Design and fabrication of palladium-based nanomaterials for catalysis and environmental applications	Awarded, March 2024
Dr. Prangya Bhol	Controlled fabrication of one-dimensional metal tellurides for energy storage application	Awarded, Oct. 2023
Dr. Bhavya M. B.	Controllable synthesis of anisotropic nanomaterials for sensing applications	Awarded, Sept. 2022

M.Sc. Students: 7, 5 (completed), and 2 (ongoing)

Name	Thesis title	Status
Anusha Naik	Anisotropic chalcogenides nanostructures for water splitting	Ongoing, 2025
Nandini S	Design and fabrication of nanostructured transition-based metal on carbon fiber for water-splitting application	Completed, 2024
Subham K Subudhi	$NiFe_2O_4$ alloy-based nanostructure: An efficient electrocatalyst for oxygen evolution reaction in alkaline medium	Completed, 2023
Ramya Priya G	Synthesis of iron-oxide nanocubes for the degradation and adsorption of pesticides	Completed, 2022
Tanmay K. Parida	Controlled synthesis of Fe_3O_4 nanostructures for organic pollutant remediation	Completed, 2021
Satya Ranjan Jena	Controlled Synthesis of Au@Cu_2O Core-Shell Nanostructures for the Organic Pollutant Remediation	Completed, 2020
Abhinav Nair	Synthesis, characterization, and properties of one-dimensional metal telluride	Completed, 2019

M.Sc. Interns: 6 (Completed)

Name	Institute	Thesis title

Swarnalata Swain	Sambalpur University, Orissa	Synthesis of palladium nanocubes and its application for Suzuki coupling reaction
Prangya Bhol	Sambalpur University, Orissa	Synthesis of tellurium nanowires and metal tellurides for supercapacitors
Divyajyoti Sahu	Sambalpur University, Orissa	Facile synthesis of silver nanocubes for pesticide removal
Manbit S. Panda	Sambalpur University, Orissa	Synthesis of gold nanostructures for catalytic degradation of methylene blue
Meenakshi N	Christ University, Bangalore	Synthesis of bimetallic alloy nanostructures for catalytic conversion
Karthika G Nair	M. G. University, Kerala	Synthesis of core-shell nanostructures for sensing application

Postdocs: 3, 2 (ongoing)

Name	Tentative work title	Status
Dr. Basudev Baral	Chalcogenide nanostructures for water splitting	ongoing
Dr. Renji Rajendran	Metal oxide nanocomposites for photocatalytic applications	Ongoing
Dr. Bhavya M. B.	Silver nanocomposite for environmental applications	Assistant Professor @Presidency University

GUEST EDITOR

- Frontier in Chemistry, Topic: Shape and Size Dependent Nanostructures for Environmental Applications
- Frontier in Catalysis, Guest Review Editor
- Water Journal, Topic: Application of Membrane Processes in Purification and Power Generation Systems
- Journal of Chemical Engineering Research Updates, Topic: Recent advances in nanotechnology for environmental applications