Dr. KOUSHIK SARKAR, PhD

Assistant Professor
Department of Chemistry
St. Xavier's College (Autonomous), Kolkata
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Academic Details

Ph.D.-
Indian Association for the Cultivation of Science (IACS) *[With Prof. Parthasarathi Dastidar]*
Affiliated to Jadavpur University (From 2013 to 2019)
Thesis title: Supramolecular Approach in Developing Organic and Organic-Inorganic-Hybrid-Systems for Biological Applications

Master of Science (Chemistry)-
Raja bazar Science College, University of Calcutta
From 2011 to 2013
Specialization: Organic Chemistry

Bachelor of Science (Chemistry)-
Dinabandhu Andrews College, University of Calcutta
From 2008 to 2011

Higher Secondary-
Naktala High School, WBCHSE
From 2006 to 2008

Secondary-
Naktala High School, WBBSE
From 2001 to 2006

Previous work experiences

- *Post-doctoral Research Associate at IISER Kolkata with Prof. Rahul Banerjee from December 2019 to May 2022.*

- *Post-doctoral Research Associate at Indian Association for the Cultivation of Science (IACS) with Prof. Parthasarathi Dastidar from July 2019 to December 2019.*

Area of Expertise & Interest

- *Crystal Engineering, Supramolecular Chemistry and Porous Materials*
- *Metal-Organic Frameworks (MOF), Covalent-Organic Frameworks (COF)*
- *Gels, Metallogels and soft materials*
- *Coordination Polymer, Metal-Organic Polyhedra (MOP) and Organic cage*
- *Organic Synthesis and catalysis*
- *Biomedical applications of Organic and Organic-Inorganic-Hybrid-Systems*
- *Anticancer and Anti-inflammatory materials*

Achievements

- ***CSIR-NET December-2012*** *with* ***JRF CSIR AIR 54****.*
- ***CSIR-NET June-2013*** *with* ***JRF CSIR AIR 53****.*
- ***GATE-2013*** *exam with* ***AIR 876****.*
- *Joint Admission Test (****JAM 2011****) conducted by* ***Indian Institutes of Technology*** *with* ***AIR 159****.*

Conferences Attended

- **'ChemComm 60th Year Symposium'** held on 22nd November, 2022 at IACS, Kolkata. ***(Poster presentation)***
- ***'National Symposium on Perspective & Challenges in Organic Chemistry'*** *held on October 18th at Kolkata, India.*
- ***'13th Conference of the Asian Crystallographic Association'*** *held on December 5-8, 2015 at Kolkata, India.* ***(Poster presentation)***
- ***'International Conference on Polymer Science & Technology'*** *held on January 8-11, 2017 at Thiruvanthapuram, India.* ***(Poster presentation)***
- ***'24th Congress & General Assembly of the International Union of Crystallography'*** *held on August 21-28, 2017 at Hyderabad, India.* ***(Oral presentation)***
- ***'Workshop and Training Course on Single Crystal XRD'*** *on August 28-30, 2017 at Kolkata, India.*

Publications

Articles:

1. *Metallogels Derived from Silver Coordination Polymers of C3-Symmetric Tris(pyridylamide) Tripodal Ligands: Synthesis of Ag Nanoparticles and Catalysis. Mithun Paul,* ***Koushik Sarkar*** *and Parthasarathi Dastidar.* ***Chem. Eur. J. 2015, 21, 255 – 268****.*

2. *Multifunctional single-layered vesicles derived from Cu(II)-metal–organic-polyhedra.* ***Koushik Sarkar****, Mithun Paul and Parthasarathi Dastidar.* ***Chem. Commun. 2016, 52, 13124-13127****.*

3. *Nanoscale Mn^{II}-Coordination Polymers for Cell Imaging and Heterogeneous Catalysis.* ***Koushik Sarkar*** *and Parthasarathi Dastidar.* ***Chem. Eur. J. 2016, 22, 18963 – 18974****.*

4. *Hand-Ground Nanoscale Zn^{II}-Based Coordination Polymers Derived from NSAIDs: Cell Migration Inhibition of Human Breast Cancer Cells. Mithun Paul,* ***Koushik Sarkar****, Jolly Deb and Parthasarathi Dastidar.* ***Chem. Eur. J. 2017, 23, 5736 – 5747****.*

5. *Supramolecular Hydrogel Derived from A C3-symmetric Boronic acid Derivative for Stimuli Responsive Release of Insulin and Doxorubicin.* ***Koushik Sarkar*** *and Parthasarathi Dastidar.* ***Langmuir 2018, 34, 685-692****.*

6. *Exfoliated Nanosheets of a Cu^{II} Coordination Polymer Modulate Enzyme Activity of α-Chymotrypsin.* ***Koushik Sarkar*** *and Parthasarathi Dastidar.* ***Chem. Eur. J. 2018, 24, 11297 – 11302****.*

7. *Rationally Developed Metallogelators Derived from Pyridyl Derivatives of NSAIDs Displaying Anti-inflammatory and Anticancer Activities.* ***Koushik Sarkar****, Shaik Khasimbi, Souvik Mandal and Parthasarathi Dastidar.* ***ACS Appl. Mater. Interfaces 2018, 10, 30649-30661****.*

8. *Rational Approach Towards Designing Metallogels From a Urea Functionalized Pyridyl Dicarboxylate - Anti-inflammatory, Anticancer and Drug Delivery.* ***Koushik Sarkar*** *and Parthasarathi Dastidar.* ***Chem. Asian J. 2019, 14, 194 – 204****.*

9. *Self-assembly of Spherical Organic Molecules to form Hollow Vesicular Structure in Water for Encapsulation of an Anti-cancer Drug and Its Release.* ***Koushik Sarkar****, Sabir Ahmed and Parthasarathi Dastidar.* ***Chem. Asian J. 2019, 14, 1992-1999****.*

10. *Synthesis, structure and phenoxazinone synthase-like activity of three unprecedented alternating Co^{II}–Co^{III} 1D chains. Sayantan Ganguly, Paramita Kar, Maharudra Chakraborty,* ***Koushik Sarkar*** *and Ashutosh Ghosh.* ***New J. Chem. 2019, 43, 18780- 18793****.*

11. *Design and Synthesis of Zn^{II}-Coordination Polymers Anchored with NSAIDs: Metallovesicle Formation and Multi-drug Delivery. Sourabh Bera, Abhinanda Chowdhury,* ***Koushik Sarkar*** *and Parthasarathi Dastidar.* ***Chem. Asian J. 2020, 15, 503-510****.*

12. *Cu(II)-Metallacryptands Self-Assembled to Vesicular Aggregates Capable of Encapsulating and Transporting an Anticancer Drug Inside Cancer Cells. Protap Biswas,* ***Koushik Sarkar*** *and Parthasarathi Dastidar.* ***Macromol. Biosci. 2020, 20, 2000044****.*

13. *Influence of Triazole Substituents of Bis-Heteroleptic Ru(II) Probes toward Selective Sensing of Dihydrogen Phosphate. Sahidul Mondal,* ***Koushik Sarkar*** *and Pradyut Ghosh.* ***Inorg. Chem. 2021, 60, 12, 9084–9096****.*

14. *Structural Rationale towards Designing Coordination Polymer Based Metallogels Displaying Anti-Cancer and Anti-Bacterial Properties.* ***Koushik Sarkar****, Hemanta K. Datta, Sabir Ahmed and Parthasarathi Dastidar.* ***ChemistrySelect 2021, 6, 13992-14004.***

15. *Diarylazooxime complex of cobalt(III): synthesis, structure, ligand redox, DFT calculations and spectral characteristics. Soumitra Dinda,* ***Koushik Sarkar****, Bikash K. Panda, Kausikisankar Pramanik and Sanjib Ganguly.* ***Transit. Met. Chem. 2022, 47, 31 – 38.***

16. *A post synthetically modified metal–organic framework as an efficient hydrogen evolution reaction catalyst in all pH conditions. Tuhina Mondal, Poulami Hota, Koushik Sarkar, Anup Debnath, Bikash K. Shaw and Shyamal K. Saha.* ***New J. Chem, 2023,47, 8102-8110.***

17. *Structures, magnetism, and oxygen evolution reaction (OER) of azidoisophthalate bridging Cu(II) and Co(II) coordination polymers. Sabir Ahmed, Koushik Sarkar, Arnab Samanta and Chittaranjan Sinha.* ***Appl. Organomet. Chem., 2024, 38(9), e7635.***

18. *Designed Synthesis of Amino-Azo-Quinoline and Their Nickel(II) Complexes: Molecular Structure, Electrochemistry and an Insight Into Their In Vitro Anti-Cancer Activities. Srijita Naskar, Koushik Sarkar, Supriyo Halder, Bidisha Chatterjee, Debjeet Chakraborty, Arka Laha, Rahul Sharma, Arup Kumar Mitra, Kausikisankar Pramanik and Sanjib Ganguly.* ***Chemistry & Biodiversity, 2025, 22(6), e202402436.***

Reviews:

19. *Metallogels from Coordination Complexes, Organometallic, and Coordination Polymers. Parthasarathi Dastidar, Sumi Ganguly and* ***Koushik Sarkar****,* ***Chem. Asian J. 2016, 11, 2484 – 2498****.*

20. *Supramolecular Synthon Approach in Designing Gels for Advanced Therapeutics. Parthasarathi Dastidar, RajdipRoy, Rumana Parveen and* ***Koushik Sarkar****,* ***Advanced Therapeutics 2019, 2, 1800061.***

Book Chapter:

21. *Nitrogen Ligand based Molecular Building Block. Parthasarathi Dastidar, Sumi Ganguly and* ***Koushik Sarkar****,* ***Comprehensive Supramolecular Chemistry-II, Elsevier, 2017, 7, 207 – 242****.*

Expertise in Scientific Area and Instruments

- *Organic synthesis and characterization of small molecules, supramolecular gelators, and high molecular weight cargo-based biologics/cellular probe*
- *Cell culture and Cell proliferation and cytotoxicity assay*
- *Enzyme-linked immune sorbent assay (ELISA)*
- *Fluorescence microscopy, UV-Vis, Fluorescence spectroscopy, GC-MS and LC-MS*
- *Quadrasorb and Autosorb for gas adsorption*
- *Dynamic light scattering and Thermogravimetric analysis*
- *Single crystal X-ray diffraction, X-ray powder diffraction*
- *^{1}H, ^{13}C, DOSY & DEPT-NMR spectroscopy*
- *HRMS, MALDI TOF and FT-IR*
- *Combi-flash chromatography*
- *Scanning electron microscopy (SEM)*
- *Transmission electron microscopy (TEM)*
- *Atomic force microscopy (AFM)*
- *Rheometer (rheology study of gels)*
- *Confocal microscopy (live and fixed cell imaging)*
- *Flow cytometry (sample preparation and analysis)*