

Dr. Krishna Kumar (Ph.D., MRSC)

RJP-Postdoctoral Fellow

Department of Chemistry

Institute of Science

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Current Research Interests

To utilize my skills and research experience in the synthesis of homo- and heterobimetallic complexes with sulfur/oxygen donor ligands, 3d transition metal hydrosulfide complexes, and catalysis, with a primary focus on multicomponent reactions, cross-coupling, click catalysis using homo/heterobimetallic systems, and photochemical CO₂ reduction.

Educational Qualifications

Course	University/Board	Year of passing	Subjects	Div.	percentage
10 th	U.P. Board	2006	Hindi, English, Science, Social Science, Mathematics, Sanskrit,	I	70.5
12 th	U.P. Board	2008	Physics, Mathematics, Chemistry, Hindi, English	I	77.9

B.Sc. (Hons.)	Institute of Science, BHU, Varanasi	2012	Physics, Mathematics, Chemistry (Hons. in Chemistry)	I	7.67/10
M.Sc.	Dept. of Chemistry Institute of Science, BHU, Varanasi	2014	Chemistry (Specialization in Inorganic Chemistry)	I	8.03/10
Ph.D.	Dept. of Chemistry Institute of Science, BHU Varanasi	2023	<i>“Studies on few metal complexes of S, O donor ligands and their catalytic application”</i>		
Postdoctoral Fellow	RJP- PDF(Under the Scheme of IoE), BHU	2024	<i>Synthesis of coordinatively unsaturated Metal complexes, clusters and their applications</i>		

Awards/Scholarships

- CSIR- UGC(LS)2015
- CSIR- UGC(JRF) 2016
- Senior Research Fellow from 2019 to 2022.
- Received IPDF, IIT Bombay under the mentorship of Prof. Ramaswamy Murugavel.
- Received IPDF, IIT Kanpur under the mentorship of Prof. S. P. Rath.
- CSIR-RA under the mentorship of Prof. S. Bhattacharya (Shortlisted for the interview).
- Currently working as IoE-RJP-PDF under the mentorship of Prof. S. Bhattacharya, BHU, Varanasi (2023 to till now)

International Postdoctoral fellowship

UC Devis College California under the mentorship of Prof.

	Alan Balch Herbin Institute of Technology China under the mentorship of Prof. Peng Ren
Title of Ph.D. Thesis	<i>“Studies on few metal complexes of S, O donor ligands and their catalytic applications”</i>
Ph.D. Supervisor	Prof. Subrato Bhattacharya
Scientific Achievements	• Research papers published in international journals (Q1 and Q2 grade): 20 • Patent: 05 (Application filed) • Review: 02 (Under review) • Book chapter: 02 • Citations of research papers: 144 • H index: 7 • I10 index: 4 • Oral Presentations in International Conferences: 08 • Poster Presentations in International Conferences: 05
Scientific Talk	Invited Talk: Distinguished Lecture Series On "Future of catalysis and industrial sustainability" The Assam Royal Global University, from 17th -19th May 2023.
Best Presentation Awards	AIRSA–1st International Research Conference (AIRSA-IRCON 2025) – “Shodh Sangam: A Confluence of Innovation, Collaboration & Research Excellence”, entitled Bulk Production of Green Methanol from CO₂ using a Highly Efficient Heterobimetallic Photo-Catalytic System, 20-22 November 2025 at AIIMS, New Delhi, India.
Industrial Experience	Scientific Advisor at Scitechesy Research and Private Limited Noida/Varanasi, U.P., India

Activity as Reviewer	<i>Environmental Progress & Sustainable Energy (Willey)</i> <i>Journal of Nanomaterials (Hindawi)</i>
Members in Professional Bodies	Member of Royal Society of Chemistry, UK (MRSC) Member of American Chemical Society, USA Life member of All India Research Association State Representative of All India Research Association (AIRSA) Life Member of Vijnana Bharati (Vibha) Members/Subject Experts of Vijnana Bharati President of Science faculty BHU (AVBP, 2018) Subject matter expert at AIRSA New Delhi
Activities as volunteers	Student Coordinator in CRSI Symposium-2013 Student Coordinator in MTIC 2022 Symposium-2022 Student Coordinator in DST-PAC review committee-2023 Student Coordinator in DST-PAC review committee-2024 Coordinator in 1 st International conference (AIIMS New Delhi) AIRSA- 2025 RSC editorial Meet 2026, Department of Chemistry, BHU, Varanasi, India
Instruments acquaintance	❖ Hands-on experience in handling Single-Crystal X-ray Diffractometer systems. ❖ Basic expertise in structure solution and refinement of single-crystal data using WinGX and OLEX2 software. ❖ Experience in structural characterization through X-ray Diffraction (XRD) and High-Resolution Mass Spectrometry (HR-MS). ❖ Familiarity with FT-NMR spectrometer operation and analysis. ❖ Practical knowledge of TGA, UV–Vis, IR, and fluorescence spectroscopic techniques.

- ❖ Skilled in handling air- and moisture-sensitive compounds using Schlenk line techniques.
- ❖ Experience in purification and separation of compounds through column chromatography.
- ❖ Proficient in various scientific software packages, including Origin, Mnova, NovaPax, Gaussian G09, GaussView, Mercury, Diamond, etc.
- ❖ Experience in performing reactions under low-temperature and solvothermal conditions, including the use of Julabo systems.

Significant contributions

- ✓ Synthesis of several new monometallic, homo-bimetallic, heterobimetallic complexes, metal clusters mainly based on S, O donor ligands.
- ✓ Exceptionally good results have been obtained in case of coupling catalysis, click catalysis, electro-catalysis as well as photo catalytic reduction of CO_x.
- ✓ Synthesis of quantum container/quantum vehicle to increase the efficacy of curcumin for the treatment of cancer (Glaucoma).
- ✓ Synthesis of few ternary composite materials for the energy storage materials due its low dielectric loss.

Conferences / workshop Participated / Presented

- **15th CRSI national symposium** 1-3 February 2013 at **Department of Chemistry, I.Sc., B.H.U., Varanasi, India** (Presented a poster)
- **Global Initiative for Academic Network “GIAN”** modeling and simulation at nanoscale and nanostructures 7-10 March 2016 **MNIT Allahabad** (Hand on training Workshop by Foreign faculty) (Workshop)
- **National symposium on emerging trends in chemical sciences** 17-18 November 2018 (NSETCS-2018) **Department of Chemistry, I.Sc., B.H.U., Varanasi, India** (Participated)
- **National symposium on contemporary trends and prospects of functional material (CTFM-2019)** 29-30 November 2019 **Department of Chemistry, I.Sc., B.H.U., Varanasi, India** (Presented a poster)
- **International Congress on natural sciences (ICNAS-2021)** 10-12 September 2021, **Ataturk**

- University, Turkey** entitled “Design and Synthesis of a few Cu(I) Complexes as potential catalysts for the Synthesis of Unsymmetrical Vinyl Sulfide via C-S cross Coupling” (**Oral presentation**)
- **International symposium on recent advances in fundamental and applied sciences (ISFAS-2021)** 10-12 September 2021, **Ataturk University, Erzurum, Turkey** entitled “Structural Studies on a few In(III) and Sn(IV) complexes of thioester ligands” (**Oral presentation**)
 - **International conference on recent advancements in chemical sciences: health, environment and society (ICRACS-2022)**, entitled “Design, synthesis, and structural feature of a series of furan-2-thiocarboxylate complexes of Ni (II) its potential application as selective electrocatalyst for the production of hydrogen peroxide” 8-9 April 2022 **Department of Chemistry D. C. University of Delhi, India** (**Oral presentation**)
 - **9th Asian Network for Natural and Unnatural Materials (ANNUM-9)** 8 April 2022 **Department of Chemistry, University of Delhi, India** (**Presented a poster**)
 - **19th International conference on Modern Trends in Inorganic (MTIC-2022)** 15-17 December 2022, **Department of Chemistry, I.Sc., BHU, Varanasi, India** (**Presented a poster**).
 - **26th Congress and General Assembly of the International Union of Crystallography (IUCr 2023)**, 22-29 August 2023 at the **Melbourne Convention and Exhibition Centre** Australasia (**Workshop**).
 - **International Conference on New Material for Industry and Medicine (NMIM-24)** 30-31 January 2024, **PSGR Krishnammal college for women Coimbatore, India** (**Presented a poster**)
 - **Thin Film Materials & Devices at the 32nd International workshop** on active-matrix flatpanel displays and devices (am-fpd25) July 1-4, 2025, at **Ryukoku University, Japan** (**Presented a poster**)
 - **AIRSA–1st International Research Conference (AIRSA-IRCON 2025)** – “Shodh Sangam: A Confluence of Innovation, Collaboration & Research Excellence”, entitled Bulk Production of Green Methanol from CO₂ using a Highly Efficient Heterobimetallic Photo-Catalytic System, 20–22 November 2025 at **AIIMS, New Delhi, India**. (**Oral Presentation**)
 - **International conference on "Advancing Higher Education in Rural India Through Global Insights (IC2026)**, entitled Technology-Driven Transformation in Higher Education Systems” in association with: STUDENTNEST FOUNDATION, USA Student Nest Foundation 2121 Merced St., Fresno, CA. 93721, February 24-25, 2026, kripalu mahila mahavidyalaya Subhash Nagar,

Kunda, Pratapgarh, Uttar Pradesh - 230204, India. (Oral Presentation).

- **International conference on “Viksit Bharat@2047: Multidisciplinary Pathways through Science, Technology, Commerce and Humanities”** entitled Bulk Production of Green fuels (Methanol/methane) from CO₂ using a Highly Efficient Heterobimetallic Photo-Catalytic System, April 10-11, 2026, IQAC & Research Cell, Kishan Lal Public College, Rewari, India in collaboration with **Manipal University College Malaysia**. (Oral Presentation)

Research Publications (Peer Reviewed Journals)

- M. Nayak, D. K. Joshi, **K. Kumar**, A. S. Singh, V. K. Tiwari, & S. Bhattacharya; Synthesis of a Series of a Few Hydrosulfide Complexes of Cu (I). A μ_3 -SH-Bridged Rare Cubane-like Tetramer Showing Efficient Catalytic Activity toward Azide–Alkyne Cycloaddition. *Inorganic Chemistry* (2021) 60, 8075-8084. <https://doi.org/10.1021/acs.inorgchem.1c00628> (ACS).
- **K. Kumar**, D. K., Singh, M. K. Adak, V. Ganesan, A. R. Choudhury, & S. Bhattacharya; On-Site H₂O₂ Synthesis Using a Series of Ni (II) Furan-2-thiocarboxylate Complexes Integrated on Multi-Walled Carbon Nanotubes: Soft Donor Sites Stimulated Selective Two-Electron Oxygen Reduction. *Crystal Growth & Design* (2023) 23, 4580-4590. <https://doi.org/10.1021/acs.cgd.3c00343> (ACS).
- **K. Kumar**, Kshitij R. B. Singh, Ritu S. Rathour, Jay Singh, S. S. Pandey, S. Bhattacharya; Fabrication of Nano-bio-engineered Interfaces Utilizing Quaternary Nanocomposite for highly efficient and selective electrochemical biosensing of urea. *Langmuir* (2024) 40, 21052–21066 <https://doi.org/10.1021/acs.langmuir.4c02457>. (ACS).
- **K. Kumar**, P. Tiwari, R. Kant, & S. Bhattacharya; Synthesis and structural studies of Cu (I) methylthiosalicylate complexes and their catalytic application in thiol-yne click reaction. *New Journal of Chemistry* (2022) 46, 17854-17864. <https://doi.org/10.1039/D2NJ02722D> (RSC).
- **K. Kumar**, A. K. Agrahari, R. Pratap, V. K. Tiwari, & S. Bhattacharya; Synthesis and structural features of a series of Cu (i) furan-2-thiocarboxylate complexes: efficient “click” catalysts for the synthesis of glycoconjugates and glycocluster. *New Journal of Chemistry* (2022) 46, 18471-18481. <https://doi.org/10.1039/D2NJ03433F> (RSC).
- **K. Kumar**, R. K. Sahani, S. Garai, & S. Bhattacharya; Synthesis and Structural Features of Indium(III) Furan-2-thiocarboxylates: Geometry-dependent catalytic activity toward the synthesis of Chromene and Imidazopyrimidine derivatives via Knoevenagel condensation Reaction. *Dalton*

- Transaction* (2023) 52, 17499-17513. <https://doi.org/10.1039/D3DT02681G> (RSC).
- **K. Kumar**, P. Tiwari, S. Moharana, R. Kant, & S. Bhattacharya; Indium (III) and organotin (IV) 2-(methoxycarbonyl) benzenethiolates: Synthesis, structure and properties. *Journal of Molecular Structure* (2022) 1260, 132801. <https://doi.org/10.1016/j.molstruc.2022.132801> (Elsevier).
 - **K. Kumar**, N. Sareen, R. Kant, S. Garai, & S. Bhattacharya; Synthesis and structural characterization of Cd (II) complexes based on acetylene dicarboxylate: A 1-D polymer as a precursor to CdO nanoparticles. *Journal of Molecular Structure* (2022) 1267, 133653. <https://doi.org/10.1016/j.molstruc.2022.133653> (Elsevier).
 - **K. Krishna**, A. K. Vishwakarma, S. Garai, R. Sharma, A. Pathak, S. Bhattacharya; Theoretical and structural studies on bio-pertinent disulfide of methyl thiosalicylate and furan-2-thiocarboxylic acid and effect of insertion of methylene group in gas phase. *Chemical papers* (2024), 48, 3721-3733. <https://doi.org/10.1007/s11696-024-03342-4> (Springer Nature).
 - **K. Krishna**, A. Shrivastav, Sakshi, A. R. Choudhuri, S. Bhattacharya; Synthesis of a series of Cd(II)Furan-2-thiocarboxylates: Unprecedented coordination geometry of a Cadmium(II) complex exhibiting efficient catalytic property for the synthesis of 3, 4-Dihydropyrimidine-2(1H)-ones. *New Journal of Chemistry* (2024) 48, 12654-12663. <https://doi.org/10.1039/D3NJ04083F> (RSC).
 - Neeraj K Sah, **K. Kumar**, Subrato Bhattacharya, Tanay Pramanik, Tanmoy Roy, Somenath Garai; Unveiling the catalytic potential of silicomolybdic acid in crafting diverse biologically relevant organic compounds. *RSC advances* (2025) 15, 28783-28804. <https://doi.org/10.1039/D5RA03549J> (RSC).
 - V. K. Maurya, A. K. Singh, R. P. Singh, S. Yadav, **K. Kumar**, P. Prakash, & L. B. Prasad; Synthesis and evaluation of Zn (II) dithiocarbamate complexes as potential antibacterial, antibiofilm, and antitumor agents. *Journal of Coordination Chemistry* (2019) 72, 3338-3358. <https://doi.org/10.1080/00958972.2019.1693041> (Taylor and Francis).
 - N. P. Yadav, A. K. Vishwakarma, **K. Kumar**, A. Vats, A. Pathak, R. Kumar, ... & S. Srivastava; Theoretical spectroscopic signature of synephrine using DFT and the effect of hydrogen removal. *Phase Transitions* (2022) 95, 475-485. <https://doi.org/10.1080/01411594.2022.2085101> (Taylor and Francis).
 - **K. Kumar**, S. Moharana, A. Shrivastav, S. Bhattacharya; Nickel(II) carbothioate complex incorporated graphene oxide-polyvinylidene fluoride ternary composite film: Preparation, structural features, dielectric, and electrical characteristics. *Journal of Chemical Sciences* (2023) 135, 96.

<https://doi.org/10.1007/s12039-023-02209-7> (Springer Nature).

- Vinod Kumar, Anup Kumar, Shruti Singh, **Krishna Kumar**, K.D. Mondal; The emergence of Griffiths phase in $\text{CaCu}_3\text{Ti}_{(4-x)}\text{Mn}_x\text{O}_{12}$ (CCTMO, $x=1, 2$ and 3) geometrically frustrated antiferromagnetic complexes perovskite. *Journal of Materials Science: Materials in Electronics* (2023) 35, 136. <https://doi.org/10.1007/s10854-024-11930-z>. (Springer Nature).
- **K. Kumar**, S. Bhattacharya. Synthesis and structural, features of a few novel Pt(II) mts complexes: A surprisingly cleavage of C-C bond to form seven membered ring and their application “the bulk production of hydrogen peroxide”. (2026) (**Manuscript under preparation**).
- **K. Kumar***, Subrato Bhattacharya. Quantum Chemical Investigation of Oxidized and Reduced Scytonemin: Thermodynamic, Electronic, and Vibrational studies. (2025) (**Journal of Molecular Structure**, Under review, Elsevier).
- **K. Kumar***, Shivi Singh, Subrato Bhattacharya. Exploring the Potential of Advanced Luminescent Transition Metal Dichalcogenides (TMDs) Hybrid Nanomaterials for Sensing Applications. (2025) (**Luminescence**, Submitted Willey).
- **K. Kumar**, D. K. Singh, V. Ganeshan, S. Bhattacharya. Strain Dependent ORR on Nickel thiocarboxylate Complexes: A Mechanistic Insight. (2025) (**Manuscript Under preparation**).
- Deepika, **Krishna Kumar*** Improvement in stability and efficacy of *Commiphora myrrha* (Nees) Engl. essential oil against fungal and aflatoxin B₁ contamination of chia seeds through nanoencapsulation in chitosan (2026) (**Journal of food sciences, under review**).
- Deepika¹, Ranjan Tyagi², Anand P S Gaur³, **Krishna Kumar**^{4*} Micro- and Nanosized Polymer Powders: From Design to Applications in Biomedicine, Energy, and Flexible Electronics (2026) (**Journal of EPJ-Special topics**)

Patents Filed

- **Patent 1** *Novel Polyoxoniobate Derived Quantum Dots Enables the Delivery of the Sparingly Soluble Curcumin into the Retinal Layers.*
- **Patent 2** *Metal Oxide Super Fullerene Facilitates Tandem Sequestration of Fluorides and Arsenic from Aqueous Solutions in All Dispositions.*
- **Patent 3** *Switchable Bulk production of Green Energy Fuel (Methane/Methanol) Under the Visible*

light Irradiation via Establishment of the Z-Scheme Based Photocatalytic system.

- **Patent 4** Bulk Production of Green Methanol from CO₂ using a Highly Efficient Heterobimetallic Photo-Catalytic System.
- **Patent 5** Facile One-Pot Synthetic Procedure for Water-Soluble Porphyrin with Near-Quantitative Yield.
- **Review Article:** Photo catalytically CO₂ reduction, challenges, and its Impact on environment (Under review)

Book Chapters

- Nano-filtration application in the textile industry for wastewater treatment
Mrinal K. Adak, **Krishna Kumar**, Ajit Das, Debasis Dhak. DOI: [10.1007/978-981-19-5315-6_5](https://doi.org/10.1007/978-981-19-5315-6_5) (Springer Nature).
- Functional Materials from Used PPEs for Energy Harvesting Applications and their Recycling
Srikanta Moharana, Bibhuti B Sahu, **Krishna Kumar**, Alekha Kumar Sutar, Tungabidya Maharana. DOI: [10.1007/978-981-97-4692-7_4](https://doi.org/10.1007/978-981-97-4692-7_4)

Edited Book

- Sulfur and selenium-based metal complexes: Synthesis to emerging applications. (Elsevier, Under process).

Date of Birth	19 th July 1991		
Marital Status	Unmarried		
Declaration			
I herewith state that the above-said items are true to the best of my knowledge.			
Signature			
Correspondence address		Permanent address	
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Recommendations:

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