Catalysis & Bioinorganic Research Laboratory

Principal Investigator: **Dr. Umesh Kumar**
Assistant Professor
Department of Chemistry
Deshbandhu College (University of Delhi)
Kalkaji, New Delhi–110 019, India
Mobile: +91 9599219634, +91 9968122458
E-mail:umeshk146@gmail.com, ukumar@db.du.ac.in

Research Areas: Coordination Chemistry, Organometallics, Supramolecular Chemistry, Materials Chemistry, Bioinorganic Chemistry and Catalysis

Supervision of Doctoral Thesis under Progress

1. Ms. Deepika Tanwar
2. Mr. Jugminder Singh

Research Papers Published in Refereed/Peer Reviewed Journals (Last Ten years): 07

1. *Acridine Based (S,N,S) Pincer Ligand: Designing of Silver(I) Complexes for the Efficient Activation of A^3(Aldehyde, Alkyne and Amine) Coupling.* Prakash, O.; Joshi, H.; **Kumar, U.**; Sharma, A. K. ; Singh, A. K. *Dalton Trans.* **2015**, *44*, 1962–1968. (RSC Publication, ISSN: 1477-9226; **Impact Factor: 4.097**).
2. *Sterically Hindered Selenoether Ligands: Palladium(II) Complexes as Catalytic Activators for Suzuki-Miyaura Coupling.* **Kumar, U.**; Dubey, P.; Singh, V. V.; Prakash, O.; Singh, A. K. *RSC Adv* **2014**, *4*, 41659–41665. (RSC Publication, ISSN: 2046-2069; **Impact Factor: 3.708**).
3. *Shape Dependent Catalytic Activity of Nanoflowers and Nanospheres of Pd_4S Generated via One Pot Synthesis and Grafted on Graphene Oxide for Suzuki Coupling.* Singh, V. V.; **Kumar, U.**; Tripathi, S. N.; Singh, A. K. *Dalton Trans.* **2014**, *43*, 12555–12563. (RSC Publication, ISSN: 1477-9226; **Impact Factor: 4.097**).
4. *Mole Ratio Dependent Formation of Mononuclear versus Pentanuclear Zinc(II) Pivalate Complexes and the 'Carboxylate Shift' Process.* **Kumar, U.**; Singh, M.; Thirupathi, N.

Polyhedron **2013**, *55*, 233–240. (ELSEVIER Publication, ISSN: 0277-5387; **Impact Factor: 2.068**).

5. *3,5–Lutidine Coordinated Zinc(II) Aryl Carboxylate Complexes: Precursors for Zinc(II) Oxide.* **Kumar, U.**; Thomas, J.; Nagarajan, R.; Thirupathi, N. *Inorg. Chim. Acta* **2011**, *372*, 191–199. (ELSEVIER Publication, ISSN: 0020-1693; **Impact Factor: 2.041**).
6. *Effect of Steric/Basic Properties of Lewis Bases on the Degree of Aggregation of Zinc(II) Pivalate Complexes.* **Kumar, U.**; Thomas, J.; Agarwal, M.; Thirupathi, N. *Inorg. Chim. Acta* **2011**, *370*, 122–131. (ELSEVIER Publication, ISSN: 0020-1693; **Impact Factor: 2.041**).
7. *Factors Dictating the Nuclearity/Aggregation and Acetate Coordination Modes of Lutidine-Coordinated Zinc(II) Acetate Complexes.* **Kumar, U.**; Thomas, J.; Thirupathi, N. *Inorg. Chem.* **2010**, *49*, 62–72. (ACS Publication, ISSN: 0020-1669; **Impact Factor: 4.857**).

Research Publications (Abstracts) in International Conferences/Symposiums (Last five year): 12

1. Delivered an oral presentation entitled ***"Bioinspired 'Carboxylate Shift' Process in Zinc(II) Carboxylate Complexes: An Analytical Study"*** in an international conference **'International Conference on Advances in Analytical Science (ICAAS – 2018)"** jointly organized by Indian Society of Analytical Scientists (ISAS)-Delhi Chapter and CSIR-Indian Institute of Petroleum Dehradun. **15th to 17th March 2018**.
2. Delivered an oral presentation entitled ***"Chalcogenated Schiff's base ligated palladium(II) complexes for Suzuki-Miyaura C−C coupling reactions"*** in a national conference **'Clean & Green Energy: The Chemical & Environmental Aspects" (NCGE – 2017)'** organized by Department of Chemistry Bhaskaracharya College of Applied Sciences (University of Delhi), New Delhi. **16th & 17th February 2017**.
3. Delivered an oral presentation entitled ***"Silver(I) Complexes of Acridine Based (SNS) Pincer Ligand: Catalytic Activity for A^3 of Aldehyde, Alkyne, and Amine"*** in an international conference **'The 5th Asia-Oceania Conference on Green and Sustainable Chemistry (AOC-5 GSC)'** jointly organized by The Royal Society of Chemistry Landon, North India Section-Green Chemistry Network Centre Delhi

University and The Energy and Resources Institute (TERI) New Delhi at India Habitat Centre, New Delhi. **15th to 17th January 2015**.

4. Delivered an oral presentation entitled ***"Sterically Hindered Di/Tridentate Thio/Selenoether Ligated Palladium(II) Complexes: Effective Catalysts for Suzuki-Miyaura C−C Coupling Reactions"*** in **'National Symposium on Chemistry at the Interface of Innovative Researchesin Science and Technology (CIIRST-14)'** organized by Department of Chemistry, University of Allahabad, Allahabad. **27th-28th February 2014**.
5. Delivered an oral presentation entitled ***"Factors that Influence the Nuclearity/Aggregation and Carboxylate Coordination Modes in Lewis Base Coordinated Zinc(II) Carboxylate Complexes"*** in **'International Conference on Emerging Trends in Chemical Sciences (ICETCS–2013)'** organized by School of Chemical Sciences, Central University of Gujrat, Gandhinagar. **14th-15th March 2013**. (***Best Oral Presentation Award***).
6. Presented a poster entitled ***"Earth abundant Nickel(II) complexes as catalytic activator for Suzuki-Miyaura C−C coupling reactions in greener aqueous media"*** Deepika Tanwar and **Umesh Kumar*** in a national conference on **'Recent Trends and Advancements in Chemical Sciences –2019'** organized by Department of Chemistry & Bhaskaracharya College of Applied Sciences, University of Delhi, Delhi *in Association with* Society for Promotion of Education and Science. **29th to 31st March 2019.**
7. Presented a poster entitled ***"Silver Chalcogenides Nanoparticles: Synthesis, Characterization and Catalytic Activities"*** Garvit Gupta, Deepika Tanwar, Debajyoti Deb and **Umesh Kumar*** in a national conference on **'Recent Trends and Advancements in Chemical Sciences –2019'** organized by Department of Chemistry & Bhaskaracharya College of Applied Sciences, University of Delhi, Delhi *in Association with* Society for Promotion of Education and Science. **29th to 31st March 2019.**
8. Presented a poster entitled ***"Schiff's base(O,N,S donor) ligated Nickel(II) complexes as bio-activator for sustainable antibacterial activity"*** Deepika Tanwar, Pooja Mittal, Indrakant K. Singh and **Umesh Kumar*** in an international conference **'1st International Conference on Integrated Chemistry, Biology and Traslational Medicine (ICBTM–2019)'** organized by Hansraj College, University of Delhi, DelhI,

India and Stritch School of medicine, Loyala University of Chicago, USA. **25th & 26th February 2019.**

9. Presented a poster entitled ***"Removal of toxic metal ions from water using metal sulfide ion exchangers"*** Robin Kumar and **Umesh Kumar*** in an international conference **'International Conference on Sustainable Initiatives in Water Management (SIWM–2018)'** organized by Manav Rachna University Faridabad, India. **06th March 2018.**
10. Presented a poster entitled ***"Facile method to synthesize silver-sulfide nanoparticles for their photocatalytic activity for the degradation of methylene blue"*** Pratyaksh Arora and **Umesh Kumar*** in a symposium **'Innovation Coclave-2016)'** organized by Acharya Narendra Dev College (University of Delhi), New Delhi, India. **25th & 26th October 2016.**
11. Presented a poster entitled ***"One pot synthesis of silver sulfide nanoparticles for their catalytic and biomedical applications"*** Annesha Baruah, Rohit Kumar Singh and **Umesh Kumar*** in a national symposium **'National Symposium on Nanobiotechnology (BIOTIKOS 2016)'** organized by Department of Biotechnology, TERI University, New Delhi, India. **31st March & 1 April 2016.**
12. Presented a poster entitled ***"Efficient Reduction of Oximes Catalyzed by Magnetic Fe_3O_4 Nanoparticles using Sodium Borohydride"*** Pratibha Kumari and **Umesh Kumar*** in **'9th National Conference on Solid State Chemistry and Allied Area (ISCAS–2015)'** organized by Bhaskaracharya Collge of Applied Sciences, University of Delhi, Delhi in association with Indian Association of Solid State Chemists and Allied Scientists. **8th-10th May 2015**.

Research Project Completed/Ongoing

S. No.	Title of the projects	Funding agency	Amount (Rs. in Lakh)	Status
1	Homo/heterometallic pincer complexes: Catalytic activity and materials aspects	DST, New Delhi, India	25.8	Completed

	(SR/FT/CS-79/2011)			
2	Silver chalcogenide nanoparticles for their catalytic and biomedical applications (DBC-303/2015-16)	University of Delhi, New Delhi, India	05	Completed
3	Ni(II)/Co(II) complexes with *O*-/*N*-donor ligands for their supramolecular architectures and catalytic activities.	UGC, New Delhi, India	06	Ongoing

Research Facilities and Infrastructure:

- Schlenck line technique
- Digital Balance
- Vacuum Rotary Evaporator
- Solvent distillation unit
- Research centrifuge