Dr. Rahul Kumar
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Research/Teaching Experience

- Research Fellow, School of Chemistry, Chemical Engineering and Biotechnology, Nanyang Technological University (NTU) Singapore (April 2022 to date) [QS World University Rankings: 26th]
- Assistant Professor (Guest Faculty) for two semesters at Department of Chemistry, Doon University, Dehradun (academic sessions 2020-21 and 2021-22) (Appendix A)
- Research Fellow, Department of Chemistry, National University of Singapore, (March 2019-April 2020) [QS World University Ranking: 8th]
- Research Fellow, Department of Chemistry and Biological Chemistry, School of Physical and Mathematical Sciences, NTU, Singapore (September 2015- January 2019)
- Lecturer, Department of Applied Science, Radha Govind Engineering College, Meerut, India, (February 2007 to July 2008)

Educational Qualifications

- Ph.D., Organometallic Chemistry, Indian Institute of Technology Delhi (IIT Delhi), India, 2015 (CGPA: 9.0)
- M.Sc., Organic Chemistry, Department of Chemistry, Ch. Charan Singh University, Meerut,India, 2006 (78%)
- B.Sc., Chemistry, Zoology, and Botany, Ch. Charan Singh University, Meerut, India, 2003 (68%)

Scholarships and Awards

- Junior Research Fellowship (NET-JRF) awarded by the Council of Scientific and Industrial Research (CSIR),Government of India (July 2008-July 2010)
- Senior Research Fellowship (SRF) awarded by the CSIR, Government of India (August 2010-2013).
- Graduate Aptitude Test in Engineering (GATE) (All India Rank: 294), Indian Institute of Technology (IITs) and Indian Institute of Science (IISc) (2009)
- The Chemical Society Award, Department of Chemistry, IIT Delhi for publishing articles in High Impact Factor journals (academic year 2010-2011)
- Best Poster Award at National Symposium on “Frontiers in Main-Group and Organometallic Chemistry” (NSFMOC), [November 20, 2010, Department of

Inorganic & Physical Chemistry, IISc Bangalore]

Research Outline

- Synthesis and stabilization of structurally modified carbenes with unusual electronic features. Measurement of amphiphilicity of newly synthesized carbenes. Application of these carbenes in the thermodynamic and kinetic stabilization of main group and transition metal complexes with catalytic significance. The stabilization, isolation, and characterization of low-valent main-group elements (Ca, Mg, B, Al, C, Si, Ge, Sn, and P) with a purpose to utilize them as a low-cost and benign catalyst (a replacement of precious transition metal-based catalysts)

Technical Skills

- Synthesis, characterization, and handling of extremely reactive and air/moisture/heat/light sensitive compounds by means of various Schlenk/glove box/low-temperature techniques.
- Purification and drying of solvents/reagents by various means: Distillation, vacuum distillation, fractional distillation, sublimation, crystallizations, freez-pump-thaw etc.
- Instrumental proficiency: NMR (Bruker: 300-500 MHz and Jeol 400-500 MHz), IR, UV-vis, Elemental analysis, GCMS, LCMS, and HRMS Mass spectrometer and single crystal X-ray diffractometer.
- Hands on Scientific Software: Apex, Saint, SHELXTL, Olex, Mercury, Diamond, winGX, Origin, Topspin, Delta, and ChemDraw etc.

Teaching Assistance and Mentorship

- Mentored seven M.Sc students in their final one-year projects at IIT Delhi, India
- Teaching Assistant for B.Tech laboratory courses, three years, IIT Delhi, India
- Eight years working experience on Bruker made single crystal X-ray diffractometer: crystal mounting, data collection and refinement for more than 500 novel molecular structures.
- Mentored one master student (NTU-UK exchange program), nine months, NTU, Singapore
- Mentored one undergraduate student, six months, NTU, Singapore

Publications

1. **Siwatch. R. K.;** Yang, M.-C.; Su, M.-D.; So, C.-W. *Inorg. Chem.* **2024**, (DOI: 10.1021/acs.inorgchem.4c00471) [A Digermanium(III) 1,2-Dication Stabilized by Amidinate and cAAC-Phosphinidenide Ligands]
2. Singh, V. K.; Joshi, P. C.; Kumar, H.; **Siwatch, R. K.**; Jha, C. K.; Nagendran, S. *Dalton Trans.* **2022**, *51*, 16906. [Stannylene cyanide and its use as a cyanosilylation catalyst].
3. Sinhababu, S.; Singh, D.; Sharma, M. K.; **Siwatch, R. K.**; Mahawar, P.; Nagendran, S. *DaltonTrans.* **2019**, *48*, 4094. [Ge(II) cation catalyzed hydroboration of aldehydes and ketones].

4. Li, Y.; **Siwatch, R. K.**; Mondal, T.; Li, Y.; Ganguly, R.; Koley, D.; So, C.-W. *Inorg. Chem.* **2017**, *56*, 4112. [Diverse Bonding Activations in the Reactivity of a Pentaphenylborole towardSodium Phosphaethynolate: Heterocycle Synthesis and Mechanistic Studies].
5. **Siwatch, R. K.;** Karwasara, S.; Sharma, M. K.; Mondal, S.; Mukherjee, G.; Rajaraman, G.; Nagendran, S. *Organometallics* **2016**, *35*, 429. [Reactivity of LGe−NR2 and LGe(E)−NR2 over LGe−Cl and LGe(E)−Cl toward Me3SiX (L = Aminotroponiminate; NR2 = N(SiMe3)2/NC4H4;E = S/Se; X = Br/CN)].
6. Yadav, D.; **Siwatch, R. K.;** Sinhababu, S.; Karwasara, S.; Singh, D.; Rajaraman, G.; Nagendran, S. *Inorg. Chem.* **2015**, *54*, 11067. [Digermylene Oxide Stabilized Group 11 MetalIodide Complexes].
7. Karwasara, S.; **Siwatch, R. K.;** Jha, C. K. Nagendran, S. *Organometallics* **2015**, *34*, 3246. [Aminotroponiminatosilathio- and Siloxygermylenes: Reactivity Comparison].
8. **Siwatch, R. K.;** Nagendran, S. *Chem. Eur. J.* **2014**, *20*, 13551. [Germylene Cyanide Complex:A Reagent for the Activation of Aldehydes with Catalytic Significance].
9. **Siwatch, R. K.;** Yadav, D.; Mukherjee, G.; Rajaraman, G.; Nagendran, S. *Inorg. Chem.* **2014**,
   53, 5073. [Are Ligand Stabilized Carboxylic Acid Derivatives with Ge=Te Bonds Isolable?].
10. Yadav, D.; **Siwatch, R. K.;** Mukherjee, G.; Rajaraman, G.; Nagendran, S. *Inorg. Chem.* **2014**, *53*, 10054. [Use of Thio and Seleno Germanones as Ligands: Silver(I) Halide Complexes with Ge=E→Ag−I (E = S, Se) Moieties and Chalcogen-Dependent Argentophilic Interaction].
11. Yadav, D.; **Siwatch, R. K.;** Sinhababu, S.; Nagendran, S. *Inorg. Chem.* **2014**, *53*, 600. [Aminotroponiminato(chloro)germylene Stabilized Copper(I) Iodide Complexes: Synthesis and Structure].
12. **Siwatch, R. K.;** Yadav, D.; Mukherjee, G.; Rajaraman, G.; Nagendran, S. *Inorg. Chem.* **2013**,
    52, 13384. [Digermylene Oxide Complexes: Facile Synthesis and Reactivity].
13. **Siwatch, R. K.;** Nagendran, S. *Organometallics* **2012**, *31*, 3389. [Germaester Complexes witha Ge(E)Ot-Bu Moiety (E = S or Se)].
14. Sinhababu, S.; **Siwatch, R. K.;** Mukherjee, G.; Rajaraman, G.; Nagendran, S. *Inorg. Chem.*
    2012, *51*, 9240. [Aminotroponiminatogermaacid Halides with a Ge(E)X Moiety (E = S, Se; X
    = F, Cl)].
15. **Siwatch, R. K.;** Kundu, S.; Kumar, D.; Nagendran, S. *Organometallics* **2011**, *30*, 1998. [Bulky Aminotroponiminate-Stabilized Germylene Monochloride and Its Alkyne Derivatives].

Manuscripts in progress

1. [CAAC-HMDS] adducts as Convenient Precursors for N-Alkylated CAACs via alpha Elimination Reaction (to be submitted)

2. A tetrameric Si(0) Clusters Stabilized by a Sterically Non-hindered Cyclic Alkyl(amino) Carbene (to be submitted)
3. # Apart from the published/non-published research work, six more projects have been completed successfully and the outcomes will be published in elite journals such as *JACS, Angew. Chem., Int. Ed. and Chem. Commun.* Etc.

Conferences/Workshops

1. Attended *OLEX2* workshop of AsCA2019 [15-16 December 2019, Faculty of Science, Department of Physics, National University of Singapore]
2. 7th Asian Silicon Symposium, [July 28-31, 2019, Department of Chemistry and BiologicalChemistry, Nanyang Technological University Singapore] (Participation).
3. 12th International Symposium on Inorganic Ring Systems (IRIS-12), [August 16-21, 2009, Department of Chemistry, Indian Institute of Technology Bombay] (Participation).
4. National Symposium on Frontiers in Main-Group and Organometallic Chemistry (NSFMOC), [November 20, 2010, Department of Inorganic & Physical Chemistry, Indian Institute of Science, Bangalore 560012, India], "Alkynyl Germylene Complexes Stabilizedby Bulky ATI Ligand" (Poster Presentation: **Second Prize**).
5. 3rd Asian Conference on Coordination Chemistry (ACCC-3) , [October 17-20, 2011, Indian Institute of Technology, Kanpur and Indian Institute of Technology, Delhi], (Participation).
6. Symposium on Modern Trends in Inorganic Chemistry-XIV (MTIC-XIV), [December 10-13, 2011, School of Chemistry, University of Hyderabad-500046], "Germathio and Germaseleno Ester Complexes" (Poster Presentation).
7. National Seminar on Recent Advancement in Chemistry (RAC 2012), [September 29-30, 2012, Department of Chemistry, Ch. Charan Singh University, Meerut (UP), India], "Aminotroponiminate Ligand Stabilized Germanium Analogues of Acid Halides andEsters" (Poster Presentation).
8. New Directions in Chemical Sciences (NDCS-2012), [December 7-9, 2012, Department of Chemistry, Indian Institute of Technology Delhi-110016], "Synthesis and Reactivity of Bisgermylene Oxide Complexes" (Poster Presentation).

Invited Talks

- National Seminar on Recent Advancement in Chemistry (RAC 2012), [September 29-30, 2012, Department of Chemistry, Ch. Charan Singh University, Meerut (UP), India], "Synthetic Utilityof Aminotroponiminatogermylene Monochlorides"
- "Chemistry of Low-valent Main Group Elements", [February 11, 2019, Department of Chemistry, Doon University, Dehradun, India]

References

1. **Prof. Selvarajan Nagendran (Thesis Supervisor)**
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