

Curriculum Vitae

Name Abhishek Kumar
Designation Assistant Professor
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Educational Qualifications

2012 Ph.D. Chemistry, Indian Institute of Technology Delhi
Title of Thesis: *Design, Synthesis and Characterization of Polyorganoselenium Compounds and Their Unique Functional Behavior as Chemical Sensors*
Supervisor: [Professor Jai Deo Singh](#).

2004 M.Sc Chemistry, Indian Institute of Technology Delhi

2002 B.Sc (Hons.) Chemistry, University of Delhi (Hindu College)

1999 AISSCE (Class XII), CBSE

1997 AISSE (Class X), CBSE

Post Ph.D. Research and Teaching Experience

1. Post-Doctoral Researcher, Artificial Photosynthesis Research Group, Korea Research Institute of Chemical Technology (KRICT), South Korea from December 2012 to November 2016 (Mentor: Prof. Dr. Jin-Ook Baeg).
2. Assistant Professor (Guest), Department of Chemistry, University of Delhi from January to May 2017.
3. CSIR Pool Scientist (SRA), Department of Chemistry, IIT Delhi from June 2017 to January 2020.
4. Assistant Professor, Department of Chemistry, Institute of Science, Banaras Hindu University from January 2020 onwards.

Academic Awards and Achievements

- Awarded Junior Research Fellowship (NET) in 2004 by Council of Scientific and Industrial Research (CSIR), New Delhi.
- Among India's top 20% of JRF (NET) awardees in the area of chemical sciences in the year 2004.
- Qualified Graduate Aptitude Test for Engineering (GATE-2004) in Chemistry with a percentile score of 97.94 and All India 64th Rank.
- KRICT STAR award 2015 of Korea Research Institute of Chemical Technology (KRICT) for outstanding research performance in the year 2014.
- KRICT STAR award 2016 of Korea Research Institute of Chemical Technology (KRICT) for outstanding research performance in the year 2015.
- Awarded Senior Research Associateship (Pool Scientistship) in June 2017 by Council of Scientific and Industrial Research (CSIR), New Delhi.

Research Work on Journal Cover Pages



Journal Publications

1. An organoselenium-based highly sensitive and selective fluorescent “turn-on” probe for the Hg²⁺ ion, **Abhishek Kumar** and Jai Deo Singh, *Inorg. Chem.* **2012**, *51*, 772-774 (DOI: 10.1021/ic2023902). **Among the top 20 “Most Read” publications of Inorganic Chemistry for the month of December 2011.** Also highlighted in *ChemInform*, Volume 43, Issue 12, March 20, 2012.
2. Highly Selective Solar-Driven Methanol from CO₂ by a Photocatalyst/Biocatalyst Integrated System, Rajesh K. Yadav, Gyu Hwan Oh, No-Joong Park, **Abhishek Kumar**, Ki-jeong Kong and Jin-Ook Baeg, *J. Am. Chem. Soc.* **2014**, *136*, 16728-16731 (DOI: 10.1021/ja509650r). **The work was featured on JACS homepage (December 2014).**

3. Graphene-BODIPY as a Photocatalyst in the Photocatalytic-Biocatalytic Coupled System for Solar Fuel Production from CO₂, Rajesh K. Yadav, Jin-Ook Baeg, **Abhishek Kumar**, Ki-jeong Kong, Gyu Hwan Oh and No-Joong Park, *J. Mater. Chem. A* **2014**, 2, 5068-5076 (DOI: 10.1039/C3TA14442A).
4. A Highly Efficient Covalent Organic Framework Film Photocatalyst for Selective Solar Fuel Production from CO₂, Rajesh K. Yadav, **Abhishek Kumar**, No-Joong Park, Ki-jeong Kong and Jin-Ook Baeg, *J. Mater. Chem. A* **2016**, 4, 9413-9418 (DOI: 10.1039/C6TA01625A). **Featured on Back Cover Page of the Journal.**
5. Functionalized graphene quantum dots as efficient visible light photocatalysts for selective solar fuel production from CO₂, Dolly Yadav, Rajesh K. Yadav, **Abhishek Kumar**, No-Joong Park and Jin-Ook Baeg, *ChemCatChem* **2016**, 8, 3389-3393 (DOI: 10.1002/cctc.201600905).
6. New Carbon Nanodots-Silica Hybrid Photocatalyst for Selective Solar Fuel Production from CO₂, Rajesh K. Yadav, **Abhishek Kumar**, No-Joong Park, Dolly Yadav and Jin-Ook Baeg, *ChemCatChem* **2017**, 9, 3153-3159 (DOI: 10.1002/cctc.201700789). **Featured on Inside Front Cover Page of the Journal.**
7. Facile One-Pot Two-Step Synthesis of Novel in Situ Selenium-Doped Carbon Nitride Nanosheet Photocatalyst for Highly Enhanced Solar Fuel Production from CO₂, **Abhishek Kumar**, Rajesh K. Yadav, No-Joong Park and Jin-Ook Baeg, *ACS Appl. Nano Mater.* **2018**, 1, 47-54. (DOI: 10.1021/acsanm.7b00024). **Among the top 20 "Most Read Articles" of ACS Applied Nano Materials in 2018.**
8. In Situ Prepared Flexible 3D Polymer Film Photocatalyst for Highly Selective Solar Fuel Production from CO₂, Rajesh K. Yadav, **Abhishek Kumar**, Dolly Yadav, No-Joong Park, Jae Young Kim and Jin-Ook Baeg, *ChemCatChem* **2018**, 10, 2024-2029 (DOI: 10.1002/cctc.201701730). **The work was categorized as Very Important and featured on the front cover page of an issue of ChemCatChem.**
9. Highly Improved Solar Energy Harvesting for Fuel Production from CO₂ by a Newly Designed Graphene Film Photocatalyst, Rajesh K. Yadav, Jeong-O Lee, **Abhishek Kumar**, No-Joong Park, Dolly Yadav, Jae Young Kim and Jin-Ook Baeg, *Sci. Rep.* **2018**, 8, 16741 (DOI: 10.1038/s41598-018-35135-7).
10. Ultrafast Charge Transfer Coupled with Lattice Phonons in Two-dimensional Covalent Organic Frameworks, Tae Wu Kim, Sunhong Jun, Yoonhoo Ha, Rajesh K. Yadav, **Abhishek Kumar**, Chung-Yul Yoo, Inhwon Oh, Hyung-Kyu Lim, Jae Won Shin, Ryong Ryoo, Hyungjun Kim, Jeongho Kim, Jin-Ook Baeg, and Hyotcherl Ihee, *Nat. Commun.* **2019**, 10, 1873 (DOI: 10.1038/s41467-019-09872-w).
11. Facile synthesis of mixed O, S or Se bearing hexasubstituted benzenes and their unique potential as Cu(II) ion probe, **Abhishek Kumar**, Mantesh K. Yadav, Jagriti Singh, Jai Deo Singh, and Ray J. Butcher, *Dalton Trans.* **2019**, 48, 5627-5636 (DOI:

10.1039/C9DT00465C). **Selected for RSC Themed Collections: “Inorganic chemistry of the p-block elements” and “Selenium and Tellurium chemistry at the beginning of the 3rd millennium: a celebration of ICCST”.**

12. Functionalized Ruthenium-Graphene Nanosheets Photocatalyst For Highly Regioselective Visible Light Driven C-H Arylation of Imidazo-Pyrimidine, Rajesh K. Yadav, **Abhishek Kumar**, No-Joong Park, Dolly Yadav, Jae Young Kim and Jin-Ook Baeg, *Sustainable Energy Fuels* **2019**, 3, 3324-3328 (DOI: 10.1039/C9SE00823C).
13. Fullerene Polymer Film as a Highly Efficient Photocatalyst for Selective Solar Fuel Production from CO₂, Dolly Yadav, Rajesh K. Yadav, **Abhishek Kumar**, No-Joong Park, Jae Young Kim and Jin-Ook Baeg, *J. Appl. Polym. Sci.* **2020**, 137, 48536 (DOI: 10.1002/app.48536).
14. Self-Assembled Protein/Carbon Nitride/Sulfur Hydrogel Photocatalyst for Highly Selective Solar Chemical Production, Surabhi Chaubey, Pooja Singh, Chandani Singh, Shambhavi, Kavita Sharma, Rajesh K. Yadav, **Abhishek Kumar**, Jin Ook Baeg, D. K. Dwivedi, Atul P. Singh, *Mater. Lett.* **2020**, 259, 126752 (DOI: 10.1016/j.matlet.2019.126752).
15. Self-Assembled Carbon Nitride/Cobalt (III) Porphyrin Photocatalyst for Mimicking Natural Photosynthesis, Chandani Singh, Surabhi Chaubey, Pooja Singh, Kavita Sharma, Shambhavi, **Abhishek Kumar**, Rajesh K. Yadav, D. K. Dwivedi, Jin-Ook Baeg, Utkarsh Kumar, B. C. Yadav and Gajanan Pandey, *Diamond Relat. Mater.* **2020**, 101, 107648 (DOI: 10.1016/j.diamond.2019.107648).
16. Highly Efficient Perylene Based Polymer Photocatalyst/Biocatalyst System for L-Glutamate Production Under Solar Light, Pooja Singh, Surabhi Chaubey, Chandani Singh, Shambhavi, Rajesh K. Yadav, **Abhishek Kumar**, Jin-Ook Baeg and D. K. Dwivedi, *Bull. Mater. Sci.* **2020**, 43, 198 (DOI: <https://doi.org/10.1007/s12034-020-02170-y>).
17. Efficient photocatalytic synthesis of L-glutamate using a self-assembled carbon nitride/sulfur/porphyrin catalyst, Surabhi Chaubey, Chandani Singh, Pooja Singh, **Abhishek Kumar**, P. P. Pande, Jin-Ook Baeg, D. K. Dwivedi and Rajesh K. Yadav, *Environ. Chem. Lett.* **2020**, 18, 1389-1395 (DOI: 10.1007/s10311-020-01004-x).
18. Chitosan-based fluorescein isothiocyanate film as a highly efficient metal-free photocatalyst for solar-light-mediated direct C-H arylation, Pooja Singh, Rajesh K. Yadav, Tae Wu Kim, **Abhishek Kumar** and D. K. Dwivedi, *Int. J. Energy Res.* **2021**, 45, 5964-5973 (DOI: <https://doi.org/10.1002/er.6216>).
19. Fabrication of Graphitic Carbon Nitride-Based Film: An Emerged Highly Efficient Catalyst for Direct C—H Arylation under Solar Light, Surabhi Chaubey, Rajesh K. Yadav, Tae Wu Kim, Tara C. Yadav, **Abhishek Kumar**, D.K. Dwivedi, B.K. Pandey

and Atul P. Singh, *Chin. J. Chem.* **2021**, 39, 633-639 (DOI: <https://doi.org/10.1002/cjoc.202000470>).

20. Interfacially synthesized 2D COF thin film photocatalyst: efficient photocatalyst for solar formic acid production from CO₂ and fine chemical synthesis, Dolly Yadav, **Abhishek Kumar**, Jae Young Kim, No-Joong Park and Jin-Ook Baeg, *J. Mater. Chem. A* **2021**, 9, 9573-9580 (DOI: <https://doi.org/10.1039/D1TA00802A>). **Selected as a JMC A Hot Article of 2021 and Featured on Front Cover Page of the Journal.**

Patents

1. Novel visible light active graphene-isatinporphyrin photocatalyst, methods for regeneration of oxidoreductase cofactor and method for enzymatic production of methanol from carbon dioxide using the same. Korean Patent Number: 10-1561609; Patent Registration Date: 13/10/2015.
2. Novel visible light active graphene film photocatalyst, methods for regeneration of oxidoreductase cofactor and method for enzymatic production of formic acid from carbon dioxide using the same. Korean Patent Number: 10-1763142; Patent Registration Date: 25/07/2017.
3. Visible light active covalent triazine framework-based photocatalyst, method for regeneration of oxidoreductase cofactor and method for enzymatic production of formic acid from carbon dioxide using the same. Korean Patent Number: 10-1824661; Patent Registration Date: 26/01/2018.
4. Visible light active carbon nanodot-silica composite photocatalyst, method for production of formic acid from carbon dioxide by applying the same to a photocatalyst-enzyme integrated system. Korean Patent Number: 10-2062893; Patent Registration Date: 30/12/2019.