

CURRICULUM VITAE

Dr. Vikram Singh
Scientist & Assistant Professor (AcSIR)

**Analytical Chemistry Group, ASSIST Division,
CSIR- Indian Institute of Toxicology Research Lucknow
Mahatma Gandhi Marg, Lucknow, 226001**

E-mail: vikram.singh05@iitr.res.in; vikku.010@gmail.com

Mobile: +919452369265; **Date of Birth:** 04/08/1989

Web: <https://sites.google.com/view/vikkunano/home>



Research Interest

- Development of functionalized fluorescent carbon dots and silica-based nanomaterials for environment, biomedical, and energy applications
- Fluorescence sensing/chemical sensing of toxic analytes in environmental samples
- Design and synthesis of activated carbon for remediation of water pollutants
- Fabrication of white light-emitting materials for optoelectronic applications
- Photo-physical study of organic molecules

Academic Details

Thesis Awarded in Chemistry: Indian Institute of Technology Madras, Chennai, India

PhD Supervisor: Professor Ashok Kumar Mishra

PhD Coursework: CGPA 8.00/10.00

Title of PhD Thesis: White Light Emitting Vegetable Cocktail, Glucose Derived Carbon Nanoparticles and Isobenzotriazolophane as Novel Fluorescent Sensors for Analytical Applications: 2016

M.Sc. (Chemistry): University of Lucknow, India: 2010

B.Sc. (Chem, Phy): University of Allahabad, India: 2008

Research Experiences

(1) Scientist, Environment, Emissions and CRM Section CSIR-Central Institute of Mining and Fuel Research Dhanbad, India: **15th July 2021 to 31st Dec 2024**

(2) Senior Project Scientist, Department of Materials Science & Eng., Indian Institute of Technology Kanpur, India: **10th Mar-2021 to 14th Jul-2021**

(3) Institute Postdoctoral Fellow, Department of Materials Science & Eng., Indian Institute of Technology Kanpur, India: **30th Aug-2018 to 28th Feb-2021**

(4) National Postdoctoral Fellow (SERB), Medicinal and Process Chemistry Division, CSIR-Central Drug Research Institute Lucknow, India: **11th Aug 2016 to 10th Aug 2018**

(5) Research Associate, Department of Biotechnology, Indian Institute of Technology Madras, India: **19th May 2016 to 05th Aug 2016**

(6) Predoctoral Fellow, Department of Chemistry, Indian Institute of Technology Madras, India: **08th Oct-2015 to 07th Apr 2016**

List of Publications

Research Articles

1. K. Singh, T. Mandal, U. P. Pandey, and **V. Singh***, Emergence of Fluorescent Glycodots for Biomedical Applications, *ACS Biomaterials Science & Engineering*, **2025**, Just Accepted.
2. S. R. Mishra, T. Mandal, R. N. Senapati, and **V. Singh***, White-Light Emitting Self-Assembled Graphene Quantum Dots from Coal Soot, *Carbon Letters*, **2025**, DOI:10.1007/s42823-025-00860-3.
<https://link.springer.com/article/10.1007/s42823-025-00860-3>
3. T. Mandal, S. R. Mishra, M. Kumar, and **V. Singh***, Emergence of Carbon Dots as Luminescent Solar Concentrator for Building Integrated Photovoltaics, *Sustainable Energy & Fuels*, **2024**, 8, 5638. (Published with outside back cover).
<https://pubs.rsc.org/en/content/articlelanding/2024/se/d4se00806e>
4. S. R. Mishra, T. Mandal, S. Sahu, M. Mishra, R. N. Senapati and **V. Singh***, Biocompatible Fluorescent Graphene Oxide Quantum Dots for Imaging of Drosophila Melanogaster, *ACS Omega*, **2024**, 9, 38916.
<https://pubs.acs.org/doi/10.1021/acsomega.4c05244>
5. T. Mandal, S. R. Mishra, A. Banerjee, G. Firoz, R. Poddar and **V. Singh***, Low-quality Indian Coal Derived Fluorescent Carbon Nano-onions for Tissue Imaging, *ChemistrySelect*, **2024**, 9, e202402666.
<https://chemistry-europe.onlinelibrary.wiley.com/doi/abs/10.1002/slct.202402666>
6. **V. Singh***, T. Mandal, S. R. Mishra, A. Singh and P. Khare, Development of amine-functionalized fluorescent silica nanoparticles from coal fly ash as a sustainable source for nanofertilizer, *Scientific Reports*, **2024**, 14, 3069.
<https://www.nature.com/articles/s41598-024-53122-z>
7. T. Mandal, S. R. Mishra, **V. Singh***, Comprehensive Advances in Synthesis, Fluorescence Mechanism and Multifunctional Applications of Red-emitting Carbon Nanomaterials, *Nanoscale Advances*, **2023**, 5, 5717.
<https://pubs.rsc.org/en/content/articlelanding/2023/na/d3na00447c>
8. T. Mandal, A. K. Ghosh, S. R. Mishra, S. K. Pandey, **V. Singh***, Development of Fluorescent Carbon Nanoparticles from Madhuca Longifolia Flower for Sensitive and Selective Detection of Cr⁶⁺: A Collective Experimental-Computational Approach, *Nanoscale Advances*, **2023**, 5, 4269. *Featured in special regional spotlight collection highlighting top quality papers from India*
<https://pubs.rsc.org/en/content/articlelanding/2023/na/d3na00289f>
9. T. Mandal, S. R. Mishra, K. Singh, H. Agarwalla, R. E. Mastro, M. Kumar, **V. Singh***, Fluorescent carbon nanomaterials from coal and its derivatives: structure, properties, and applications, *Journal of Nanoparticle Research*, **2023**, 25, 125.
<https://link.springer.com/article/10.1007/s11051-023-05780-9>
10. H. Agarwalla, T. B. Das, R. N. Senapati, M. Gangopadhyay, R. E. Mastro, M. Kumar, **V. Singh**, Mercury in coal from southeastern coalfield and mercury partitioning at sub-critical coal-fired power plant, *Journal of Material Cycles and Waste Management*, **2023**, 25, 2632.
<https://link.springer.com/article/10.1007/s10163-023-01679-8#citeas>
11. K. Jahana, **V. Singh**, N. Mehrotra, K. Rathore and V. Verma, Development of Activated Carbon from KOH Activation of Pre-carbonized Chickpea Peel Residue and its Performance for Removal of Synthetic Dye from Drinking Water, *Biomass Conversion and Biorefinery*, **2023**, 13, 6913.

<https://link.springer.com/article/10.1007/s13399-021-01938-4#citeas>

12. K. S. Rawat, **V. Singh** (equal first-author contribution), C. P. Sharma, A. Vyas, P. Pandey, J. Singh, N. M. Gupta, M. Sachdev and A. Goel, Picomolar Detection of Pb²⁺ by Functionally Modified Fluorescent Carbon Quantum Dots from Watermelon Juice and Their Imaging in Cancer Cells, *Journal of Imaging*, **2023**, 9, 19.
<https://www.mdpi.com/2313-433X/9/1/19>
13. C. M. Pawar, S. Sreenath, V. Dave, P. P. Bavdane, **V. Singh**, V. Verma and R. K. Nagarale, Chemically stable and high acid recovery anion exchange membrane, *Polymer*, **2022**, 251, 124915.
<https://www.sciencedirect.com/science/article/abs/pii/S0032386122004037>
14. N. M. Chola, **V. Singh**, V. Verma and R. K. Nagarale, Green Synthesis and Thermal Encapsulation of Organic Cathode for Aqueous Zn Battery, *Journal of Electrochemical Society*, **2022**, 169, 020503.
<https://iopscience.iop.org/article/10.1149/1945-7111/ac4b85>
15. **V. Singh***, B. Gorbel, S. Chatterjee, P. Sen and V. Verma, Green, Economical Synthesis of Nitrogen Enriched Carbon Nanoparticles from Seaweed Extract and Their Application as Invisible Ink and Fluorescent Film, *Materials Letters*, **2022**, 309, 131446.
<https://www.sciencedirect.com/science/article/abs/pii/S0167577X21021455>
16. **V. Singh***, S. Chatterjee, M. Palecha, P. Sen, B. Ateeq and V. Verma, Chickpea Peel Waste as Sustainable Precursor for Synthesis of Fluorescent Multiwalled Carbon Nanotubes for Bio-imaging Application, *Carbon Letters*, **2021**, 31, 117.
<https://link.springer.com/article/10.1007/s42823-020-00156-8>
17. **V. Singh**, K. S. Rawat, S. Mishra, T. Baghel, S. Fatima, A. A. John, N. Kalleti, D. Singh, A. Nazir, S. K. Rath and A. Goel, Biocompatible Fluorescent Carbon Quantum Dots from Beetroot Extract for in vivo Live Imaging in *C. elegans* and BALB/c Mice, *Journal of Materials Chemistry B*, **2018**, 6, 3366.
<http://pubs.rsc.org/en/content/articlelanding/2018/tb/c8tb00503f#!divAbstract>
18. **V. Singh** and A. K. Mishra, White Light Emission from Mixture of Pomegranate Juice and Carbon Nanoparticles Obtained from the Extract, *Journal of Materials Chemistry C*, **2016**, 4, 3131.
<https://pubs.rsc.org/en/content/articlelanding/2016/tc/c6tc00480f#!divAbstract>
19. **V. Singh** and A. K. Mishra, Green and Cost-effective Fluorescent Carbon Nanoparticles for the Selective and Sensitive Detection of Iron (III) Ions in Aqueous Solution: Mechanistic Insights and Cell Line Imaging Studies, *Sensors and Actuators B: Chemical*, **2016**, 227, 467.
<https://www.sciencedirect.com/science/article/pii/S0925400515307929>
20. **V. Singh** and A. K. Mishra, White Light Emission from an Aqueous Vegetable Cocktail: Application Towards pH Sensing, *Dyes and Pigments*, **2016**, 125, 362.
<https://www.sciencedirect.com/science/article/pii/S0143720815004003>
21. **V. Singh** and A. K. Mishra, White Light Emission from Vegetable Extracts, *Scientific Reports*, **2015**, 5, 11118.
<https://www.nature.com/articles/srep11118>
22. K. Kundu, A. P. Singh, S. Panda, **V. Singh**, R. L. Gardas, and S. Senapati, Study on the Conformation of Entrapped Protein Inside the Reverse Micellar Confinement Based on the Amino Acid Derived Ionic Liquid, *Chemistry Select*, **2018**, 3, 4768.
<https://onlinelibrary.wiley.com/doi/abs/10.1002/slct.201800918>

23. D. Bharathi, B. Siddlingeshwar, R. H. Krishna, **V. Singh**, N. Kottam, D. D. Divakar and A. A. Alkheraif, Green and Cost-effective Synthesis of Fluorescent Carbon Quantum Dots for Dopamine Detection, *Journal of Fluorescence*, **2018**, 28, 573.
<https://link.springer.com/article/10.1007/s10895-018-2218-3>
24. S. Mishra, P. Awasthi, J. Singh, R. K Gupta, **V. Singh**, R. Kant, R. Jeet, D. Goswami and A. Goel, White Light Induced E/Z-Photoisomerization of Diphenylamine-tethered Fluorescent Stilbene Derivatives: Synthesis, Photophysical and Electrochemical Investigation, *Journal of Organic Chemistry*, **2018**, 83, 3669.
<https://pubs.acs.org/doi/abs/10.1021/acs.joc.8b00033>
25. A. P. Singh, K. Kundu, **V. Singh**, R. L. Gardas and S. Senapati, Enhanced Stability and Water Solubilizing Capacity of Water-in-Oil Microemulsions by Protic Ionic Liquids, *Physical Chemistry Chemical Physics*, **2017**, 19, 26132.
<http://pubs.rsc.org/en/content/articlelanding/2017/cp/c7cp04313a#!divAbstract>
26. D. Bharathi, R. H. Krishna, **V. Singh**, N. Kottam and B. Siddlingeshwar, One pot Synthesis of C-dots and Study on its Interaction with Nano ZnO Through Fluorescence Quenching, *Journal of Luminescence*, **2017**, 190, 328.
<https://www.sciencedirect.com/science/article/pii/S0022231316316532>
27. N. Venkatesan, **V. Singh**, P. Rajakumar and A. K. Mishra, Isobenzotriazolophanes: A new Class of Fluorescent Cyclophanes as Sensors for Aromatic Nitro Explosives – Picric Acid, *RSC Advances*, **2014**, 4, 53484.
<http://pubs.rsc.org/en/content/articlelanding/2014/ra/c4ra06320a#!divAbstract>

Patents

1. A Novel Process for the Synthesis of Fluorescent Silica Nanoparticles from Fly Ash, **V. Singh**, H. Agarwalla, R. E. Masto and M. Kumar: *Application No. 202211039599*, Date: 08/07/2022 (Indian Patent)
2. A one-pot, single-step ultrasonication method for preparation of white-light-emitting graphene quantum dots from coal soot, **V. Singh**, S. R. Mishra, T. Mandal: *Application No. 202411019849*, Date: 18/03/2024 (Indian Patent)

S&T Projects as Project Leader

Sr. No.	Project Title	Role	Funding Agency	Tenure	Cost (INR)
1.	Applications of Common Vegetables Derived Fluorescent Carbon Nanoparticles in in-vivo Multianalyte Sensing	PI	SERB	11-08-16 to 10-08-18; Completed	19,20,000/-
2.	RGB Emitting Carbon Quantum Dots from Vegetables/Fruits Extract and their Applications	PI	BIRAC-SRISTI	17-07-17 to 25-08-18; Completed	15,00,000/-
3.	Development of Functionalized Carbon-Based Fluorescent Nanomaterials from Coal	PI	In-house (CSIR-CIMFR) Project	05-11-2021 to 04-11-2024; Completed	62,77,920/-

4.	Development of an Indigenous Flash Joule Heating Technology for The Bulk Production of Low-Cost, High-Quality Graphene from Indian Coal	Co-PI	DST	Approved for funding	98,74,968/-
5.	Development of coal and biomass-derived nanosensor for the selective and sensitive detection of mercury in water samples	PI	In-house (CSIR-CIMFR)	09-05-2024 to Continue	19,77,920/-
6.	Recovery of Scandium and REEs from Indian Bituminous and lignite coal fly ash	PI	CSIR (Mission mode in critical minerals)	23-07-2024 to Continue	26,00,000/-

Fellowships and Awards

- Best Oral Presentation Award**, at National Seminar on Paradigm Shift in Chemical Sciences, Lucknow Christian Degree College, Lucknow: **Nov 2017**
- Gandhian Young Technological Innovation Award (GYTI)** at **Rastrapati Bhawan** New Delhi, by National Innovation Foundation (NIF), Govt. of India and SRISTI: **Mar 2017**
- National Postdoctoral Fellowship (N-PDF)** by DST-SERB Govt. of India: **Jul 2016**
- Langmuir Best Ph.D. Thesis Award in Physical & Theoretical Chemistry** by Indian Institute of Technology Madras, Chennai: **Jul 2016**
- Institute Pre and Post-doctoral Fellow at Department of Chemistry, IIT Madras Chennai: **08/10/15 - 07/04/16 (In recognition of early thesis submission)**
- Best Poster Award**, at Trombay Symposium on Radiation & Photochemistry Conference (**TSRP**), BARC Mumbai: **Jan 2016**
- Best Poster Award**, at Chemistry in House Symposium (**CIHS**), IIT Madras, Chennai: **Aug 2015**
- Junior and Senior Research Fellow of Council for Scientific and Industrial Research (CSIR/UGC exam)** in Chemical Science: **May 2011**.
- Graduate Aptitude Test in Engineering (GATE)** Fellowship in Chemistry, **All India Rank-247: Mar 2011**.
- Gold Medal in Master of Science (M. Sc.), Nov 2010**, Department of Chemistry, Lucknow Christian Degree College (University of Lucknow)

Invited Talks

Sr. No.	Title of Presentation	Conference/Symposium	Venue and Date
1	Development of Biocompatible Fluorescent Carbon Dots for Biomedical Applications	National Symposium on Next Generation Drug Delivery Systems	Sharda University, Greater Noida 26-27 Dec 2024
2	Development of White-light Emitting Materials	Multifaceted Applications of Chemical Sciences	MLK PG College Balrampur, UP: 31 Mar 2024
3	Development of Amine-functionalized Fluorescent Silica Nanoparticles from Coal Fly Ash as a Sustainable Source for Nanofertilizer	Recent Trends in Chemical Sciences	Sambalpur University: 01 Mar 2024

4	Multifunctional Application of Fluorescent Carbon Nanomaterials	International Conference on Polymer Science and Technology	IIT Guwahati: 11 Dec 2023
5	Fluorescent Carbon Quantum Dots: An Emerging Smart Material for Versatile Applications	Guest Lecture	Shri Ramswaroop Memorial University, Lucknow: 02 Nov 2023
6	Fluorescent Carbon Nanomaterials: Synthesis, Properties and Applications	International Seminar on New Frontiers in Chemical Sciences	C. M. Science College Darbhanga: 30 Jul 2022
7	Biocompatible Carbon Quantum Dots from Natural Resources: Application to White Light Emission, Sensing & Bioimaging	International Symposium on Advances in Functional & Biological Materials	Department of Physics, University of Lucknow: 28/02/2019
8	An Introduction to Fluorescence Spectroscopy and its Applications	Inaugural Lecture	Isabella Thoburn (IT) College Lucknow: 09/09/2017
9	Development of White Light Emitting Materials	Guest Lecture	Ewing Christian College Allahabad: 19/09/2015

Conferences (Poster/Oral)

1. **V. Singh**, J. Prakash and A. K. Mishra (2013) Determination of Absolute Fluorescence Quantum Yield Using a Homemade Fiber Optic Spectrometer: ***Chemistry in House Symposium, IIT Madras, Chennai.***
2. **V. Singh** and A. K. Mishra (2013) Selective and Sensitive Detection of Iron (III) by Water Soluble Fluorescent Carbon Nanoparticle: ***International Conference on Nanoscience and Nanotechnology, BBAU, Lucknow.***
3. **V. Singh** and A. K. Mishra (2013) Selective and Sensitive Detection of Iron (III) by Water Soluble Fluorescent Carbon Soot: ***National Fluorescence Workshop FCS, IISc and JNCSR, Bangalore.***
4. **V. Singh** and A. K. Mishra (2014) Selective Detection of Picric Acid Using a Carbazoloisobenzotriazolophane as a Fluorescent Sensor: ***IUPAC / Photochemistry Conference, University of Bordeaux, France.***
5. **V. Singh** and A. K. Mishra (2014) Green and Cost-effective Turn-off Fluorescence Detection of Ferric Ion by Water Soluble Carbon Nanoparticle: ***Asian Photochemistry Conference, IISER and NIIST Thiruvananthapuram.***
6. **V. Singh** and A. K. Mishra (2015) FRET Mediated Cool White Light Emission from a Mixture of Pomegranate Juice and Turmeric Extract: ***Chemistry in House Symposium, IIT Madras, Chennai.***
7. **V. Singh** and A. K. Mishra (2015) White Light Emission from Natural Plant Extracts: ***14th Conference on Methods and Applications in Fluorescence, University of Wurzburg, Germany.***
8. **V. Singh** and A. K. Mishra (2016) Vegetable Cocktail a Green and Sustainable Source of White Light Emission, at ***Trombay Symposium on Radiation & Photochemistry, BARC Mumbai.***

9. **V. Singh** and A. K. Mishra (2016) Development of Green and Cost-effective Novel Fluorescent Sensors for Analytical Applications, at **Recent Advances in Analytical Science**, IIT (BHU) Varanasi.
10. **V. Singh** and A. K. Mishra (2017) White Light Emitting Materials, at **National Seminar on Paradigm Shift in Chemical Sciences**, Lucknow Christian Degree College, Lucknow.
11. **V. Singh** and Atul Goel (2018) One-pot Synthesis of Biocompatible Fluorescent Carbon Quantum Dots from Beetroot Extract for Non-invasive *in vivo* Live Animal Imaging, at **Chemical Research Society of India-NSC, IISER Bhopal**.
12. **V. Singh** (2018) Sustainable Carbon Quantum Dots from Natural Sources: Applications for White Light Emission, Sensing and Bio-imaging: **International Conference on Chemical Sciences: National and Global Prospective at Lucknow Christian Degree College (University of Lucknow)**
13. **V. Singh** (2019) Biocompatible Carbon Quantum Dots from Natural Sources: Applications for White Light Emission, Sensing and Bio-imaging: **International Symposium on Advances in Functional and Biological Materials at University of Lucknow, Lucknow**
14. **V. Singh** (2019) Development of Biocompatible Fluorescent Carbon Quantum Dots for Non-Invasive Live Animal Imaging and Therapeutics Application: **India International Science Festival at Biswa Bangla Convention Centre Kolkata**
15. **V. Singh** (2020) Fluorescent Carbon Quantum Dots: Synthesis, Properties and Applications: **International Conference on Frontier Areas of Chemistry at Mahatma Gandhi Central University, Motihari**.

Workshops/Training

1. **Introduction of Gaussian: Theory and Practice**, Central Leather Research Institute, Chennai & Indian Institute of Technology Madras, 2012.
2. **Colloids and Interfaces with Polymers and Surfactants**, Department of Chemical Engineering, Indian Institute of Technology Madras, 2014.
3. **Laboratory Quality Management System & Internal Audit as per IS/ISO/IEC 17025:2017**, National Institute of Training for Standardization, Bureau of Indian Standards, 20-23 Sept 2021 (online).
4. **General Requirements for the competence of reference material producers as per ISO 17034:2016**, by National Accreditation Board for Testing and Calibration Laboratories (NABL), Quality Council of India, 26-27 Nov 2024, Pune.
5. **Reference Materials- Guidance for Characterization and Assessment of Homogeneity and Stability as per ISO Guide 35: 2017**, by National Accreditation Board for Testing and Calibration Laboratories (NABL), Quality Council of India, 28-29 Nov 2024, Pune

Reviewer of reputed international journals

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|-------------------------|-------------------------------|
| 1. Institute of Physics | 2. American Chemical Society |
| 3. Elsevier | 4. Royal Society of Chemistry |
| 5. Wiley | 6. Springer |
| 7. MPDI | |

Memberships of Academic/Research Bodies

1. Life Membership: **Chemical Research Society of India (LM 2185)**
2. Life Membership: **Materials Research Society of India (LMB 3142)**