

# CURRICULUM VITAE

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## **Education and Research**

**Post Doctoral:** (National Institute of Science Education and Research (NISER), Bhubaneswar, India and Tokyo Institute of Technology (TITECH), Tokyo, Japan.

**Ph.D. (Chemical Science):** Homi Bhabha National Institute, Mumbai, 2014

**NET:** Junior Research Fellowship under CSIR Scheme from Council of Scientific and Industrial Research, Govt. of India in 2008 (December).

**M.Sc.:** Chemistry (Physical Chemistry Special.) from Vidyasagar University, India in 2009.

**B.Sc.** Chemistry (Honours) from Kharagpur College, Paschim Medinipur, Vidyasagar University, India in 2007.

**Title of Thesis:** *Studies on the Dynamics of Solvation and Rotational Relaxation of Some Well-known Dipolar Fluorescent Probes in Room Temperature Ionic Liquids.*

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## **Employment History**

1. Post-doctoral Researcher: As JSPS Post-doctoral fellow in Tokyo Institute Technology, Japan -2014
  2. Assistant Professor: Raghunathpur College, Purulia, West Bengal, 2015-April, 2018.
  3. Assistant Professor: University of North Bengal, Darjeeling, West Bengal. May-2018-till date
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## **Recent Area of research**

- (1) **Supramolecular chemistry:** Investigations on receptor properties of chromo-fluorogenic systems towards various target analytes by various spectroscopic contrivances.
- (2) **Aggregation in fluorescent compounds:** Aggregation behavior and corresponding morphological changes in fluorescent compounds concerning various stimuli.

- (3) **Ultrafast proton transfer dynamics:** Proton transfer dynamics and proton relay through the solvent medium of photoacid.
- (4) **Photon upconversion:** Photon upconversion kinetics through triplet-triplet annihilation in different host mediums, design of different emitters, sensitizer for the increment of upconversion quantum yield, and application of this technique in the solar cell.
- (5) **Up and down-conversion of energy:** Up and down-conversion of photon energy with suitable intramolecular, intermolecular donor-acceptor systems with the help of different photophysical techniques which are helpful in the application of different photodevices and bioimaging.
- (6) **Design of green media:** Development of novel hydrophobic fluorescent as well as transparent biodegradable cheaper, greener media which could be applied in solar cells as upconverted media and in Li/Na ion batteries as benign cheap greener electrolyte.
- (7) **ILs-based low dimensional materials for multifaceted optoelectronic application:** Development of various novel fluorescent ILs and their materialization for versatile optoelectronic applications.
- (8) **Fusing various photophysical properties within the core of covalent and metal-organic framework for emergent materials for various lighting aspects:** Fine-tuning the various photophysical processes within the core of covalent and metal-organic framework for fabrication of various advanced functional photonic materials for versatile optoelectronic applications.
- (9) **Development of fluorescent carbon and quantum dots:** Fabrication of fluorescent carbon and quantum dots for versatile optoelectronic applications.

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## **Experience**

I worked as a teaching assistant in the undergraduate laboratory (physical chemistry and inorganic chemistry lab) for four semesters in NISER, Bhubaneswar. This involves setting up new experiments, helping students to successfully perform the experiments, and evolutions of the tutorials. Since May 2015, I have served as a full-time Assistant Professor in the Department of Chemistry, at Raghunathpur College, Purulia, West Bengal India. Subsequently, I joined as Assistant Professor in October 2018 in the Department of

Chemistry, University of North Bengal where I am actively engaged with postgraduate and Ph. D students in teaching and research till now.

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## Patents

### Patent-1

**Inventors:** Sudhir Kumar Das, Yoichi Murakami, Yuki Himuro, Kazuki Niimi, Ryotaro Morita, Noriko Kiyoyanagi

**Title of the Invention:** Light Conversion Element Containing Deep Eutectic Solvent, and Things Containing the Light Conversion Element.

**Filing Date:** October, 2015

**Application Number:** Japanese Patent Application No.2015-210125

**Applicants:** NIPPON KAYAKU KABUSHIKIKAISHA, TOKYO INSTITUTE OF TECHNOLOGY

*Details:* <https://patents.google.com/patent/JP2017082063A/en>

### Patent-2

**Inventors:** Sudhir Kumar Das, Yoichi Murakami, Yuki Himuro, Satoshi Maeda, Kazuki Niimi, Ryotaro Morita, Noriko Kiyoyanagi

**Title of the Invention:** Light Conversion Element Containing Deep Eutectic Solvent, and Things Containing the Light Conversion Element

**Filing Date:** November, 2016

**Application Number:** Japanese Patent Application No.2017-079580

**Applicants:** NIPPON KAYAKU KABUSHIKIKAISHA, TOKYO INSTITUTE OF TECHNOLOGY

*Details:* <https://patents.google.com/patent/JP2018180277A/en>

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## Publications (From-2022)

1. Ionic-Liquid-Based, Sustainable Wavelength-Shifting Materials for Energy Conversion: A Minireview. Z. Rahman, **S. K. Das**, ChemistrySelect. 7 (2022) e202103898.
2. Ionic liquids for sustainable energy-storage devices. Z. Rahman, **S. K. Das**, Ion. Liq. Technol. Environ. Sustain. (2022) 189–205.
3. Ionic liquids based sustainable materials for versatile optoelectronic applications. Z. Rahman, **S. K. Das**, Ion. Liq. Technol. Environ. Sustain. (2022) 207–223.
4. A Coumarin Coupled Electron Donor-Acceptor Dyad for Cascade Detection of Aluminium Ions and Explosive Nitroaromatic Compounds. M. Mahato, S. Mardanya, Z. Rahman, N. Tohora, P. Pramanik, S. Ghanta, A. A. Chowdhury, T. K. Shaw, **S. K. Das**, J. Photochem. & Photobio. A: Chem. 433 (2022) 114168.
5. A benzoxazole-based smart molecule for relay detection of zinc and phosphate ions and its implication towards molecular logic gate constructions. M. Mahato, N.

- Tohora, Z. Rahman, T. Sultana, S. Ghanta, **S. K. Das**, J. Photochem. & Photobio. A: Chem. 432 (2022) 114113.
6. A Phthalimide Scaffold Smart Molecule for Visualization of Acid-Base Equilibrium and Determination of Acid Dissociation Constants in the Non-Aqueous Medium. Z. Rahman, M. Rajbanshi, M. Mahato, S. Ghanta, **S. K. Das**, J. Mol. Liq. 359 (2022) 119365.
  7. Reversible acidochromism of a benzoxazole-based scaffold and construction of reconfigurable dual output molecular logic gates. Z. Rahman, M. Mahato, N. Tohora, S. Ghanta, **S. K. Das**. Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy 278 (2022) 121310.
  8. Target Analyte Interaction with a New Julolidine Coupled Benzoxazole-based Dyad: A combined Photophysical, Theoretical (DFT), and Bioimaging Study. M. Mahato, P. Sarkar, T. Sultana, N. Tohora, S. Ghanta, A. Das, P. Dutta, **S. K. Das**, ChemistrySelect. 7 (2022) e202204033.
  9. A Coumarin151 derived ratiometric and turn-on chemosensor for rapid detection of sarin surrogate. M. Mahato, S. Ahamed, N. Tohora, T. Sultana, S. Ghanta, **S. K. Das**. Microchemical J. 185 (2023) 108240.
  10. A benzoxazole-based turn-on fluorosensor for rapid and sensitive detection of sarin surrogate, diethylchlorophosphate, N. Tohora, M. Mahato, T. Sultana, S. Ahamed, **S. K. Das**. Analytica Chimica Acta 1255 (2023) 341111.
  11. A PET and ESIPT-communicated ratiometric, turn-on chromo-fluorogenic sensor for rapid and sensitive detection of sarin gas mimicking diethylchlorophosphate. S. Ahamed, M. Mahato, N. Tohora, T. Sultana, R. Sahoo, S. Ghanta, **S. K. Das**, Talanta 258 (2023) 124448.
  12. A phthalimide-based turn on fluorosensor for selective and rapid detection of G-series nerve agent's mimics, T. Sultana, M. Mahato, N. Tohora, S. Ahamed, P. Pramanik, S. Ghanta, **S. K. Das**, J. Photochem. & Photobio., A: Chem 439 (2023) 114584.
  13. A 4-aminophthalimide derives smart molecule for sequential detection of aluminum ions and picric acid. Z. Rahman, N. Tohora, M. Mahato, T. Sultana, P. Pramanik, S. Ghanta, A. Das, P. Datta, **S. K. Das**, J. Photochem. & Photobio. A: Chem. 439 (2023) 114593.
  14. Recent advances and applications of ionic liquids-based photonic materials. M. Mahato, Y. Murakami, **S. K. Das**, App. Mat. Today 32 (2023) 101808.

15. A benzoxazole-based fluorescent 'off-on-off' probe for cascade recognition of cyanide and  $\text{Fe}^{3+}$  ions. N. Tohora, M. Mahato, T. Sultana, S. Ahamed, S. Ghanta, **S. K. Das**, J. Photochem. & Photobiol. A: Chem. 442 (2023) 114807.
16. Phthalimide-Based Off-On-Off Fluorosensor for Cascade Detection of Cyanide Ions and Picric Acid. T. Sultana, M. Mahato, N. Tohora, A. Das, P. Datta, **S. K. Das**, ChemistrySelect. 8 (2023) e202204388.
17. Photoluminescent pyrene-based ionic liquid derived ratiometric organo nanosensor for rapid and selective detection of picric acid. Z. Rahman, N. Tohora, M. Mahato, S. Ahamed, T. Sultana, M. Selim Arif Sher Shah, A. Borah, **S. K. Das**, J. Photochem. Photobiol. A Chem. 444 (2023) 114906.
18. Fabrication of a re-usable benzoxazole-based colorimetric sensor for selective and sensitive recognition of sarin mimic, diethylchlorophosphate. S. Ahamed, T. Sultana, M. Mahato, N. Tohora, Z. Rahman, S. Ghanta, **S. K. Das**, Microchem. J. 193 (2023) 108982.
19. An azine-based chromogenic, fluorogenic probe for specific cascade detection of  $\text{Al}^{3+}$  and  $\text{PO}_4^{3-}$  ions. T. Sultana, M. Mahato, N. Tohora, S. Ahamed, **S. K. Das**, J. Photochem. Photobiol. A Chem. 444 (2023) 114951.
20. An Off-On-Off Benzoxazole-Based Fluorosensor for Relay Detection of  $\text{Al}^{3+}$  Ions and Explosive Nitroaromatic Compounds. N. Tohora, T. Sultana, M. Mahato, S. Ahamed, **S. K. Das**, ChemistrySelect. 8 (2023) e202301023.
21. Fluorogenic, specific detection of sarin gas mimic, diethylchlorophosphate. Z. Rahman, N. Tohora, M. Mahato, S. Ahamed, T. Sultana, **S. K. Das**, J. Photochem. Photobiol. A Chem. 444 (2023) 115007.
22. Deciphering the sensing mechanism in a sarin gas surrogate, diethylchlorophosphate specific probe: Colorimetric observation and theoretical analysis. T. Sultana, N. Tohora, S. Ahamed, M. Mahato, S. Ghanta, **S. K. Das**, Microchem. J. 193 (2023) 109095.
23. Ionic liquids-based organo nano-fluorosensor for fast and selective detection of sarin gas surrogate, diethylchlorophosphate. N. Tohora, S. Ahamed, M. Mahato, T. Sultana, M. Selim Arif Sher Shah, **S. K. Das**, J. Mol. Liq. 387 (2023) 122698.
24. Fabrication of a GUMBOS-based ratiometric organo nanosensor for selective and sensitive detection of perchlorate ions that works in 100% water. N. Tohora, M. Mahato, R. Sahoo, S. Ahamed, T. Sultana, M. Selim Arif Sher Shah, **S. K. Das**, J. Photochem. Photobiol. A Chem. 445 (2023) 115050.

25. Ionic liquids-based photonic materials for white light generation. M. Mahato, **S. K. Das**, *Ion. Liq. Their Appl. Green Chem.* (2023) 421–437.
26. Recent progress and developments of ionic liquids assimilated materials for solar cells. Z. Rahman, M. Mahato, **S. K. Das**, *Ion. Liq. Their Appl. Green Chem.* (2023) 79–95.
27. Spectroscopic and Density Functional Studies on the Interaction of a Naphthalene Derivative with Anions. Z. Rahman, M. Mahato, N. Tohora, T. Sultana, S. Ghanta, **S. K. Das**, *J. Fluoresc.* 33 (2023) 1027–1039.
28. A ratiometric, turn-on chromo-fluorogenic sensor for sequential detection of aluminum ions and picric acid. M. Rajbanshi, M. Mahato, J. Chourasia, S. Ghanta, **S. K. Das**, *J. Mol. Struct.* 1284 (2023) 135357.
29. A Chromo-fluorogenic Probe for Selective Detection of Picric Acid Alongside Its Recovery by Aliphatic Amines and Construction of Molecular Logic Gates. P. Sarkar, N. Tohora, M. Mahato, S. Ahamed, T. Sultana, **S. K. Das**, *J. Fluoresc.* (2023).
30. Fabrication of a re-useable ionic liquid-based colorimetric organo nanosensor for detection of nerve agents' stimulants. N. Tohora, S. Ahamed, T. Sultana, M. Mahato, **S. K. Das**, *Talanta.* 266 (2024) 124968.
31. An ESIPT-based chromone-coumarin coupled fluorogenic dyad for specific recognition of sarin gas surrogate, diethylchlorophosphate. M. Rajbanshi, M. Mahato, A. Maiti, S. Ahamed, **S. K. Das**, *J. Photochem. Photobiol. A Chem.* 447 (2024) 115230.
32. Chromogenic, specific cascade detection of fluoride and alkaline earth metal ions. M. Mahato, M. Rajbanshi, S. Ahamed, A. Maiti, J. Chourasia, **S. K. Das**, *J. Mol. Struct.* 1295 (2024) 136628.
33. A benzoxazole-triphenylamine conjugated fluorogenic probe for specific detection of sarin gas mimicking diethylchlorophosphate. T. Sultana, M. Mahato, N. Tohora, S. Ahamed, A. Maiti, S. Ghanta, **S. K. Das**, *Anal. Methods.* 16 (2024) 759–771.
34. Acid-base equilibrium in non-aqueous medium: colorimetric visualization, estimation of acidity constants and construction of molecular logic gates. M. Mahato, A. Maiti, S. Ahamed, M. Rajbanshi, S. Lama, **S. K. Das**, *RSC Adv.* 14 (2024) 3480–3488.
35. An efficient phenanthroimidazole-based luminogen for specific and selective detection of sarin gas surrogate, diethylchlorophosphate. S. Ahamed, T. Sultana, M. Mahato, N. Tohora, A. Maiti, **S. K. Das**, *J. Mol. Struct.* 1306 (2024) 137876.

36. Highly selective and sensitive chromogenic recognition of sarin gas mimicking diethylchlorophosphate. M. Mahato, T. Sultana, A. Maiti, S. Ahamed, N. Tohora, S. Ghanta, **S. K. Das**, *Anal. Methods*. 16 (2024) 1371–1382.
37. A sulfone-based fluorogenic probe for cascade detection of  $Zn^{2+}$  and  $PO_4^{3-}$  ions. J. Chourasia, N. Tohora, M. Mahato, T. Sultana, S. Ahamed, A. Maiti, S. Ghanta, **S. K. Das**, *J. Mol. Struct.* 1304 (2024) 137736.
38. A Phenanthroimidazole-Based Luminophore for Selective and Specific Identification of Sarin Simulant, Diethylchlorophosphate. T. Sultana, M. Mahato, N. Tohora, S. Ahamed, A. Maiti, **S. K. Das**, *J. Fluoresc.* (2024) 1–12.
39. Specific detection of sarin gas Mimicking, diethylchlorophosphate employing solvent-mediated in-situ generated hydroxyl functional group in a phthalimide-chromone coupled fluorogenic probe. N. Tohora, M. Mahato, A. Maiti, S. Ahamed, J. Chourasia, P. Sarkar, **S. K. Das**, *Microchem. J.* 200 (2024) 110298.
40. Highly specific and sensitive chromo-fluorogenic detection of sarin, tabun, and mustard gas stimulants: a multianalyte recognition approach. N. Tohora, S. Ahamed, M. Mahato, T. Sultana, J. Chourasia, A. Maiti, **S. K. Das**, *Photochem. Photobiol. Sci.* (2024) 1–18.
41. A Chromogenic Probe for Detection of Biologically Important Anions and its Implications for Designing Molecular Logic Gates. M. Rajbanshi, M. Mahato, A. Maiti, S. Ahamed, P. Sarkar, **S. K. Das**, *J. Fluoresc.* (2024) 1–12.
42. A pyrene-based chromo-fluorogenic probe for specific detection of sarin gas mimic, diethylchlorophosphate. J. Chourasia, N. Tohora, T. Sultana, M. Mahato, A. Maiti, S. Ahamed, **S. K. Das**, *Luminescence*. 39 (2024) e4731.
43. A selective chromo-fluorogenic chemosensor for visual detection of the solution and vapor phase of sarin, tabun mimics diethyl chlorophosphate and diethyl cyanophosphonate. P. Sarkar, N. Tohora, M. Mahato, S. Ahamed, T. Sultana, **S. K. Das**, *J. Mol. Struct.* 1306 (2024) 137846.
44. Chromo-fluorogenic detection of Sarin, Tabun, and mustard gas mimics triggering the ring-opening reaction in a spirolactam-based probe. S. Ahamed, N. Tohora, R. Sahoo, M. Mahato, T. Sultana, A. Maiti, S. Ghanta, **S. K. Das**, *J. Mol. Liq.* 409 (2024) 125411.
45. A Highly Selective Chromo-fluorogenic Probe for Specific Detection of Sarin Gas Simulant, Diethylchlorophosphate in Liquid and Gas Phase. T. Sultana, M. Mahato, S. Ahamed, R. N. Tohora, J. Chourasia, **S. K. Das**, *Sens. Diagn.* 3 (2024) 285



46. Decoding the ICT-PET-ESIPT Liaison Mechanism in a Phthalimide-based Trivalent Transition Metal Ions Specific Chromo-fluorogenic Probe. S. Ahamed, M. Mahato, R. Sahoo, N. Tohora, T. Sultana, A. Maiti, **S. K. Das**, *New J. Chem.* 48 (2024) 13131.
47. An orange light emitting “off–on–off” fluorogenic probe for consecutive detection of Al<sup>3+</sup> ions and 2,4,6-trinitrophenol. P. Sarkar, M. Mahato, S. Ahamed, N. Tohora, M. Rajbanshi, J. Chourasia, A. Maiti, S. Ghanta, **S. K. Das**, *Inorg. Chim. Acta.* 572 (2024) 122273.
48. Solid-State Brightness and Al<sup>3+</sup> Ions-Triggered Flower-Shaped Nano-luminogen for Cascade Detection of Al<sup>3+</sup> and PO<sub>4</sub><sup>3-</sup> ions. N. Tohora, S. Ahamed, R. Sahoo, M. Mahato, T. Sultana, S. Lama, A. Maiti, **S. K. Das**, *Opt. Mater.* 155 (2024) 115803.
49. A ratiometric, turn-on fluorosensor for specific detection of Zn<sup>2+</sup> ions. N. Tohora, S. Ahamed, M. Mahato, J. Chourasia, S. Ali, **S. K. Das**, *J. Photochem. Photobiol. A Chem.* 457 (2024) 115921.
50. A ‘Turn-on’ fluorogenic probe for selective and specific detection of Hg (II) ions. T. Sultana, M. Mahato, S. Ahamed, N. Tohora, J. Chourasia, S. Ghanta, **S. K. Das**, *J. Photochem. Photobiology A: Chem.* 459 (2024) 116028.
51. A ratiometric, turn-on fluorosensor for specific detection of Zn<sup>2+</sup> ions. N. Tohora, S. Ahamed, M. Mahato, J. Chourasia, S. Ali, **S. K. Das**, *J. Photochem. Photobiology A: Chem.* 457 (2024) 115921.
52. Metal Ion-Endows Orange-Red Light Fluorogenicity of an Imine-Linkage Probe Embracing Simple Electron Donor-Acceptor Units. A. D. Jaiswal, J. Chourasia, M. Mahato, S. Ahamed, N. Tohora, S. Ghanta, **S. K. Das**, *ChemistrySelect.* 9 (2024) e202403046.
53. White light generation embracing pyrene and rhodamine-based nano-groups of uniform materials based on organic salts (nano-GUMBOS). N. Tohora, Z. Rahman, S. Ahamed, M. Mahato, A. Maiti, **S. K. Das**, *J. Photochem. Photobiol. A Chem.* 458 (2025) 115990.
54. A specific ‘Turn-on’ fluorogenic probe for the detection of phosphate ions. A. D. Jaiswal, J. Chourasia, S. Ahamed, N. Tohora, M. Mahato, C. Debnath, S. Ghanta, **S. K. Das**, *J. Mol. Struct.* 1319 (2025) 139522.
55. A ‘Turn-on’ fluorogenic probe for selective and specific detection of Hg(II) ions, T. Sultana, M. Mahato, S. Ahamed, N. Tohora, J. Chourasia, S. Ghanta, **S. K. Das**, *Photochem. Photobiology A: Chem.* 459 (2025) 116028.



56. An Azine-based halochromic molecular chameleon. N. Tohora, Z. Rahman, S. Ahamed, J. Chourasia, M. Mahato, C. Debnath, **S. K. Das**, Inorg. Chim. Acta 574 (2025)122367.

### Scholarships and Awards received

1. Junior Research Fellowship from CSIR-New Delhi, India 2010-2012
2. Senior Research Fellowship from CSIR-New Delhi, India 2013-2014
3. Lady Davis Post Doctoral Fellowship, Hebrew University, Israel, 2014-Declined
4. JSPS Post Doctoral Fellowship, Tokyo Institute of Technology, Japan, 2014
5. Reward for Patent, Japanese Patent Application No. 2015-210125, Tokyo Institute of Technology, Tokyo, Japan-2016
6. Reward for Patent, Japanese Patent Application No. 2017-079580, Tokyo Institute of Technology, Tokyo, Japan-2017

### Experiences

1. Junior Research Fellow, NISER, Bhubaneswar, India January, 2010-January, 2012
2. Senior Research Fellow, NISER, Bhubaneswar, India February, 2013-August, 2014
3. Post Doctoral Fellowship, NISER, Bhubaneswar, India, July, 2014-Oct., 2014
4. JSPS Post Doctoral Fellow, Tokyo Institute of Technology, Japan, Nov. 2014-April, 2015.
5. Assistant Professor, Raghunathpur College, Purulia, West Bengal -May, 2015-Sept., 2018
6. Assistant Professor, University of North Bengal, West Bengal -Oct., 2018- till date.

### Research Projects as Principal Investigators


Grant agency	Title of the project	Amount in lakh Rs.
1. SERB-India	Structure-Properties Relationships of Sodium Ion Electrolytes Based on Hydrophobic Ionic Liquids and Deep Eutectic Solvents. (completed)	28.1
2. UGC-India	Schiff base triggered aggregation-induced enhanced emission and white light generation through Förster resonance energy transfer between organic and inorganic nanohybrid materials. (completed)	10.0
3. SERB-India	Nano Groups of Uniform Materials Based on Organic Salts (Nano-GUMBOS) and Their Nanocomposites with Inorganic Materials: Design, Synthesis and Photophysics. (completed)	48.0
4. SERB-India	Brightness and molecular photophysics in the solid state: Design, synthesis, and applications. (Ongoing)	25.0

### Collaborative Visits Abroad

1. Tokyo Institute of Technology, Tokyo, Japan Oct,09 - Dec 07, 2016

I hereby declare that the particulars furnished above are complete and correct to the best of my knowledge and belief.

Date: 22.11.2024

  
Sudhir Kumar Das