



ENLIGHTENMENT TO PERFECTION

UNIVERSITY OF NORTH BENGAL

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Raja Rammohunpur, Dist- Darjeeling, West Bengal, Pin-734013, India.

Department of Chemistry

Print



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B.Sc., M.Sc. Ph.D., POSTDOC

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Subject Specialization: Physical Chemistry**Areas of Research Interest:**

- **Solute and solvent relaxation in room temperature ionic liquids (RTILs):** Study of solvent response towards photoexcited dipolar probes in RTILs with the help of picoseconds time resolved fluorescence spectroscopy. Solute rotational dynamics of dipolar probes with the help of time resolved fluorescence anisotropy decay.
- **Supramolecular chemistry:** Investigations on receptor properties of naphthalimide as well as nitrobenzoxadiazole derivatives towards anionic, cationic guest molecules by various spectroscopic techniques.
- **Aggregation in fluorescent compounds:** Aggregation behaviour and corresponding morphological changes in fluorescent compounds with respect to various stimuli.
- **Ultrafast proton transfer dynamics:** proton transfer dynamics and proton relay through the solvent medium of photoacid.
- **Photon upconversion:** Photon upconversion kinetics through triplet-triplet annihilation in different host medium, design of different emitter, sensitizer for the increment of upconversion quantum yield and application of this technique in the solar cell.
- **Up and down conversion of energy:** Up and down conversion of photon energy with suitable intramolecular, intermolecular donor-acceptor system with the help of different photophysical technique which are helpful in application of different optoelectronic devices and bioimaging.
- **Design of green media:** Development of novel hydrophobic fluorescent as well as transparent biodegradable cheaper, greener media which could be applied in solar cell as upconverted media and in Li/Na ion batteries as benign cheap greener electrolyte.
- **Nano-GUMBOS based on ionic liquids (ILs)/deep eutectic solvents (DESs) and its promising application:** Synthesis of "Group of Uniform Materials Based on Organic Salts (GUMBOS)" using ILs/ DESs as templates and its aggregation behaviour with aim to its promising application.

No. of Ph.D. students: (a) Supervised: Nil (b) Ongoing: Nil.**No. of M.Phil. students:** (a) Supervised: Nil (b) Ongoing: Nil .**No. of Publications:** (a) Scientific Papers: 22 (b) Patents: 02**Achievement & Awards:**

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

Research Experiences:

- Junior Research Fellow, NISER, Bhubaneswar, India January, 2010-January, 2012

- Senior Research Fellow, NISER, Bhubaneswar, India February, 2013-August, 2014
- Adhoc Post Doctoral Fellowship, NISER, Bhubaneswar, India, July, 2014-Oct., 2014
- JSPS Post Doctoral Fellow, Tokyo Institute of Technology, Japan, Nov. 2014-April, 2015.
- Assistant Professor, Raghunathpur College, Purulia, West Bengal -May, 2015-Oct., 2018
- Assistant Professor, University of North Bengal, West Bengal-November, 2018-till date.

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 COMPANY PVT. LTD., TOKYO INSTITUTE OF TECHNOLOGY

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 NIPPON COMPANY PVT. LTD., TOKYO INSTITUTE OF TECHNOLOGY

List of Selected Publications:

- Triplet-sensitized Photon Upconversion in Deep eutectic Solvents. Murakami, Y. *; **Das, S. K. ***; Himuro, Y.; Maeda, S. Phys. Chem. Chem. Phys. 2017, 19, 30603-30615. (Impact factor-4.123) *Corresponding author

(Highlighted in Tokyo Institute of Technology Press release on 13.11.2017)

- Linking Diffusion–Viscosity Decoupling and Jump Dynamics in a Hydroxyl-Functionalized Ionic Liquid: Realization of Microheterogeneous Nature of the Medium. **Das, S. K.**; Majhi, D.; Sahu, P. K.; Sarkar, M. ChemPhysChem 2017, 18, 198. (Impact factor-3.075)
 - Studies on Intramolecular Electron Transfer Reaction in Donor–Spacer–Acceptor Systems in Room-Temperature Ionic Liquids. Sahu, P. K.; **Das, S. K.**; Sarkar, M. J. Mol. Liq. 2016, 214, 24-31. (Impact factor-3.648)
 - Linking Diffusion–Viscosity Decoupling and Jump Dynamics in a Hydroxyl-Functionalized Ionic Liquid: Realization of Microheterogeneous Nature of the Medium. **Das, S. K.**; Majhi, D.; Sahu, P. K.; Sarkar, M. ChemPhysChem 2017, 18, 198. (Impact factor-3.075)
 - Studies on Intramolecular Electron Transfer Reaction in Donor–Spacer–Acceptor Systems in Room-Temperature Ionic Liquids. Sahu, P. K.; **Das, S. K.**; Sarkar, M. J. Mol. Liq. 2016, 214, 24-31. (Impact factor-3.648)
 - Investigating the Influence of Alkyl Side Chain length on the Fluorescence Response of C153 in a Series of Room Temperature Ionic Liquids. **Das, S. K.**; Majhi, D.; Sahu, P. K.; Sarkar, M. RSC Adv. 2015, 5, 4585. (Impact factor-3.075)
 - Studies on Electronic Energy Transfer (EET) on a Series of Room Temperature Ionic Liquids (RTILs): Can the EET Studies on RTILs be exploited to predict their Structural Organization? **Das, S. K.**; Sahu, P. K.; Sarkar, M. RSC Adv. 2014, 4, 39184. (Impact factor-3.075)
 - Analyte Interactions with a New Ditopic Dansylamide–Nitrobenzoxadiazole Dyad: A Combined Photophysical, NMR, and Theoretical (DFT) Study. Bhoi, **Das, S. K.**; Sahu, P. K.; Nijamudheen, A.; **Anoop, N.**; Rahaman, A.; Sarkar, M. J. Phys. Chem. B, 2014, 118, 9926. (Impact factor-3.177)
 - Probing the Aggregation Behavior of 4-Aminophthalimide and 4-(N,N-Dimethyl) Amino-N-Methylphthalimide: A Combined Photophysical, Crystallographic, Microscopic and Theoretical (DFT) Study. Majhi, D.; **Das, S. K.**; Sahu, P. K.; Pratik, S. M.; Kumar, A.; Sarkar, M. Phys. Chem. Chem. Phys. 2014, 16, 18349. (Impact factor-4.123)
 - Fluorescence Response of a Dipolar Organic Solute in a Dicationic Ionic Liquid (IL): Is the Behavior of Dicationic IL Different from that of Usual Monocationic IL? Sahu, P. K.; **Das, S. K.**; Sarkar, M. Phys. Chem. Chem. Phys., 2014, 16, 12918. (Impact factor-4.123)
 - Toward Understanding Solute–Solvent Interaction in Room-Temperature Mono- and Dicationic Ionic Liquids: A Combined Fluorescence Spectroscopy and Mass Spectrometry Analysis. Sahu, P. K.; **Das, S. K.**; Sarkar, M. J. Phys. Chem. B 2014, 118, 1907. (Impact factor-3.177)
 - Probing Solute–Solvent Interaction in 1-Ethyl-3-methylimidazolium-based Room Temperature Ionic liquids: A Time-resolved Fluorescence Anisotropy Study. **Das, S. K.**; Sarkar, M. J. Flu. 2014, 24, 455. (Impact factor-1.461)
 - Probing the Microscopic Aspects of 1-Butyl-3-Methylimidazolium Trifluoroacetate Ionic Liquid and Its Mixture with Water and Methanol: A Photophysical and Theoretical (DFT) Study. **Das, S. K.**; Sahu, P. K.; Sarkar, M. J. Flu. 2013, 23, 1217. (Impact factor-1.461)
 - Synthesis, Photophysics, Live Cell Imaging and Aggregation Behaviour of Some Structurally Similar Alkyl Chain Containing Bromonaphthalimide Systems: Influence of Alkyl Chain Length on the Aggregation Behaviour. Soni, M.; **Das, S. K.**; Sahu, P. K.; Kar, U. P.; Rahaman, A.; Sarkar, M. J. Phys. Chem. C 2013, 117, 14338. (Impact factor-4.536)
 - Picosecond Solvation Dynamics of Coumarin153 in Bis(1-methyl-1H-imidazol-3-ium-3-yl)dihydroborate Cation Containing Room Temperature Ionic Liquid and Ionic Liquid-DMF Mixtures. Sahu, P. K.; **Das, S. K.**; Sarkar, M. J. App. Sol. Chem. Mod. 2013, 2, 47. (Impact factor-not available)
 - Diffusion–Viscosity Decoupling in Solute Rotation and Solvent Relaxation of Coumarin153 in Ionic Liquids Containing Fluoroalkylphosphate (FAP) Anion: A Thermophysical and Photophysical Study. **Das, S. K.**; Sahu, P. K.; Sarkar, M. J. Phys. Chem. B 2013, 117, 634. (Impact factor-3.177)
- (Highlighted in virtual issue of JPC 2017 as top-cited and/or top-accessed articles from India published in JPC A, B, C, and Letters during the 2012–2016 period)

- Ion Interactions with a New Ditopic Naphthalimide-Based Receptor: A Photophysical, NMR and Theoretical (DFT) Study. Mohan., V.; Nijamudheen, A.; **Das, S. K.**; Sahu, P. K.; Kar, U. P.; Rahaman, A. Sarkar, M. ChemPhysChem 2012, 13, 3882. (Impact factor-3.075)
- Photophysical and Density Functional Studies on the Interaction of a New Nitrobenzoxadiazole Derivative with Anions. **Das, S. K.**; Misra, S. S.; Sahu, P. K.; Nijamudheen, A.; Vaisakh, M. K.; Sarkar, M. Chem. Phys. Lett. 2012, 546, 90. (Impact factor-1.805)
- Studies on the Solvation Dynamics of Coumarin 153 in 1-Ethyl-3-Methylimidazolium Alkylsulfate Ionic Liquids: Dependence on Alkyl Chain Length. **Das, S. K.**; Sarkar, M. ChemPhysChem 2012, 13, 2761. (Impact factor-3.075)
- Investigating the Interaction of a Nitrobenzoxadiazole Derivative with Metal Ions: Photophysical and Theoretical (DFT) Study. **Das, S. K.**; Patra, A. S.; Jose, D.; Sarkar, M. Chem. Phys. Lett. 2012, 528, 11. (Impact factor-1.815)
- Rotational Dynamics of Coumarin-153 and 4-Aminophthalimide in 1-Ethyl-3-methylimidazolium Alkylsulfate Ionic Liquids: Effect of Alkyl Chain Length on the Rotational Dynamics. **Das, S. K.**; Sarkar, M. J. Phys. Chem. B 2012, 116, 194. (Impact factor-3.177)
- (Highlighted in virtual issue of JPC 2017 as top-cited and/or top-accessed articles from India published in JPC A, B, C, and Letters during the 2012–2016 period)
- Steady-state and Time-resolved Fluorescence Behavior of Coumarin-153 in a Hydrophobic Ionic Liquid and Ionic Liquid–Toluene Mixture. **Das, S. K.**; Sarkar, M. J. Mol. Liq. 2012, 165, 38. (Impact factor-3.648)
- Solvation and Rotational Relaxation of Coumarin 153 in a New Hydrophobic Ionic Liquid: An Excitation Wavelength Dependence Study. **Das, S. K.**; Sarkar, M. J. Lumin. 2012, 132, 368. (Impact factor-2.686)
- Solvation and Rotational Relaxation of Coumarin 153 and 4-Aminophthalimide in a New Hydrophobic Ionic Liquid: Role of N–H...F Interaction on Solvation Dynamics. **Das, S. K.**; Sarkar, M. Chem. Phys. Lett. 2011, 515, 23. (Impact factor: 1.815)

Conference Attended:

1. International conference on emerging materials (ICEM), April 20-21, 2017 conducted at Vidysagar University, Midnapore, India. Presented a poster entitled “Realization of organized nature of hydroxyl-functionalised ionic liquids through diffusion-viscosity decoupling and jump dynamics”.
2. The 8th Japan-Taiwan Workshop on mechanical and Aerospace Engineering, November 29-10, 2016 conducted at School of Engineering, Tokyo Institute of Technology, Japan and deliver an oral presentation on “Design ion sensing materials through electron donor- acceptor systems”.
3. State Level seminar on “A scientific, social & economic impact on environment: Awareness, benefits & limitations” January 10, 2017 conducted by Teacher’s Council, Raghunathpur College, Purulia-72313. Presented a poster entitled “Deep eutectic solvents: Are these greener than ionic liquids?”.
4. National workshop on “Chemistry: An Innovation Driver in materials science”, September 27-28, 2016 conducted at Department of Chemistry, Raghunathpur College, Purulia-723133. Presented a poster entitled “Understanding the structure-property relationship of a hydroxyl-functionalized ionic liquid through thermophysical and NMR investigation”.
5. UGC-sponsored National seminar on recent development in bio-active molecules (RDBAM-2016), August 4-5, 2016 conducted at Department of Chemistry, Haldia Govt. College, Haldia. Presented a poster entitled “Probe dependence solvation dynamics in room temperature ionic liquids”.
6. International level Trombay symposium on radiation and photochemistry (TSRP-2012), January 03-07, 2012, organised by “Indian society for radiation and photochemical sciences” (ISRAPS), Mumbai, India. Presented a poster entitled “Studies on the Solvation Dynamics of Coumarin 153 in 1-Ethyl-3-Methylimidazolium Alkylsulfate Ionic Liquids: Dependence on Alkyl Chain Length”.
7. National symposium on “Radiation and photochemistry” (NSRP – 2011), March 04- 07, 2011, organised by “Indian society for radiation and photochemical sciences (ISRAP), Jodhpur, Rajasthan, India. Presented a poster entitled “Solvation and rotational relaxation of coumarin 153 and 4-aminophthalimide in a new hydrophobic ionic liquid: Role of N–H...F interaction on solvation dynamics”.
8. National Seminar on frontiers in chemistry, November 11-14, 2010, conducted at School of Chemical Sciences, National Institute of Science Education and Research (NISER), Bhubaneswar, India.
9. Symposium in chemistry, Chemical Research Society of India (CRSI-2011), Feb 4-6, 2011, conducted at Kalinga Institute of Industrial Technology (KIIT), Bhubaneswar, India.
10. Indo-European symposium on frontiers of chemistry, November 10-12, 2011, conducted at School of Chemical Sciences, National Institute of Science Education and Research (NISER), Bhubaneswar, India.

Collaborative Visit Abroad:

- Department of Chemistry, Ulsan National institute of Science & Technology, Ulsan, South Korea from 1.8.2014-28.8.2014.
- Department of Mechanical Engineering, Tokyo Institute of Technology, Tokyo, Japan as “Adjunct Associate Professor”. From Oct, 09 - Dec 07, 2016.