

Dr. DEBASISH GHOSH

Present address

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Date of Birth: 26-09-1990

Sex: Male

Marital status: Unmarried

Academic Background:

2020-Till Date Serving as a Visiting Lecturer at Department of Chemistry, Vivekananda College, Madhyamgram (UG) and Scottish Church College (PG) and Behala College (PG).

2015-2020 Doctor of Philosophy (Ph.D.) in Synthetic Organic Chemistry, Department of Chemistry, University of Calcutta, West Bengal, India.
Ph.D. Supervisor: Dr. Dilip Kumar Maiti, Professor.

2012-2014 Master of Science (M.Sc.) in Chemistry (Organic Chemistry Specialization), University of Calcutta, West Bengal, India. (**72.9%**)

2008-2012 Bachelor of Science [B. Sc.(H)], in Chemistry, City College (Amherst street), University of Calcutta, West Bengal, India. (**72.9%**)

2008 Higher Secondary Examination, (12th standard) W.B.C.H.S.E, West Bengal, India.

2006 Secondary Examination, (10th standard) W.B.B.S.E, West Bengal, India.

Awards and achievements:

- 1) My last publication in *Chem Commun.* has been selected as HOT ARTICLE of RSC publications.
- 2) Promotion from Junior Research Fellow (JRF) to Senior Research Fellow (SRF) on the basis of satisfactory research progress. (2017)
- 3) Qualified National Eligibility Test (NET) for Junior Research Fellowship (JRF) funded by Council of Scientific and Industrial Research (CSIR) securing All India Rank CSIR-83 (JUNE 2014).
- 4) Secured 1st position in B.Sc. (H) Exam. among the students of City College under the University of Calcutta. (2012)

Main Skills:

Instruments handled:

- Dynamic Light Scattering (Malvern)
- Inverted Optical Microscope (Carl Zeiss)
- FT-IR (Bruker and Perkin-Elmer), React-IR (Perkin-Elmer)
- UV-VIS-NIR and Fluorimeter (Perkin-Elmer)
- Absorption Spectrophotometer (Hitachi)
- NMR 300 MHz (Bruker)
- GC-MS (Perkin-Elmer)
- HPLC, Spin Quitter, Tentiometer, Vortex-Shaker, Sonicator, Polarimeter etc.
- HR-MS (Waters)

Other Instruments used for Research

BIO-SEM, FE-SEM, HR-TEM (with EELS and EDAX), HRMS, MULDMASS, CHN-analyzer, Solid State NMR, EPR.

Computer skills:

- **Operating Systems:** Windows.
- **Software Familiar with:** MS-Office, Adobe illustrator, Adobe Photoshop, Chem Office, ISIS draw, Origin.

Publications:

1. Selective amidation by a photocatalyzed umpolung reaction: **Debasish Ghosh**, Rajesh Nandi, Saikat Khamarui, Sukla Ghosh and Dilip K. Maiti*, *Chem. Commun.* **2019**, 55, 3883-3886.
2. Ratiometric chemodosimeter: an organic nanofiber platform for sensing lethal phosgene Gas: Kalipada Maiti, **Debasish Ghosh**, Rituparna Maiti, Vena Vyas, Pallab Datta, Debabrata Mandal* and Dilip K. Maiti*, *J. Mater. Chem. A* **2019**, 7, 1756-1767.
3. Water—the best solvent for DMAP-mediated dual cyclization towards metal-free firs synthesis of fully substituted phthalimides: Subhasis Samai, **Debasish Ghosh**, Uttam K. Das, Sanghamitra Atta, Saikat K. Manna and Dilip K. Maiti*, *Green Chem.* **2016**, 18, 2961-2965.
4. Synthesis and characterization of a magnetically separable novel Fe₃O₄@ L-DOPA@CuII nanocatalyst (L-DOPA= L-3,4-dihydroxyphenylalanine): Asymmetric aza-Michael addition reaction: Arnab Datta, Jaydeep Adhikary, Sourav Chatterjee, **Debasish Ghosh**, Saikat Khamarui, Tanmay Chattopadhyay*, *Inorganica Chimica Acta* **2016**, 444, 209-216.

Research Overview:

Thesis title: “Studies On Developing Diverse Heteroatomic Bond Formation And Cyclization To Access Valuable Organic Compounds: A Search For Chemical Sensor”

Syntheses of small functionalized molecules using C-H activation and C-C/C-N/C-O coupling under mild conditions are the main objectives in this modern era. With the advancement of science, scientists are looking for simple strategies using metal catalysis, and efficient photocatalytic transformation to achieve functional molecules with synthetic efficiency. In particular, diverse catalytic synthesis of heterocyclic organic compounds and use of organic nanofiber materials for sensor and bio-active molecules are main objective of this thesis.

During my Ph.D work, the main objectives were to accomplish new, straightforward and benign methods those include the development of new chemistry using benign catalysts for relatively mild catalysis for direct C-H bond functionalization for diverse C-C, C-N and C-O coupling and cyclization to achieve valuable compounds. The substrate scopes of these newly

developed methodologies were successfully investigated and some of these synthesized compounds were used as a chemical sensor.

My thesis is comprised with four relevant chapters:

CHAPTER 1: Organic base-mediated dual cyclization in water towards substituted phthalimides: a sustainable synthetic approach.

CHAPTER 2: Selective oxidation of active methylenes through amidation using a photocatalyzed umpolung reaction.

CHAPTER 3: Cu^{II} catalyzed oxidative C-C and O-C coupling reaction: a stereoselective synthesis of oxiranes.

CHAPTER 4: Efficient ratiometric fluorescent chemodosimeter for detection of phosgene: Fast detection of the gas in nanofiber platform.

In Chapter 1, DMAP promoted intermolecular cascade dual cyclization among acetoacetanilides and alkynes was demonstrated for synthesis of *N*-aryl phthalimides and their analogues. The mechanistic pathway was established by means of control experiments, DLS and UV-Vis study. In Chapter 2, Cu^I-organophotocatalyzed synthesis of α -ketoamides and its chiral analogs from 1,3-dicarbonyl compounds was demonstrated. The plausible mechanism of unprecedented C-C amidation was established from several experiments and photophysical studies. In Chapter 3, A diastereoselective α,β -epoxy ketone syntheses via oxidative C-C/O-C coupling of α -halo ketones under mild catalytic condition has been discussed. The reaction pathway was explained on the basis of the molecular oxygen trapping, labelling experiments and control experiments. In Chapter 4, the development of a sensor for colorimetric and fluorescence sensing of phosgene by riding on the advantage of the ESIPT process is depicted. Sensor-embedded polymeric fibers were prepared which shows distinct color and fluorescence changes upon exposure to phosgene in a small span of time (< 5 sec.). SEM images of the corresponding film and Nano fiber were also provided.

Declaration:

I, Debasish Ghosh, hereby declare that the information contained herein is true and correct to the best of my knowledge and belief.

Date:

Place: Kolkata

Debasish Ghosh

(DEBASISH GHOSH)