
Asima Chatterjee

Sponsored by Sister Nivedita University		
Venue: University College of Science and Technology, University of Calcutta, Kolkata-700009 (Rajabazar)		
ICCHD-2026: Program Schedule Day-1 (10th January, 2026, Saturday)		
Breakfast & Registration: 8:00-8:55AM		
11:00AM-11:55AM: Inaugural Ceremony (Mukto Mancho)		
Garlanding the portrait of Prof. Asima Chatterjee and Song		
Welcome Address by the Conference Chair and Vice-President of Professor Asima Chatterjee Foundation Kolkata (PACFK)		
Address by the *Pro-Chancellor, Sister Nivedita University*		
Address by *the Vice-Chancellor, Sister Nivedita University*		
Address by *the Registrar, Biswa Bangla Biswabidyalay*		
Address by the HOD, Department of Chemistry		
Vote of Thanks by the Convener of the conference		
***Sponsored by* Syngenta Biosciences Pvt. Ltd.**		
Hall-1 (Meghnad Saha Auditorium, Meghnad Saha Bhavan, 1st floor) *Technical Session* **1**	**Hall-2 (N R Sen Auditorium, Ground Floor, N R Sen Building)** *Technical Session 2*	**Hall-3 (Chemistry Lecture Theatre, Palit Building, 1st floor** *Technical Session* **3**
Chairman: Prof. B. C. Ranu, IACS	**Chairman: Prof. A. K. Chakraborti, NIPER Mohali**	**Chairman: Prof. Nikhil Guchhait, University of Calcutta**

9:00AM-9:30 AM **Plenary Lecture -1:** **Speaker: Prof. Bimal K. Banik, Prince Mohammed Bin Fahd University, Saudi Arabia** **Title: Synthesis and Biological Evaluation of Novel Anticancer Polyaromatic Compounds**	**9:00AM-9:30 AM** **Plenary Lecture -3:** **Speaker: Prof. Manas K. Ghorai, IIT Kanpur** **Title: Asymmetric Synthesis of Bioactive Compounds *via* DKR**	**9:00AM-9:30 AM** **Plenary Lecture -5** **Speaker: Prof. Suhrit Ghosh, IACS** **Title: Redox-Activable Heavy Atom Free Photodynamic Therapy**	
9:30-10:00 AM: Plenary Lecture -2 **Speaker: Prof. Thirupathi Barla, IISER Berhampur** **Title: 2-Keto-1,3-Indandione, a Versatile Ingredient for the Synthesis of Medicinally Important Carbocyclic and Heterocyclic Compounds**	**9:30-10:00 AM** **Plenary Lecture -4** **Speaker: Prof. Subhas C. Pan, IIT Guwahati** **Title: Iridium and Silver Catalyzed Cyclization Reactions**	**9:30-10:00 AM** **Plenary Lecture -6** **Speaker: Prof. Ajit K. Mahapatra, IIEST Shibpur** **Title: Real-Time Detection of Chemical Warfare Agents Through Advanced Chemosensor Detection Method**	
10:00-10:30 AM: PACA Lecture-1 **PAC Award Lecture (International)** **Speaker: Prof. Arun K. Ghosh, Purdue University, USA** **Title: Bioactive Natural Products and Their Enduring Molecular Templates for Innovative Molecular Design**	**10:00-10:20 AM** **Invited Lecture-1** **Speaker: Prof. Alakananda Hajra, Visva-Bhaarati** **Title: Molecular Editing of Azaheterocycles**	**10:00-10:20 AM** **Invited Lecture-4** **Speaker: Prof. Prithidipa Sahoo, Visva-Bharati** **Title: Smart Nanosensors at the Interface of Environmental Sustainability and Human Health**	

10:30-11:00 AM: PACA Lecture-2 **PAC Award Lecture (National Young Scientist)** **Speaker: Dr. Debasis Banerjee, IIT Roorkee** **Title: Alcohol as Renewable Reagent for Sustainable Organic Transformations**	**11:20-10:40AM** **Invited Lecture-2** **Speaker: Prof. Utpal Bora, Tezpur University** **Title: Transition Metal-Free Synthesis of Oxime Ethers**	**10:20-10:40AM** **Invited Lecture-5** **Speaker: Prof. Mijanur R. Molla, CU** **Title: Dynamic Covalent Poly(disulfide)s and its Applications**	
	11:40-11:00 AM **Invited Lecture-3** **Speaker: Dr. Sujit Ghorai, Syngenta Biosciences Pvt. Ltd.** **Title: Synthesis of 3-Substituted 5,5-Dimethyl Isoxazolines: Towards Agrochemical Lead Generation**	**10:40-11:00 AM** **Invited Lecture-6** **Speaker: Prof. Tithi Maity, PKC** **Title: Detection of biomolecules and hazardous chemicals by organic chemosensors, metalloreceptor and quantum dots**	
10:55-11:55 AM	**inaugural Ceremony & Tea Break**		
Hall-1 (Meghnad Saha Auditorium, Meghnad Saha Bhavan, 1st floor) ***Technical Session* 4**	**Hall-2 (N R Sen Auditorium, Ground Floor, N R Sen Building)** ***Technical Session 5***	**Hall-3 (Chemistry Lecture Theatre, Palit Building, 1st floor** ***Technical Session* 6**	
Sponsored by Wiley			
Chairman: Prof. Kyoko Nozaki, University of Tokyo, Japan	**Chairman: Prof. Susanta Adhikari, University of Calcutta**	**Chairman: Prof. Dhrubajyoti Chattopadhyay, Sister Nivedita University**	

12:00-12:30 PM **Plenary Lecture-7** **Speaker: Prof. Debabrata Maiti, IIT Bombay** **Title: Unlocking new chemical space via selective catalysis**	**12:00AM-12:30 PM** **Plenary Lecture-9** **Speaker: Prof. Sabuj Kundu, IIT Kanpur** **Title: Cobalt-Single-Atom Catalyzed Small Molecule Activation**	**12:00AM-12:30 PM** **Plenary Lecture-11** **Speaker: Prof. Debasis Bandyopadhyay, University of Calcutta** **Title: Diclofenac Induced Cardiac-Injury: Protection By Melatonin**	
Time: 12:30-1:00 PM **Plenary Lecture-8** **Speaker: Prof. Yoichiro Kuninobu, Kyushu University, Japan** **Title: Non-covalent Interaction-Controlled Site-selective C–H Transformations**	**Time: 12:30-1:00 PM** **Plenary Lecture -10** **Speaker: Prof. Dibyendu Das, IISER Kolkata** **Title: Non-equilibrium self-assembly for living matter-like properties**	**Time: 12:30-1:00 PM** **Plenary Lecture -12** **Speaker: Prof. P. Jaisankar, IICB Kolkata** **Title: Synthetic Small-Molecule Modulators for the Rare Genetic Disease Friedreich's Ataxia: A Dual-Mechanistic Approach**	
Time: 10:00-1:30 PM **PACA Lecture-3** **PAC Award Lecture (Industry)** **Speaker: Dr. Thomas Colacot, Hindustan Platinum Pvt Ltd** **Title: Advancing Human Development with Next-Gen Sustainable Palladium Catalysts for Pharmaceuticals**	**Time: 1:00-1:20 PM** **Invited Lecture-7** **Speaker: Prof. Amit Saha, Jadavpur University** **Title: Dithiocarbamate Mediated Synthesis of Useful Organic Molecules**	**Time: 1:00-1:20 PM** **Invited Lecture-9** **Speaker: Prof. Koena Ghosh, Presidency University** **Title: Direct homo Michael type addition of deconjugated butenolides to donor-acceptor cyclopropane under catalytic activation**	

Time: 1:30-2:00 PM PACA Lecture-4 **Plenary Lecture: PAC (National Young Scientist) Award Lecture** **Prof. Uttam K. Ghorai, RKMV Belur** **Title: Magneto-Electrochemical Ammonia Synthesis via NOx Reduction**	**Time: 1:20-1:40 PM** **Invited Lecture-8** **Speaker: Prof. Avik K. Bagdi, KU** **Title: Shining Light on Cross-Dehydrogenative Synthesis of Functionalized Heterocycles**	**Time: 1:20-1:40 PM** **Invited Lecture-10** **Speaker: Dr. Bibaswan Biswas, CRAH** **Title: From Pharmacopoeial Compliance to Chemical Markers: Advancing Quality Control of Homoeopathic Medicines**	
	Time: 1:40-2:00 PM **Sponsor Lecture-1:** **Speaker: Dr. Subhabrata Mukhopadhyay, Wiley** **Title: ICCHD Special Collection and Today's Publication Landscape**	**Time: 1:40-2:00 PM** **Invited Lecture-11** **Speaker: Dr. Krishna Chattopadhyay, WS-CU** **Title: Metal–Organic Framework–Based Composites for High-Performance Aqueous Symmetric Supercapacitor Applications**	
1:50-3:25PM	**Lunch Break**		
Hall-1 (Meghnad Saha Auditorium, Meghnad Saha Bhavan, 1st floor) ***Technical Session* 7**	**Hall-2 (N R Sen Auditorium, Ground Floor, N R Sen Building)** ***Technical Session 8***	**Hall-3 (Chemistry Lecture Theatre, Palit Building, 1st floor** ***Technical Session* 9**	
Sponsored by *Royal Society of Chemistry*			
ChairpersonProf. Fumitoshi Kakiuchi, University of Keio, Japan	**Chairperson: Prof. Arun K. Ghosh, Purdue University, USA**	**Chairperson: Dr. Sitaram Pal, Former Scientist, Syngenta Biosciences Pvt. Ltd.**	
3:30-4:00PM **Plenary Lecture-13:** **Speaker: Prof. Bruce A. Arndtsen, McGill University, Canada** **Title: Alternative Energy Drivers in Metal Catalyzed Coupling Reactions**	**3:30-4:00PM** **Plenary Lecture-15** **Speaker: Prof. Goutam Brahmachari, Visva-Bharati** **Title: Application of Green Tools in Modern Organic Synthesis**	**3:30-4:00PM** **Plenary Lecture-16** **Speaker: Prof. Aniruddha Banerji** **Title: All-trans Retinoic Acid (ATRA): A Potent Inhibitor of Matrix Metalloproteinases and Cellular Signalling Cascades in Cervical Cancer Cells**	

Time: 4:00-4:30PM **Plenary Lecture-14:** **Speaker: Prof. A. T. Biju, IISc** **Title: N-Heterocyclic Carbene-Catalyzed Synthesis of C-N, C-O and N-N Axially Chiral Molecules**	**Time: 4:00-4:20PM** **Invited Lecture-12** **Speaker: Prof. R. Natarajan, IICB** **Title: Supramolecular Organic Frameworks for Efficient Iodine Capture**	**Time: Time: 4:00-4:20PM** **Invited Lecture-14** **Speaker: Prof. Joydev K. Laha, NIPER Mohali** **Title: Radical Generation, Philicity, and Reactivity (R-GPR) in the Synthesis of Pharmaceuticals**
Time: 4:30-5:00PM; PACA Lecture-5 **Speaker: Prof. Shoubhik Das, Germany** **Title: Turning CO_2 into Opportunity: Designing Catalysts for Versatile Applications**	**Time: 4:20-4:40 PM** **Invited Lecture-13** **Speaker: Prof. Raj Nandi, Jadavpur University** **Title: Discovery of New Cyclic Hypervalent Iodine Reagents & Its Application Towards Synthesis for Therapeutic Interest**	**Time: 4:20-4:40 PM** **Invited Lecture-15** **Speaker: Prof. Poulami Hota, MAC** **Title: Metal free organo-electrocatalyst for electrocatalytic hydrogen generation**
	Time: 4:40-5:00 PM **Sponsor Talk-2** **Speaker: Dr. Dipankar Malakar, Sciex**	**Time: 4:40-5:00 PM** **Invited Lecture-16** **Speaker: Dr. Manosi Das, CCRAS, Kolkata** **Title: Analysis of Plant based Drugs and of Essential Oils from Indian and African sources: HPTLC, GC-MS, Anti-oxidant assay and *In-silico* approaches**
4:50-5:00 PM Tea Break		
Sponsored by *TCG Life Sciences Limited*		
Hall-1 (Meghnad Saha Auditorium, Meghnad Saha Bhavan, 1st floor) ***Technical Session* 10**	**Hall-2 (N R Sen Auditorium, Ground Floor, N R Sen Building)** ***Technical Session 11***	**Hall-3 (Chemistry Lecture Theatre, Palit Building, 1st floor** ***Technical Session* 12**
Sponsored by		
Chairman: Prof. Stephen Hashmi, Germany	**Chairman: Prof. Yoichiro Kuninobu, Kyushu University, Japan**	**Chairman: Prof. Kaliprasanna Dhara, University of Calcutta**

5:10-5:40PM: PAC Lecture 10 **PAC (International) Award Lecture (Shifted from Day-2)** **Speaker: Prof. Kyoko Nozaki, University of Tokyo, Japan** **Title: Efficient Recycling of Plastic Wastes Using Controlled –Active-Site Catalysts**	**5:00-5:30PM** **Plenary Talk-20:** **Speaker: Prof. Ramkrishna G. Bhat, IISER Pune** **Title: Versatile Reactivity of Diazo Carbonyl Compounds Towards Metal Catalysts and Visible Light**	**5:00-5:30PM** **Plenary Talk-21:** **Speaker: Prof. Sanjib Bhattacharya, NBU** **Title: Development of Na_2O Doped Solid State Glassy System for Supercapacitor Applications: Study of Electrical and Electrochemical Properties**	
5:40-6:10 PM **Plenary Lecture-18** **Speaker: Prof. Yasushi Nishihara, Okayama University, Japan** **Title: Photovoltaic Properties of Organic Thin-film Solar Cells Based on Semiconducting Polymers**	**5:30-5:50 PM** **Invited Lecture-17** **Speaker: Prof. Subhash Samanta, CU** **Title: Photoswitchable Antibiotics to Combat Antibiotic Resistance**	**5:30-5:50 PM** **Invited Lecture-22** **Speaker: Prof. Anindita Das, IACS** **Title: A Versatile Condensation Polymerization Route to Functional Degradable Polymers**	
6:10-6:40PM **Plenary Lecture-19** **Speaker: Prof. Masahiro Terada, Tohoku University, Japan** **Title: Enantioselective Catalysis by Higher Order Organosuperbase**	**5:50-6:10PM** **Invited Talk-18** **Speaker: Prof. Santanu Panda, IIT Kgp** **Title: Stereoselective Synthesis of Olefin by Exploiting Vinyl Boronates and Amino Acids**	**5:50-6:10PM** **Invited Talk-23** **Speaker: Prof. Mahasweta Nandi, Visva-Bharati** **Title: Supercapacitors Based on Carbon Nanofibers of Bacterial Cellulose Decorated with Polydopamine**	
6:40-7:00PM **Plenary Lecture-48** **Speaker: Prof. Sanjib Panda, IIT Madras** **Title: Model Study of Oxy-tyrosinase**	**6:10-6:30PM** **Invited Talk-19** **Speaker: Prof. Biswajit Maji, IGNTU** **Title: NHC-catalyzed Enolate and Homoenolate Michael Additions to Nitroalkenes Embedded in Benzo-fused Heterocycles**	**6:10-6:30PM** **Invited Talk-24** **Speaker: Prof. Hari Sankar Biswas, SNC** **Title: Hydrogenated Diamond-Like Carbon as a Robust Carbon Nanomaterial for Advanced Energy Storage**	
	6:30-6:50PM **Invited Lecture-20** **Speaker: Prof. Soumen K. Samanta, Biswa Bangla Biswabidyalay** **Title: A High-Affinity "Synthavidin" Receptors for Squaraine Dyes**	**6:30-6:50PM** **Invited Lecture-25** **Speaker: Prof. Mossaraf Hossain, NBU** **Title: Unfolding a Greener Methodology for the Synthesis of Novel Heterocycles using a Biocatalyst in Aqueous Medium**	

		6:50-7:00PM **Invited Lecture-26 (Short)** **Speaker: Prof. Antara Roy, Adamas University** **Title: Application of edible coating on different types of fruits and vegetables and assesing their cytotoxic effects**	

7:00-7:30 PM **Mukto Mancho**

Panel Discussion: Industry Academia Consortium

Topic: Industry-Academia Collaboration and Job Opportunity

Executive Members: Prof. Dilip K. Maiti, Vice-Chancellor, Biswa Bangla Biswabidyalay

: Prof. Stephen Hashmi, Heidelberg University, Germany

: Dr. Ashoke Banerjee, PACFK

: Dr. Thomas Colacot, Hindustan Platinum Pvt Ltd

: Dr. Sujit Ghoria, Syngenta Biosciences Pvt Ltd

: Dr. Susanta Samanta, TCGLS Kolkata

7:30-9:00 PM **Dinner**

Day 2: Technical Sessions will be started at 9AM tomorrow

ICCHD-2026: Program Schedule Day 2: 11th January 2026 (Sunday)*		
Venue: University College of Science and Technology, University of Calcutta, Kolkata-700009 (Rajabazar)		
Hall-1 (Meghnad Saha Auditorium, Meghnad Saha Bhavan, 1st floor) *Technical Session* **13**	**Hall-2 (N R Sen Auditorium, Ground Floor, N R Sen Building)** *Technical Session 14*	**Hall-3 (Chemistry Lecture Theatre, Palit Building, 1st floor** *Technical Session* **15**
***Oral Presentation: Auditorium-4 (1st Floor, Secretary Office Building, Beside Bank) 9:30am; Poster Presentation: Mukto Mancho: 2:00pm**		
***Sponsored by* Swami Vivekananda University**		
Chairperson: Prof. Manas K. Ghorai, IIT Kanpur	**Chairperson: Prof Bruce A. Arndtsen, McGill University, Canada**	**Chairperson: Prof. Atul Goel, CDRI Lucknow**
9:00AM-9:30 AM **Plenary Lecture-22** **Speaker: Prof. Fumitoshi Kakiuchi, Univ. of Keio, Japan** **Title: Catalytic C–C Bond Formation via Aryl C–H Bond Cleavage Using Iron-Phosphine Complexes**	**9:00AM-9:30 AM** **Plenary Lecture-24** **Speaker: Prof. Joyee Mitra, CSMCRI** **Title: Exploring Hydrogen-bonded Supramolecular Materials for Catalytic Transformations**	**9:00AM-9:30 AM** **Plenary Lecture-28** **Speaker: Prof. Arindam Talukdar, IICB Kolkata** **Title: From Inhibition to Degradation: Targeting E3 Ubiquitin Ligases with Small Molecules and PROTACs for NAFLD Therapy**
9:30-10:00 AM **Plenary Lecture -23** **Speaker: Prof. Pinaki Talukdar, IISER Pune** **Title: Engineering Supramolecular Channels for Responsive Ion Transport and Biomedical Applications**	**9:30-10:00 AM** **Plenary Lecture-25** **Speaker: Prof. Debasis Manna, IIT Guwahati** **Title: Ion Transport-mediated Molecular Communications**	**9:30-10:00 AM** **Plenary Lecture-29** **Speaker: Prof. Valmik S. Shinde, CDRI, Lucknow** **Title: Electrochemical 3d-Transition Metal Catalyzed C-Cl Bond Activation**

10:00-10:30AM: PACA Lecture-7 **PAC (National) Award Lecture** **Speaker: Prof. Nitin T. Patil, IISER Bhopal** **Title: Enantioselective Gold Redox Catalysis**	**10:00-10:30AM** **Plenary Lecture-26** **Speaker: Prof. Satyendra Kumar Pandey, BHU** **Title: Metal-Free Approaches for the Synthesis of Bioactive Molecules**	**10:00-10:20AM** **Invited Lecture-27** **Speaker: Prof. Arindam Indra, IIT Varanasi** **Title: Organometallic Chemistry in Meatal-Organic Framework: Application in Photoelectrochemical Water Splitting**	
10:30-11:00AM: PACA Lecture-8 **PAC (International Young Scientist) Award Lecture (Online)** **Speaker: Prof. Kornkanya Pratumyot, KMUT Thornburi, Thailand** **Title*:* Supramolecular System for Gene and Drug Delivery**	**10:30-11:00 AM** **Plenary Lecture-27** **Speaker: Prof. Sandipan Halder** **Title: Synthetic Methodology for the Construction of Functionalized Heterocyclic Ring Systems**	**10:20-10:40 AM** **Invited Lecture-28** **Speaker: Prof. Suman Kalyan Samanta, IIT Kgp** **Title: Bandgap Engineered Conjugated Porous Organic Polymers in Photocatalysis**	
		10:40-11:00 AM **Invited Lecture-29** **Speaker: Prof. Subhasis Rana, IEM-UEM** **Title: Design of Hydrophobic–Hydrophilic copolymer Coated γ-Fe_2O_3 Nano-carriers for Biocompatible and Targeted Chemotherapy Applications**	

11:00-11:25 AM	**Tea Break & Poster Session**	
Hall-1 (Meghnad Saha Auditorium, Meghnad Saha Bhavan, 1st floor) *Technical Session* **16**	**Hall-2 (N R Sen Auditorium, Ground Floor, N R Sen Building)** *Technical Session 17*	**Hall-3 (Chemistry Lecture Theatre, Palit Building, 1st floor** *Technical Session* **18**
Sponsored by Hindustan Platinum Pvt Ltd		
Chairperson: Prof. Bimal K. Banik, Prince Mohammed Bin Fahd University, Saudi Arabia	**Chairperson: Dr. Thomas Colacot, Hindustan Platinum Pvt Ltd**	**Chairperson: Dr. Ashoke Banerjee, PACFK**
11:30AM-12:00 PM **Plenary Lecture-30** **Speaker: Prof. Stephen Hashmi, Germany** **Title: Gold Catalysis: Extended π-Systems and Azulenes**	**11:30AM-12:00 PM** **Plenary Lecture-32** **Speaker: Prof. Indu Bhusan Deb, IICB** **Title: Synthesis of Functionalized N-Heterocycles via Electrochemical Synthesis and Annulation Reaction**	**11:30AM-12:00 PM** **Plenary Lecture-34** **Speaker: Prof. Vinod Kumar Tiwari, Banaras Hindu University, Banaras** **Title: Chemoenzymatic Synthesis of complex Sialoconjugates of Chemotherapeutic Potential**
12:00-12:30 PM **Plenary Lecture-31** **Speaker: Prof. Janakiram Vaitla, IIT Delhi** **Title: Unifying Carbene Precursors: Synthetic Opportunities with Vinyl Sulfoxonium Ylides and Diazo Esters**	**12:00-12:30 PM** **Plenary Lecture-33** **Speaker: Prof. Ranjan Jana, IICB Kolkata** **Title: Development of Visible Light-Mediated Sustainable Cross-coupling Reactions**	**12:00-12:30 PM** **Plenary Lecture-35** **Speaker: Prof. Amiya K. Panda, RRGU** **Title: Methanolic Extract of *Acorus calamus* Rhizome Loaded Nanostructured Lipid Carriers: Preparation, Physicochemical Properties and *In Vivo* Anti-allergic Activity Studies**

Time: 12:30-1:00PM: PACA Lecture-9 **PAC (National) Award Lecture** **Speaker: Prof. Amitava Das, IISER Kolkata** **Title: N-Capped Short Peptides for Therapeutic Applications**	**Time: 12:30-12:50 PM** **Invited Lecture-30** **Speaker: Prof. Nanda D. Paul, IIEST Shibpur** **Title: Redox Active Azo-aromatics From Thermal/Photochemical Reactions to Molecular Memristor Devices**	**Time: 12:30-12:50 PM** **Invited Lecture-33** **Speaker: Prof. Tapas Ghosh, Jadavpur University** **Title: From Mechanism to Molecules: Ligand-Free Nickel Catalysis in Cascade Reactions**	
Time: 1:00-1:30PM **Plenary Lecture-17** **Speaker: Prof Laurean Ilies, Riken Tokyo, Japan** **Title: Control of Selectivity and Reactivity in Organic Transformations**	**12:50-1:10PM** **Invited Lecture-31** **Speaker: Prof. Rajarshi Sarkar, VIT-AP University** **Title: Multifunctional Metal-Organic Gels Based on Terpyridine-Metal Coordination for Sensing and Soft Materials Applications**	**12:50-1:10PM** **Invited Lecture-34** **Speaker: Prof. Amitava Mandal, RU** **Title: Light Sensitive Chiral Supramolecular Superhelix**	
	1:10-1:30PM **Invited Lecture-32** **Speaker: Prof. Sk Ajarul, GGDC** **Title: 2-Alkynylanilines as Privileged Synthons for Regioselective Synthesis of N-Heterocyclic Frameworks**	**1:10-1:30PM** **Invited Lecture-35** **Speaker: Prof. Krishanu Show, Malda College** **Title: An organocatalytic approach for the first total synthesis of proposed structure of pandangolide I**	
1:30-3:25PM	**Lunch Break & Poster Session***		

Hall-1 (Meghnad Saha Auditorium, Meghnad Saha Bhavan, 1st floor) *Technical Session* 19	Hall-2 (N R Sen Auditorium, Ground Floor, N R Sen Building) *Technical Session 20*	Hall-3 (Chemistry Lecture Theatre, Palit Building, 1st floor *Technical Session* 21
*Poster presentation (Wiley and RSC Award) will be started at 1:30pm in the Mukto Mancha ground		
Sponsored by GO		
Chairperson: Prof. Amiya K. Panda, RRGU	**Chairperson: Prof Laurean Ilies, Riken Tokyo, Japan**	**Chairperson: Prof. Manas Chakraborti, Bose Institute**
3:30-4:00PM **Plenary Lecture-36** **Speaker: Prof. Basker Sundararaju, IIT Kanpur** **Title: Dual Cobalt/Photoredox Catalysis: Toward Sustainable Synthetic Methodologies**	**3:30-4:00PM** **Plenary Lecture-38** **Speaker: Prof. Sukalyan Bhadra, CSMCRI Bhavnagar** **Title: Catalysis via SET-Induced Formation of C-Centered Radicals**	**3:30-4:00PM** **Plenary Lecture-41** **Speaker: Prof. Subhasis Roy, CU** **Title: Hybrid Nanocomposite Designs for Superior Performance and Long-Term Stability in Perovskite Solar Cells**
4:00-4:30PM **Plenary Lecture-37** **Speaker: Prof. Mrinmoy De, IISc Bengaluru** **Title: Nanocatalysis: Direction for Photo-mediated Organic Transformations**	**4:00-4:30PM** **Plenary Lecture-39** **Speaker: Prof. Alakesh Bisai, IISER Kolkata** **Title: Total Synthesis of Complex Alkaloids of Biological Relevance**	**4:00-4:30PM** **Plenary Lecture-42** **Speaker: Prof. Kalpataru Das, DHGV, Sagar** **Title: Green Approaches for Synthesis of Fine Chemicals and Biologically Relevant Organic Compounds**

Time: 4:30-5:00PM: PACA Lecture-11 **PAC (National) Award Lecture** **Speaker: Prof. Atul Goel, CDRI Lukhnow** **Title: Drug Discovery and Diagnostic Research for Improving Human Health**	**4:30-5:00PM** **Plenary Lecture-40** **Speaker: Prof. Milan Bera, Amity University Noida** **Title: A Sustainable Atom Economical Approaches to Selective π-Functionalization of Allenes towards Synthesis of Bio-active Molecules**	**4:30-5:00PM** **Plenary Lecture-43** **Speaker: Prof. Manirul Islam, KU** **Title: Development of functionalized porous materials and their catalytic applications**
5:00-5:25 PM	**Tea Break**	
	Sponsored by Fharmacy Bazaar Ltd	
Hall-1 (Meghnad Saha Auditorium, Meghnad Saha Bhavan, 1st floor) ***Technical Session* 22**	**Hall-2 (N R Sen Auditorium, Ground Floor, N R Sen Building)** ***Technical Session 23***	**Hall-3 (Chemistry Lecture Theatre, Palit Building, 1st floor** ***Technical Session* 24**
Chairperson: Yasushi Nishihara, Okayama University, Japan	**Chairperson: Prof. Masahiro Terada, Tohoku University, Japan**	**Chairperson: Dr. Avijit Banerji, PACFK**
5:30-6:00PM **Plenary Lecture-44** **Speaker: Prof. Srimanta Manna, NIPER SAS Nagar** **Title: A New Strategy for Transition-Metal-Free C-N Cross-Coupling**	**5:30-6:00PM** **Plenary Lecture-47** **Speaker: Prof. Ekambaram Balaraman, IISER Tirupati** **Title: Sustainable Chemical Production via Catalytic Dehydrogenation Strategy**	**5:30-6:00PM** **Plenary Lecture-46** **Speaker: Prof. Kiran Kumar Pulukuri, IISER Tirupati** **Title: Title: Synthesis of Sesquiterpenoids through Siteselective Functionalization**

6:00-6:30 PM **Penary Lecture-45** **Speaker: Prof. Soumitra Maity, ISM Dhanbad** **Title: Manipulating Reactivity Paradigms by Light**	**6:00-6:20PM** **Invited Lecture-36** **Speaker: Prof. Safiul Alam, AU** **Title: Transition Metal-Catalyzed Synthesis of Bioactive *N*-heterocyclic Compounds under Microwave-Assisted Conditions**	**6:00-6:20PM** **Invited Lecture-39** **Speaker: Prof. Palash Pandit, SNIM** **Title: Nonplanar Bowl-Shaped Heterocycles: Synthetic Challenges, Dynamic Curvature, and Functional Materials**	
6:30-7:00 PM **PACA Lecture-6** **PAC Award Lecture (Industry)** **Speaker: Mr. Manoranjan Roy** **Chairman, Fharmacy Bazaar Limited, Kolkata**	**6:20-6:40PM** **Invited Lecture-37** **Speaker: Prof. Nabanita Sadhukhan, ICT Mumbai** **Title: Renaissance of phthalocyanine: Exploring its functional frontiers**	**6:20-6:40PM** **Invited Lecture-40** **Speaker: Prof. Moupiya Ghosh, IEM-UEM** **Title: Synthesis, characterization and antibacterial activity of nontoxic Cu-Ag-TiO_2 nanocomposite**	
7:00-7:30PM **Valedictory Session** **Prof. Avijit Banerji, Conference Chair** **Prof Bruce A. Arndtsen, McGill University, Canada** **Prof. Stephen Hashmi, Germany** **Prof. Fumitoshi Kakiuchi, Univ. of Keio, Japan** **Prof. Arun K. Ghosh, Purdue University, USA** **Prof. Kyoko Nozaki, University of Tokyo** **Prof. Dilip K. Maiti, Convener**			
7:30-9:00 PM **Dinner**			
Day 3: We will cruise through the Ganga River			

ICCHD-2026

ADVISORY COMMITTEE MEMBERS

Prof. Vinod K. Singh, IIT Kanpur, India

Prof. Pierre H. Dixneuf, University of Rennes, France

Dr. Manjunath Bhanu, Syngenta Goa, India

Prof. Stephen Hashmi, University of Heidelberg, Germany

Prof. Brindaban C. Ranu, IACS Kolkata, India

Prof. Bimal K. Banik, PMU, Saudi Arabia

Prof. Asit Chakraborti, NIPER Mohali, India

Prof. Nitin T. Patil, IISER Bhopal, India

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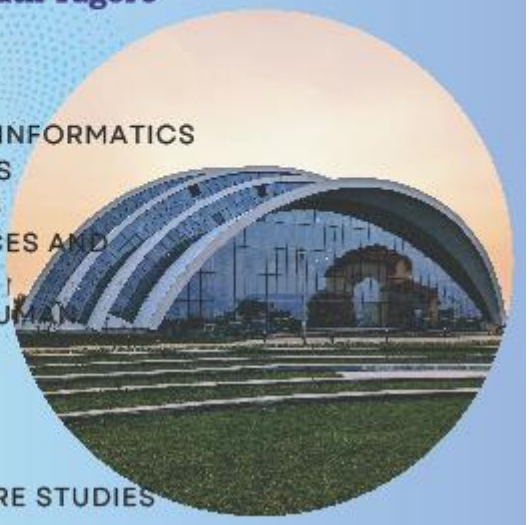

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PROFESSOR (MRS.) ASIMA CHATTERJEE (1917-2006)

Early Life and Education

Mrs. Asima Chatterjee (neé Mookerjee) was born in Calcutta (now known as Kolkata) on September 23, 1917, being the elder of two children of Late Dr. Indranarayan Mukherjee and Late Sm. Kamala Devi. She passed her Matriculation Examination in 1932, from Bethune Collegiate School, Kolkata, (founded by Mr. John Elliot Drinkwater Bethune on 7th May 1849) securing a Bengal Government Scholarship. In 1934 she passed the I.Sc. Examination from Bethune College and obtained a Bengal Government Scholarship, Nawab Latif – Father Lafont Scholarship of the University of Calcutta and the Hemprova Bose Memorial Medal of the Sadharan Brahma Samaj. She graduated with Honours in Chemistry in 1936 from Scottish Church College and received the Basanti Das Gold Medal. She was the only woman student (out of the three admitted) in the Chemistry Department of the Scottish Church College who completed higher education. Coming from an orthodox, joint Hindu family, severe objections were raised by the elders in allowing Miss Mookerjee to study in a co-education college. It was the courage and sheer determination of ***her Mother*** which enabled her to do so.

During her post-graduate studies at the University of Calcutta she came into the close proximity with the doyens of Indian Science, like Acharya Prafulla Chandra Ray, Professors Prafulla Chandra Mitter, Pulin Behari Sarkar, Jogendra Chandra Bardhan, Priyada Ranjan Ray and Dr. Prafulla Kumar Bose, who later joined Bose Institute as Professor and Head of the Department of Chemistry. She obtained her M.Sc. degree in 1938 with Organic Chemistry as special paper and received the University of Calcutta Silver Medal and Prize (ranking 2nd in the first class) and Jogmaya Devi Gold Medal. Miss Mookerjee started her research work under the guidance of Dr. Prafulla Kumar Bose, one of the pioneer Natural Product chemists in India. Acharya Prafulla Chandra Ray created a fellowship for her (amounting to Rupees seventy-five at that time) out of his salary which he used to donate to the University of Calcutta every month. Miss Mookerjee received the Nagarjuna Prize and Gold Medal of the University of Calcutta in 1940 for the best piece of research work carried out in the Department of Chemistry, the Premchand Roychand Studentship in 1942, the Mouat Gold Medal (one of the prestigious medals of the University) and the D.Sc. degree of the University of Calcutta in 1944 on the merit of her research contributions on 'Naturally Occurring Indole Alkaloids and Coumarins'. She was the first lady to obtain the D.Sc. degree of any Indian University.

Miss Mookerjee was interested in vocal music since her childhood. She received training in classical music, *Dhrupad* and *Khayal*, for over fourteen years and stood second in the All Bengal Music Competition in 1933. When Sir C.V. Raman received the Nobel Prize in 1930 she sang in the felicitation function at the Calcutta University Institute. Her parents took special care to see that she was well conversant in Sanskrit which enabled her to read the great ***epics*** of the renowned writers of ancient India.

In 1940 Miss Mookerjee joined Lady Brabourne College (one of the *prestigious colleges in Kolkata*) as the **Founder-Head** of the Department of Chemistry. She was appointed **Honorary Lecturer** in the Department of Chemistry, University of Calcutta, in 1944.

Dr. (Mrs.) Chatterjee (née Miss Mookerjee) left for U.S.A. in 1947 on study leave from Lady Brabourne College. She showed considerable courage in taking her eleven month old daughter with her along with a

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governess. There she came into close contact with Swami Nikhilanandaji Maharaj, Head of the Ramakrishna-Vivekananda Centre, New York, and Swami Prabhavanandaji Maharaj, Head of the Ramakrishna-Vedanta Centre in Los Angeles. Thus began her life-long association with them and subsequently with the Ramakrishna Math and Mission, Belur, West Bengal. Swami Abhayanandaji Maharaj (the senior most Vice-President of the Ramakrishna Order; popularly known as Bharat Maharaj) and Swami Rangathanandaji Maharaj (13th President of the Ramakrishna Order) Ramakrishna Math and Mission, played a dominant role in her life in providing inspiration and courage.

Dr. (Mrs.) Chatterjee worked with Professor L.M. Parks, University of Wisconsin, on *Naturally Occurring Glycosides* (1947-1948) and with Professor L. Zechmeister, California Institute of Technology, Pasadena, on *Carotenoids* and *Provitamin* A (1948-1949). In recognition of this work she was awarded the coveted *Watumull fellowship*. (Mrs.) Chatterjee worked with Professor Paul Karrer, N.L., University of Zürich, Switzerland (1949-1950) on *Biologically Active Indole Alkaloids* which became her life-long interest. During her stay at the California Institute of Technology she came into close contact with Professor Linus Pauling, N.L. She made it a point to attend his classes. Thus, began her life long association with Professor and Mrs. Pauling. When they came to Calcutta (now known as Kolkata) in 1967 they visited Professor Chatterjee at the University College of Science and met her research students.

Family Background

In 1945 Miss Mookerjee married Dr. Baradananda Chatterjee, F.N.A., a well-known Physical Chemist who was an authority on Soil Science and Corrosion and was a member of the Railway Board on Corrosion. He became Professor and Head of the Department of Chemistry and Geology and Vice- Principal (Academic) of Bengal Engineering College (now known as Indian Institute of Engineering Science and Technology). Professor Chatterjee had a profound influence on his wife. Without his constant inspiration, encouragement and co-operation it would have been impossible for Mrs. Chatterjee to dedicate herself to the cause of science. Her only child, Dr. Mrs. Julie Banerji, former Head of the Department of Chemistry, University of Calcutta, and son-in-law, Dr. Avijit Banerji, former Head of the Department of Chemistry, University of Calcutta, and Programme-Coordinator, UGC Centre of Advanced Studies on Natural Products including Organic Synthesis, were Professors in the Department of Chemistry, Calcutta University. Her only grandchild, Dr. Aniruddha Banerji, has a brilliant academic career. He is inclined to Life Sciences – obtaining his B.Sc. (Zoology Honours) and M.Sc. in Zoology from Calcutta University, he secured the first position in both the examinations. Working at the Chittaranjan National Cancer Institute, Kolkata, with a CSIR-NET fellowship he obtained his Ph.D. degree in Life Sciences from Jadavpur University. He joined St. Xavier's College, Calcutta (*one of the most prestigious colleges in India*) as Assistant Professor in the newly opened Department of Biotechnology offering an integrated five-year M.Sc. course. He is now an Associate Professor in the same Department. Her grand daughter-in-law, Dr. (Mrs.) Pia Banerji, is Assistant Professor in the Department of Economics, St. Xavier's College (Autonomous).

The year 1967 proved disastrous for Professor (Mrs.) Chatterjee. She lost her father and then her husband within a period of four months. Unable to bear this double tragedy, she suffered a massive heart attack at the University College of Science and had to be hospitalised in a critical state. She lingered between life and death for days. It took nearly three months for her recovery but by then she had broken down completely. It was through the influence and affection of Revered Swami Abhayanandaji Maharaj of the Ramakrishna Math and Mission, Belur, and Late Professor Satyendra Nath Bose, F.R.S. that she regained her mental strength. The love and affection of her students, colleagues and staff members of the Department of Chemistry helped in bringing her back to normal activities.

Professional Career

After her return to India in 1950, Dr. (Mrs.) Chatterjee started research on alkaloids and coumarins. She had rejoined her services as Head of the Department of Chemistry at Lady Brabourne College and Honorary Lecturer in the Department of Chemistry, University of Calcutta. In those days, scholarships were rare and financial assistance most inadequate. As a result the students often had to work in shifts. Those were indeed hard days for any teacher and frustrating for students who pursued research. Dr. (Mrs.) Chatterjee kept up the morale of her students through her own dedication.

In 1954 she was appointed Reader in the Department of Chemistry, University of Calcutta. At that time

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there was only one post of Reader in the department. Soon she gained reputation as a teacher of rare distinction and an unique research guide. In 1962 she became the Kumar Guruprasad Singh Khaira Professor of Chemistry, a Chair she held till her retirement in 1982.

In 1969, she became the Head of the Department of Chemistry, University of Calcutta, a post she continued till 1979. Due to her untiring efforts, understanding and coordination with her colleagues and under her dynamic leadership and foresight the department earned international reputation as a leading Centre of Teaching and Research in Chemistry. One would remember her eloquent address as General President at the 62nd Session of the Indian Science Congress in Delhi in 1975, "Universities constitute the backbone of Scientific and Technological Training and University Research still forms the spearhead of scientific progress and provides a reasonably good barometer to the Standard of Science and Technology in the Country. Hence Universities should receive top national priority".

Professor (Mrs.) Chatterjee was not satisfied with merely transmitting the facts of science to her students but she instilled in them an awareness of the significance of all they were learning – a rare skill which required a high degree of competence in the art of communication. In recognition of the work carried out in the Organic Section of the Department of Chemistry, the University Grants Commission sanctioned in 1972 the Programme of Special Assistance to selected departments for intensifying teaching and research on ***Natural Products Chemistry*** with Professor (Mrs.) Chatterjee as its Honorary Programme Coordinator. She continued in this post till 2003. This Department was upgraded to the Centre of Advanced Studies on Natural Products in 1985 and since 2003 as the Centre of Advanced Studies on ***Natural Products including Organic Synthesis,*** with Professor Avijit Banerji as Honorary Programme Coordinator. In the period 1975-1978 the Organic Section of the Department of Chemistry received the first phase of the UNESCO-UNDP assistance with substantial grants for purchase of equipments and fellowships for teachers and one technician of this section for training abroad. Incidentally, this was the only Organic Chemistry Department in this country to receive such an assistance at that time. The second phase of this assistance continued till 1982. At that time there was serious dearth of space in the Department. Professor (Mrs.) Chatterjee secured funds from the University Grants Commission (New Delhi) and three floors were constructed in the N.R. Sen Building. The rooms have been used for installation of sophisticated instruments, as research laboratories for teachers and for expansion of the departmental library.

She got the University authorities Vice Chancellor (Late Professor S. N. Sen), pro- Vice Chancellor Academic (Late Professor P. K. Bose) and Pro- Vice Chancellor Finance (Late Mr. Arun Roy) to sanction four rooms in the newly constructed fourth floor of Sir Tarak Nath Palit Building. At present one of the rooms houses the Analytical Chemistry Laboratory, one the Analytical Chemistry Lecture Theatre and the third Organic Chemistry Lecture Theatre. She exchanged the fourth room with a room on the ground floor of the Sir Tarak Nath Palit Building which was being used by the Physiology Department.

Professor (Mrs.) Chatterjee has travelled far and wide, not only in connection with the dissemination of the fruits of her research to the world community, but also to gain knowledge on the progress of research in her area of specialisation. She delivered a number of *Oration* and *Convocation* lectures in Universities and Institutes throughout India. She acted as Chairperson and delivered lectures in the UNESCO Symposia on Phytochemistry held in Kuala Lampur (1957) and Hongkong (1961), in the IUPAC Symposia on Chemistry of Natural Products held in Zürich (1955), Australia (1960), Japan (1965) and USSR (1970). She participated in the meetings of the British Association for the Advancement of Science in 1970 and 1971. As a member of the Indian delegation she visited several Universities and Institutes in USSR in 1965 on an Indo-Soviet Cultural Exchange Programme. She delivered invited/plenary lectures in the Indo-Soviet Symposia in USSR (Riga – 1971; Tashkent – 1973; Tbilsi (Georgia) – 1983), the Sri Lanka Science Congress in 1976, the International Symposium on Isoprenoids in Poland in 1979 and the first Princess Congress on Natural Products in Bangkok in 1987. As a guest of the German Academy of Science in 1975 Professor (Mrs.) Chatterjee visited the Universities of Berlin, Frei, Ruhr and Bonn on a lecture and study tour. She also delivered lectures in the Universities of Manchester and East Anglia and visited the Imperial Chemical Industries, U.K., as a guest of the British Council in 1975. As a member of the national delegation, Government of India, Professor (Mrs.) Chatterjee attended the World Congress of Women in Prague, Czechoslovakia, which was organised by WIDF (Women International Democratic Federation) and spoke on

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"Women and Work, including Rural Women" in 1981. She revisited U.S.A. in 1981 on a lecture tour and also Germany in 1981, 1986 and 1987. She went to Bulgaria in 1986 and 1987 and revisited Zürich in 1986. As she began taking more and more life-saving drugs she was compelled to stop all visits abroad and as the condition of her heart deteriorated still further she could not leave Kolkata and was only permitted to come to the University College of Science (Calcutta University) which was a few kilometres away from her home.

In 1968 Professor (Mrs.) Chatterjee was involved in one of the historic legal battles in the country in the Calcutta High Court over infringement of a patent right involving a "Sulphonamide Derivative" between Bengal Chemical and Pharmaceutical Works Ltd., Kolkata (now a Government of India Enterprise) and Hoechst Co. Ltd. Due to her profound respect and devotion for her teacher, Late Acharya Prafulla Chandra Ray (Founder of Bengal Chemical and Pharmaceutical Works Ltd.), she agreed to be the principal witness for the Indian Company on condition that she would not accept any fees. Professor Dukshaharan Chakraborty (the then Head of the Department and Sir Rashbehari Ghose Professor of Chemistry, University of Calcutta) was the principal paid witness for Hoechst Co. Ltd. Late Barristers Rathin Deb and Barrister Somnath Chatterjee (the former Speaker of the Lok Sabha) were the lawyers for Bengal Chemical and Pharmaceutical Works Ltd. while the lawyers for Hoechst Co. Ltd. were eminent patent lawyers from abroad. Professor (Mrs.) Chatterjee's profound knowledge of Organic Chemistry, courage and conviction helped Bengal Chemical Pharmaceutical Works Ltd. in winning the legal battle. She literally had to answer hundreds of questions in Chemistry for days together in the Calcutta High Court, standing in the Witness Box. It was a critical situation for the Indian Company for if it had lost the case it would have to go into liquidation on account of the astronomical amount of libel suit sought by Hoechst Co. Ltd. Even today, the judges and lawyers of the Calcutta High Court, who were present at that time remember Professor Chatterjee with devotion, awe and profound respect as several of them recalled this historic legal battle to her daughter on learning of her passing away.

This case was historic on three ways: -

(i) The Bombay High Court in an earlier similar case gave the verdict just opposite to the Calcutta High Court.

(ii) The Government of India changed the Patent Law after this legal battle (*Asima Chatterjee. Doyen in the Chemistry of Natural Products by Dhrubajyoti Chattopadhyay, Head Purulia Science Centre under NCSM; Science and Culture, Vol. 84, Nos. 5-6, May-June 2018*).

(iii) Had the judgement gone the way of Hoechst, then BCPW Founded by Acharya Prafulla Chandra Ray would have been forced to close down.

Notable Scientific Contributions

The research activities of Professor (Mrs.) Asima Chatterjee extended over a period of nearly sixty years. Her major interest was on the Chemistry of Natural Products from Indian Medicinal Plants. She, along with her scores of research students and research associates, made significant contributions in diverse classes of Natural Products, of which alkaloids, polyphenolics and terpenoids deserve special mention, and also on structural and mechanistic organic chemistry. Besides her keen interest on fundamental research, Professor Chatterjee always stressed on the utilization of phytochemicals from indigenous plants as drugs and drug-intermediates. Only ***some*** of her important contributions have been highlighted in the following sections.

A large number of students have obtained their Ph.D. (59), D.Sc. (3) and M.Sc. (4) degrees under her guidance, many of whom are occupying important positions in academia and industry in India and abroad. Many of them have developed their own research schools on Natural Products and synthetic Organic Chemistry and are playing key-roles in the development of this area in India and abroad, in colleges, research institutions, universities, industries and policy-making bodies.

Alkaloids

Professor (Mrs.) Chatterjee is well known for her research on the chemistry of indole alkaloids, a field in which she evinced keen interest since the beginning of her research career in 1938, when she started work on the chemical investigation of the alkaloids of ***Rauwolfia canescens***. Her interest in this field received further impetus while working with Professor Paul Karrer, N.L., at Zürich University (1949-1950) on the investigation of corynantheine and related compounds. On her return to India she extended her investigations to different *Rauwolfia* species and also to other genera of *Apocynaceae*. Her work on *Rauwolfia* species

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brought her into close association with Late Professor Dr. Salimuzzaman Siddiqui, F.R.S., former Director of Husein Ebrahim Jamal Post Graduate Institute of Chemistry, University of Karachi, Pakistan. For her contribution on *Rauwolfia* species she was invited to write two reviews: "Rauwolfia alkaloids – A. Chatterjee, *Zechmeister's Fortschritte der Chemie Organischer Naturstoffe*, **10**, 382 (1953)", and "Recent development in the Chemistry and Pharmacology of Rauwolfia alkaloids – A. Chatterjee, S. C. Pakrashi and G. Werner, *Zechmeister's Fortschritte der Chemie Organischer Naturstoffe*, **13**, 346 (1956)". Her pioneering work on the alkaloids of *Rauwolfia, Vinca, Alstonia, Rhazya* and *Kopsia* made immense impact on the researches that followed in the field of indole alkaloids both in India and abroad. Professor Chatterjee and her associates have investigated the chemistry of almost all the principal types of indole alkaloids. This included, in addition to several bis-indoles of novel structures, monomeric C_{19}-C_{20} indolic bases of the *corynantheinoid, yohimbinoid, heteroyohimbinoid, strychnos, sarpagine-ajmaline, vobasine, picraline* and *aspidosperma* types. Among her earlier work in this area mention may be made of her studies on the structure and stereochemistry of rauwolscine, the major alkaloid of *Rauwolfia canescens*. This work not only revealed the occurrence of yohimbinoid bases in *Rauwolfia* species, but also helped to elucidate the structure of other related alkaloids of the genus *Rauwolfia*. She also made notable contributions to the elucidation of the structures of ajmaline and sarpagine. The correct stereo- configuration of the latter was first suggested by her group. Her later work on *Rauwolfia reflexa* revealed the presence of a novel dimeric bis- indole alkaloid, flexicorine, in addition to other indole alkaloids of new structural patterns.

One of the most fruitful areas of her research had also been the investigation of various *Alstonia* species. More than twenty new alkaloids had been isolated from *Alstonia species*. Extensive studies on echitamine, a quaternary alkaloid of *Alstonia scholaris*, established the presence of a pyrrolidino-indoline moiety in the compound. Another challenging problem had been the structure elucidation of nareline, isolated from the same plant. It possessed a new skeletal pattern (indolo-2-aza-adamantane) and was biogenetically derived from the picraline-type bases. It featured a modified E-ring with a C_5-C_{12} rather than the usual N_4-C_5 bond. The exocyclic C_5 was present as an aldehyde group which formed a cyclic hemiacetal with a hydroxyl attached to N_4.

The work on *Alstonia macrophylla* was highlighted by the investigations on the chemistry of the dimeric alkaloids villalstonine, macralstonine and the structure of the monomeric O-benzoyl-vincamajine.

Her research on *Rhazya stricta* was widely acclaimed. This involved the structural studies on aspidospermine (rhazidine), sarpagine (rhazine), picraline (strictamine and rhazinaline) and tetrahydro-β-carboline (rhazinine) types. The isolation of the novel alkaloid rhazinilam from the same source was made from her laboratory.

Professor (Mrs.) Chatterjee made extensive investigations on the alkaloids of *Voacanga grandifolia*. This resulted in the isolation and structure elucidation of the bis-indole alkaloid grandifoline and a number of its congeners. The structure of grandifoline was established and was shown to possess an isovobtusine stereochemistry at the spiro-carbon, C_{14}, and an oxide bridge flanked by $C_{2'}$ and $C_{3'}$.

In connection with her work on indole alkaloids Professor (Mrs.) Chatterjee published a number of papers dealing with their biogenesis. A notable contribution in this connection was the isolation and characterisation of geissoschizine, a key precursor in the biogenesis of indole alkaloids, from *Rhazya stricta*. Another interesting observation made on *Alstonia venenata* and *Vinca major* was the isolation of venoterpine, a monoterpenoid pyridine base, whose co-occurrence with C_{19}-C_{20} indole alkaloids provided evidence in favour of the currently accepted biogenetic theory.

Professor (Mrs.) Chatterjee made significant contributions on mechanistic, stereochemical and transformation studies of a number of indole alkaloids. These included conversion of yohimbinoid alkaloids to their 3,4-secoderivatives, studies on the stereochemical course of ketone reduction in yohimbone and rauwolscine with different reagents, conformational analysis of various yohimbine isomers and novel chemical transformations of ajmaline and ajmalicine.

Synthetic studies were carried out on a number of complex indole, quinoline and isoquinoline alkaloids through novel routes. A simplified and novel procedure for the synthesis of β-phenylethanol amines in connection with alkaloid synthesis was developed by her. Synthesis of alkaloids under physiological conditions was also carried out. The syntheses of calycotomine, pseudocodanine and pseudolaudanine deserve special mention.

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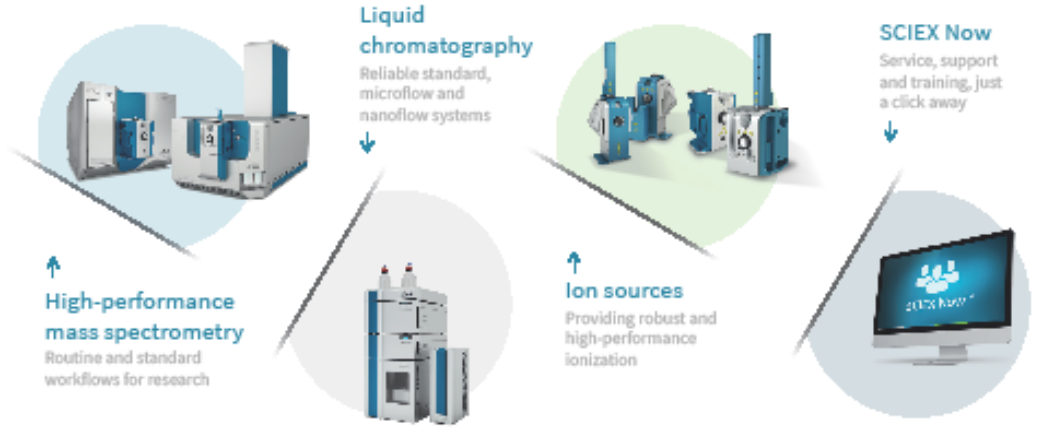

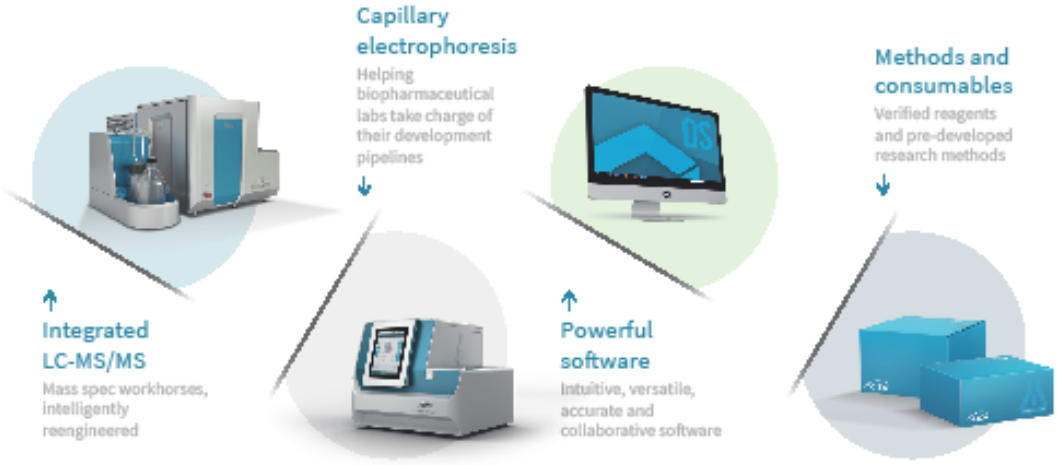

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Professor (Mrs.) Chatterjee also studied other groups of alkaloids. She made significant contributions to

the chemistry and synthesis of steroidal alkaloids, particularly on the new and interesting 5α-pregnane derivatives from *Apocynaceae* and *Buxaceae*. The structure of kashmirine, isolated from *Fritillaria roylei* (*Liliaceae*), having a C-nor-D-homo steroidal skeleton bearing a *cis* D/E ring juncture was hitherto unknown in this type of steroid alkaloids. In addition, more than half a dozen steroidal alkaloids had been isolated from *Sarcococca pruniformis* of which the structure and stereochemistry of saracocine, saracodine and saracodinine all bearing the 5α-pregnane skeleton had been established. The novel synthesis of several isoquinoline and indole alkaloids using **"diazoketone intermediates"** was developed by her. Synthetic chemists who had been frequently using the "diazoketone intermediates" for the synthesis of terpenoids were surprised at this elegant application of what they considered as their reagent. Of the several alkaloids synthesised by her using this intermediate, mention may be made of a few, (±)-2,3-dimethoxy berbine, (±)-norcoralydine, (±)-demethoxy carbonyl dihydrogambirtanine, (±)-17-methoxy- hexadehydroyohimbane, (±)-rauwolscine and (±)-2,3-dimethoxyhexahydroberbine. The concise synthesis of the DNA-Intercalating and antimalarial alkaloid, Cryptolepine deserves special mention. The key step in this synthesis involved the aqueous-phase base-catalysed condensation of isatin and 1-acetyl-IH-indol-3-yl acetate which was simplified and expedited by dielectric heating. The method transforms the synthesis of an important drug molecule from a prohibitively lengthy process to a matter of a few minutes with a much-improved yield.

Terpenoids

Professor Chatterjee's contributions in the field of terpenoids once again reflected her varied interest in other groups of Natural Products. More than a dozen plant species were thoroughly examined of which studies on the plants *Aphanamixis polystacha, Walsura tabulata* and *Cedrela toona* (all *Meliaceae*), *Zanthoxylum rhetsa* (*Rutaceae*), *Artemisia vulgaris* (*Compositae*), *Croton caudatus* (*Euphorbiaceae*) and *Callicarpa macrophylla* (*Verbenaceae*) deserve special mention. She made significant contributions on the transformation of terpenoids. Her novel work on the correlation of terpenoids of different skeleta through Lewis acid catalysed rearrangements led to a better understanding of their structural relationships. The partial synthesis of triterpenoids from readily available natural substrates through novel rearrangements once again reflected her deep understanding of mechanistic organic chemistry.

Coumarins

Coumarins are yet another group of Natural Products which bear the imprint of her outstanding contributions. A significant number of new coumarins of biogenetic interest and bearing interesting substitution patterns were isolated by her research group from Indian medicinal plants belonging to the families *Rutaceae, Umbelliferae, Compositae, Euphorbiaceae* and *Thymelacaceae*. Her research in this field began with the elucidation of the structure of luvangetin, isolated from ***Luvanga scandens***, in 1940. It was first observed by her that γ,γ-methylallyl ethers of hydroxycoumarins when subjected to the conditions of Claisen rearrangement suffered degradation to phenolic coumarins and isoprene instead of undergoing any molecular rearrangement. She had made extensive studies on the action of Lewis acids on prenylated coumarins using natural products as substrates. This resulted, not only in the synthesis of coumarins already isolated from nature, but also in the discovery of new and interesting reactions and rearrangements. In fact, several natural coumarins bearing unusual types of functionalised isopentenyl side chains could be synthesised in the course of these studies. She also developed new synthetic routes to other coumarin systems, an example being the 4-phenyl coumarins, dalbergin and nor-dalbergin.

Mechanistic and synthetic studies

Mechanistic and synthetic studies also constituted another important area of her research activity. The mechanism of the acid-catalysed hydramine fission of β-phenylethanol amines had been thoroughly investigated by her research group. It was observed for the first time during these studies that the substituents on the aromatic rings played an important role in determining the nature of the products formed and steering the course of the reaction. She introduced the use of periodic acid as a reagent for the detection and location of terminal and exocyclic double bonds in organic compounds and was the first to show that this method was a good alternative to ozonolysis.

Professor Chatterjee made outstanding contributions to the chemistry of indoles. Her studies on the reactivity of the indole and substituted indole nuclei towards various electrophiles for two decades resulted in the discovery of new and novel reactions, correction of complex structures of products reported earlier in

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the literature and discovery of newer facets of the Plancher Rearrangement. Her studies have opened up a New Chapter in Indole Chemistry.

Development of Drug Formulations based on Indigenous Medicinal Plants

Professor Chatterjee's interest on plant products occurring in Phanerogam was also extended to lower lants, particularly Cryptogam. From *Marsilea minuta* (water fern) the sedative and anticonvulsant drug, marsilin, was isolated and its structure established. The pharmacological activity of marsilin had been established through decades of research and clinical trials at the **Bon Hooghly Hospital for Crippled Children** in collaboration with her doctor brother, Late Professor Sarashi Ranjan Mukherjee, M.B., M.S., Ph.D. (a Bhatnagar Awardee in Medical Sciences), former Director of Seth Sukhlal Karnani Memorial Hospital (S.S.K.M.; formerly known as Presidency General Hospital), Kolkata, and former Professor and **Founder-Directo**r, Department of Experimental and Nuclear Medicine, Post-Graduate Institute of Medical Education and Research (PGIMR), S.S.K.M. Hospital. Marsilin has been found to be effective in the treatment of epilepsy and in curing behavioural epileptic disorders. It is now being used as a highly successful rehabilitation drug in combination with *Nardostachys jatamansi* under the code-name Ayush 56 (patented in1976). The anti-malarial drug, coded Ayush 64, is yet another successful drug developed by Professor (Mrs.) Chatterjee (patented in 1979). This is a combination of different parts of four plants Chirata (*Swertia chirayata)*, Chhatim/ Saptaparni (*Alstonia scholaris)*, Kuberakshi (*Caesalpinia indica*), Katuka (*Picrorhiza kurroa)*. Both these *combination-drugs* have been patented by the CCRAS (under Ministry of Health and Family Welfare), Government of India. The discoveries of these two *combination-drugs* are landmarks in developing ***"alternate lines of treatment"*** leaving no side effects. Since the beginning of her teaching and research profession she had dreamt of establishing an Institute for carrying out research on Indian Medicinal Plants, developing new Ayurvedic formulations and of building an Ayurvedic hospital for the people of West Bengal. She took the initiative to establish a multi-disciplinary Research Institute at Bidhannagar. This was the Regional Research Institute (Ay), now upgraded to the Central Ayurveda Research Institute under the direct administration of the recently formed Ministry of Ayush, Government of India. Professor Chatterjee served as Honorary Principal Coordinator for many years. This Institute has in addition to the Ayurvedic Hospital, a Pharmacy for producing drug formulations, and sections for carrying out research on Chemistry, Pharmacognosy and Botany, Biochemistry and Pharmacology of drugs derived from Indian Medicinal Plants. Ayurvedic formulations are developed and clinical trials are systematically carried out and the drugs are sent to different parts of India. With support from the Ministry of Ayush, extensive expansion of facilities are being made, and a new 8-storey building has been constructed. She obtained land in Sector V CN 4 Block, Salt Lake City, free of cost. Professor Chatterjee obtained the building grand from the Ministry of Health and Family Welfare, Government of India. This unique Centre-State collaboration gave birth to the Regional Research Institute, now known as the Central Research Institute on Ayurveda under the direct administration of Ministry of Ayush, Government of India. Earlier different units sanctioned by ICMR, Government of India were in different departments of Calcutta University, the Chemistry Unit under Late Professor (Mrs.) Asima Chatterjee, Department of Chemistry, the Department of Pharmacognosy in the Department of Botany under Late Professor S. M. Sarkar and later under Late Professor A. K. Sarma and the Department of Pharmacology in the Department of Pharmacognosy under Late Professor S. R. Dasgupta. These were quasi- permanent units. The hospital was later established at 14, Jagannath Dutta Lane in a part of the Lakshmi Villas House along with the Pharmacy Unit under Late Dr. G. D. Mukherjee as Officer- in-Charge. Professor Mrs. Asima Chatterjee brought all these Units under one roof in the newly constructed Regional Research Institute (Ay) at Salt Lake City. Now these permanent units became the various department.

Author and Editor of Books

At the request of Late Professor Satyendra Nath Bose, F.R.S., she wrote in Bengali *Madhyamic Rasayan Vidya*, a book on Chemistry in two volumes for secondary school students, published by *Bangiya Bijnan Parishad*, an Institute for the Popularisation of Science founded by the renowned scientist himself. She had edited and rewritten *Bharater Bonousadhi*, a treatise in Bengali on Indian Medicinal Plants in six volumes (Volumes 1-5; 1973; Volume 6; 1977) (originally compiled by Late Dr. K.P. Biswas in 2 volumes) and

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published by Calcutta University. As an author/ principal-editor she has compiled in English ***The Treatise on Indian Medicinal Plants*** published in six volumes earlier by Publication and Information Directorate, C.S.I.R., then by National Institute of Science Communication, C.S.I.R. and later by the National Institute of Science Communication and Information Resources, C.S.I.R. – (Volume 1 – First Edition : 1991; Reprinted : 1994, 1997; Revised and Updated Edition : 2005; Volume 2 – First Edition : 1992; Reprinted 1995; Revised and Updated Edition : 2006; Volume 3 – First Edition : 1994; Reprinted : 2003; Revised : 2006; Volume 4 – First Edition : 1995; Reprinted : 2003; Volume 5 – First Edition : 1997; Reprinted : 2003; Volume 6 – First Edition : 2001).

Popularisation of Science

She was also deeply involved in the Popularisation of Science through Bengali language. She was closely associated with Professor Satyendranath Bose, FRS, who established the *Bangiya Bijnan Parishad*. On the demise of Professor Bose in 1974, Professor Chatterjee took up the helm of the Parishad as its second President. She helped in the construction of the building of the Parishad and also obtained funds from the West Bengal Government for Experimental Science – the *'Hatey Kalamey' Bibhag.* She was active for the education and upliftment of women and was the President of the *'Nari Siksha Mandir'* school.

Awards and Honours

Professor Chatterjee was elected a Fellow of the National Institute of Sciences of India (now known as Indian National Science Academy) (1960), was awarded the Shanti Swarup Bhatnagar Award, CSIR (India) (1961), Sir P. C. Ray Award of the Indian Chemical Society (1974), elected General President of the 62nd Session of the Indian Science Congress, New Delhi (1975), elected "Woman of the Year" by the Ladies Study Circle, Chamber of Commerce (1974) in International Women's Year, received ~~the~~ D.Sc. Degree (honoris causa): University of Burdwan (1976), Benaras Hindu University (1982), University of Kalyani (1999), the Vidyasagar University (2006), honoured with "Padma Bhusan" by the Government of India (1975), received the Bhuban Mohini Das Gold Medal, by the University of Calcutta, for the best contribution in Bengali for compiling in six volumes "Bharater Banausadhi" (1981), was nominated by the President of India as a Member of Parliament (Rajya Sabha) as a Scientist- Academician (February 1982-84; May 1984 - May 1990), was Leader of the Indian Delegation to the VIIth Indo-Soviet Symposium on Natural Products (1983), received the Sisirkumar Mitra Lectureship of the Indian National Science Academy (1984; lecture delivered in 1985), received Sir C. V. Raman Award of the Hari Om Ashram Trust by the University Grants Commission (1982, awarded in 1985), Professor P.K. Bose Award of the Indian Chemical Society (1988; lecture delivered in 1991), was honoured by the Indian Science Congress in the Platinum Jubilee Celebration, Pune (1988), received Sir Asutosh Mukherjee Memorial Gold Medal, the most prestigious award of the Indian Science Congress Association (1989), the first Goyal Prize and Gold Medal in Chemical Sciences of the Goyal Foundation, University of Kurukshetra (1992), the Dr. G.P. Chatterjee Lectureship of the Indian Science Congress Association (1994), the Indira Gandhi Priyadarshini Award of the All India Unit Conference (1994), the Silver Jubilee Award of the Central Council for Research in Ayurveda and Siddha, Government of India (1995), the Eminent Teacher Award by the University of Calcutta (1997), the Rathindra Award of Visva-Bharati (1997), honoured by the West Bengal Academy of Science and Technology and awarded the Academy Medal (1998), awarded the special title "Bijnan Bharati" on the 175th Anniversary of the Sanskrit College, Kolkata (1999), honoured by the Indian Chemical Society in the Platinum Jubilee Celebration in recognition of her life-time achievements in Promoting the Standard of Organic Chemistry Research in India (1999), received Sir Devaprasad Sarbadhikary Gold Medal, the most prestigious award of the University of Calcutta (1999) for her Contributions to Science and the P. C. Chandra Purashkar of the P. C. Chandra Group for her contributions to Science (2001). A week before she slipped into coma, the then Mayor of Kolkata, Hon'ble Shri Bikash Ranjan Bhattacharyya, visited her at her residence and conferred on her the award of "HONOURED" citizen of Kolkata (2006).

A Person to be Remembered

Her rise to her present eminence had been possible due to her sincere devotion to duty, hard work and unquenched thirst for knowledge. She had been learning throughout her life and she never hesitated to learn even from her students. A true "Karma Yogi" as she was, she believed in carrying out her duties and her responsibilities without aspiring for the results and rewards. She was passionately devoted to the ideals of Shri Ramakrishna and Holy Mother Sarada and had ardent faith in the philosophy of Swami Vivekananda. It was possibly this *selfless devotion* which refrained her from accepting any royalties for the development of drugs, for books written or for

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accepting fees from Bengal Chemical and Pharmaceutical Works Ltd., Kolkata, for the still "well-known legal battle" of 1968 at the Calcutta High Court.

Her life was and will always remain as a unique example of commitment and harmony between the professional and her private life. By her grace, she had made herself adorable to all her students and acquaintances. Professor Chatterjee was a very good human being steeped in Indian Culture. She inspired and encouraged a legion of students in the active pursuit of teaching and research. She nurtured a well-recognized School of Chemistry of Natural Products. Her record of achievements, her idealism, devoted commitment to the teaching vocation and total dedication to work were exemplary and had added lustre to the glorious heritage of the University of Calcutta, the pioneer and great seat of learning. Her simplicity and affability, warmth and boundless love had won her a permanent place in the hearts of those who ever came in contact with her. Her students reverentially called her "Master" (teacher), her younger contemporaries "Didi" (elder sister) and others "Ma" (mother). Late Dr. Madhuri R. Shah, Former Chairman, University Grants Commission, in one of her letters to Professor Chatterjee's daughter wrote "Her selfless devotion inspires and gives strength to people like me and renews my faith and the goodness of human nature".

Professor Asima Chatterjee Foundation, Kolkata

The genesis of the Professor Asima Chatterjee Foundation goes back to 1997, when a Committee was formed for the observance of her 80th Birthday in September 1997. A three-day Conference was organised at Science City in which participants came from Academia, Industry, and Public Life. Professor Chatterjee was also felicitated at the Science College campus, in the Meghnad Saha auditorium later in the same month in a function organised by the Chemistry Department, Calcutta University. This Committee, with Dr. S. C. Pakrashi as President, continued its activities after 1997.

After the sad demise of Professor Chatterjee in 2006, the students and admirers of Professor Chatterjee gave shape to this Committee as a registered Foundation – the Professor Asima Chatterjee Foundation, Kolkata was established with a view to perpetuate her memory and to inspire future generations for the upliftment of the status of chemical research and education in India. Dr. Pakrashi was the first President of PACFK, with Prof. Biswapati Mukherjee as its Honorary Secretary.

From 2015, the PACFK has been arranging the Professor Asima Chatterjee Oration Lecture on her Birth Anniversary on or about 23rd September. Eleven Oration lectures have been given till 2024 by Dr. A. V. Rama Rao, Professor Goverdhan Mehta, Dr. Ganesh Pandey, Dr. K. N. Ganesh, Professor Tushar Chakrabarty, Professor J.S. Yadav, Professor C. S. Mathela, Professor Shital Chattopadhyay, Professor Uday Maitra, Professor Amitava Das and Professor Nitin Patil. The Foundation organised two **International Conferences on Chemistry for Human Development** (**ICCHD**) with the collaboration of The University of Calcutta and Heritage Foundation in January 2018, and January 2020 at the premises of the Heritage Institute of Technology, Kolkata. Due to the COVID pandemic, the third **International Conferences on Chemistry for Human Development** (**ICCHD2025)** was held in January 2025 at the Science College premises, 92 Acharya Prafulla Chandra Road, with the collaboration of The University of Calcutta and Biswas Bangla BiswasBidyalala. Many famous scientists drawn from Academia and Industry in India, and several Asian, European and American countries participated in the three Conferences

Recent Accolades

It would be relevant to mention certain other accolades given to Professor Chatterjee in recent years.

On 23rd September 2017, Google celebrated her 100th birthday with a special doodle tribute to her. On 8th November 2017, India Post issued a commemorative postage stamp; the India Post write-up accompanying the release of this stamp was as follows: Asima Chatterjee was an Indian chemist noted for her work in the fields of organic chemistry and phytomedicine. She is the first Indian woman to be awarded a D.Sc. for science for her work in medicinal chemistry. The Government of India announced the creation of eleven chairs in the names of Indian Women scientists in February 2020 - Professor Asima Chatterjee's name figured among these illustrious names.

In a book brought out by Vigyan Prasar entitled 'Indian Scientists: The Saga of Inspired Minds" a Chapter has been devoted to her. A plenary Session entitled 'Investigations of Indian Medicinal Plants - *A Post-Centenary Tribute to Professor (Mrs.) Asima Chatterjee* - was organised at the 107th Session of the Indian Science Congress Association at Bangalore in 2020. In recent years the Asiatic Society, Lady Brabourne College, Scottish Church College, IIT – Indore and WIEE have organised Seminars and lectures on the life and work of Professor Chatterjee. The Indian Chemical Society organised an on-line Session on Professor Chatterjee at their Annual Convention in 2021. Many members of the Professor Asima Chatterjee Foundation delivered lectures in various Symposia and National Institutes highlighting her life and research contributions. Very recently, information was received that

an Auditorium at DST Headquarters and also at IISER, Kolkata have been named after her.

The Science City Museum has done a course correction to rectify a gender bias at Science Centres across the country by showcasing ten remarkable women scientists, whose achievements are no less than their illustrious male counterparts who have been in the spotlight thus far. The National Council of Science Museums (NCSM) that manages all the Science Centres in the country unveiled busts of 10 Pioneering women scientists - Kadambini Ganguly (Medicine), Bibha Chaudhuri (Physicist), Asima Chatterjee and Darshan Ranganathan (Chemists), Janaki Ammal (Botanist), Irawati Karve (Sociologist and Anthropologist), Kamal Jayasingh (Biomedical Research), Anna Marie (Physicist and Meteorologist), Rajeswari Chatterjee (Engineer) and Archana Sharma (Botanist) at Science City during the International Museum Expo in May, 2024. The Birla Industrial and Technology Museum (under the National Council of Science Museums) honoured these ten scientists by installing their busts in December 2024. In addition, Professor Chatterjee's Early Life and Education, Family Background, Professional Career, Notable Scientific Contributions, Important Research Publications, Awards and Honours, Establishment of Central Ayurveda Research Institute and Hospital at Bidhannagar with pictorial illustrations have been installed in the Video gallery along with several other scientists in December, 2024 – this was formally opened by the Governor of West Bengal, His Excellency C. V. Ananda Bose in December 2nd 2024.

A Tribute to Professor (Mrs.) Asima Chatterjee

Professor Chatterjee as a teacher

Professor Asima Chatterjee as a teacher from some of her former Ph.D. Students and Research Associates, Late Professor S. N. Ghosal, Former Professor of Pharmaceutics, Benaras Hindu University, Late Professor P. L. Majumdar, Former Professor of Chemistry, Calcutta University, Dr. S. Chandra Sekharan, Professro Arup Siddhanta and Dr. Ashoke Banerjee have

As a token of love, respect and gratitude to their teacher her three Ph.D. students, Prof. Shibnath Ghosal, Prof. Bhupesh Chandra das and Prof. Narayan Aditya Chowdhury, offered their "Guru Dakshina" in the form of the title 'MASTER', a name by which Prof. (Mrs.) Asima Chatterjee is addressed even today (more than nineteen years after she passed away on November 22nd, 2006).

By, Professor Dr S. N. Ghosal and Professor Dr P. L. Majumdar,

Professor (Mrs.) Asima Chatterjee, a great master of teaching and research in Organic Chemistry in India, is well known for her contribution in the academic and cultural advancement of the nation. With her profound faith in God, single devotion to duty, unique determination, charming personality, and above all, tremendous self-confidence coupled with uncommon dynamism, she appeared on the horizon of Indian Science and started dominating the field of Chemistry of Natural products since the early fifties. She is now recognised as one of the outstanding Organic Chemists and undoubtedly the greatest among the contemporary women scientists of our country "From the Forward in the Sixtieth Birth Celebration Souvenir, 1977, written jointly by Professor Shibnath Ghosal and Professor Priyalal Majumdar.

(Late) Professor Priya Lal Majumder. MSc Calcutta University - 1960. PhD with Professor (Mrs.) Asima Chatterjee in 1966. Joined Chemistry Department, University of Calcutta in 1968. Became Reader then Professor in this Department. Worked with Dr. G. F. Smith, Manchester University; visits abroad on UNESCO Fellowship. Prolific work on Indole Alkaloids and Polyphenolics. Honorary Secretary – Indian Chemical Society; Director – Academic Staff College, University of Calcutta.

(Late) Professor Sib Nath Ghosal. MSc Calcutta University - 1956. PhD with Professor (Mrs.) Asima Chatterjee in 1960. Post-doctoral work in USA. Lecturer, Kalyani University Chemistry Department; then joined as Reader in Pharmaceutics, Benares Hindu University, then promoted Professor. Carried out prolific work on Natural Products and Biomedical Chemistry. Developed strong links with Industry. Has more than 20 patents. Served as Consultant to Natreon Ltd. for several years.

By, Dr. S. Chandra Sekharan

I recall the days nearly six decades ago when I enrolled myself as a student of PG science in chemistry in 1962. Professor Mrs Asima Chatterjee was one of the teachers among those who taught us organic chemistry at that time. How can we forget those precious days! Her lectures in the MSc classes were very inspiring and always kept her students engaged. Her teachings were unique and her class notes were beyond text books. In those times when text books were very expensive, her special "black board notes" were very useful. We had just to attend her classes and dedicatedly take notes of what she taught. "Master", as we affectionately called her was Peter Sykes, Jerry March, Finar, Fieser, Manske, Gould and Burger all by herself.

The greatest learnings from her teachings were Dedication, Devotion, Commitment and Discipline without which she would often say one cannot become a good Teacher or a Scientist. Almost all her students were well placed in their lives and career!

As a Researcher, it was my good fortune that I got accommodated in her research lab in 1965 and could spend my next precious 8 years in her laboratory, famously called Room #48. I got the basic foundation in Natural Products Chemistry while working in that laboratory. The Saturday weekly seminars brought all her students together to discuss various topics. Every student had to give a talk on topics assigned to him/her. That was a great significant experience.

Dr. S. Chandra Sekharan – MSc 1964; worked in Professor Chatterjee's laboratory for his PhD {registered with Prof. Tarakeswar Chakraborty}, and then post-doctoral work in an ICMR/CCRIMH scheme. After 1973, he worked in Captain Srinivasmurty Research Institute (CCRIMH), Amrutanjan Ltd, Kancor Flavours and Extracts, Procter and Gamble, and Katra Phytochem Pvt. Ltd.

By, Professor Arup K Siddhanta

I was fortunate to have been taught by Professor Asima Chatterjee during 1973-1975 in the MSc classes in the Chemistry Department of Calcutta University. After post-graduation I had joined her laboratory in the Science College, 92 APC Road for doing PhD research. I worked under her direct supervision for several months. Thereafter, I joined the research group of Professor Avijit Banerji with whom I did my PhD. I was privileged to get trained initially in Professor Asima Chatterjee's lab and to have received her blessings. For the first time ever in my life I met an astute professional that she was. Professor Asima Chatterjee initiated me into the world of R&D as well as that of critical thinking. Besides her scientific acumen and wisdom, I still fondly remember her motherly affection and care with which she nurtured all her students. She was an institution by herself. It is a rare opportunity for me to offer a humble tribute to her.

Professor Asima Chatterjee – Reminiscences

I have tried to capture the illustrious personality of Professor Asima Chatterjee in my tribute in terms of a few attributes viewed through my own reminiscences.

1. Inspirational teacher: Professor Asima Chatterjee was an inspirational teacher. She would take two classes in a row, after saying if you do not like to be in the class, you are free to go away. Do not worry about the attendance percentage. She would go on teaching, touching up all possible details of the subject/topic with latest information, answering all questions that anyone would ask. She, I thought once, actually taught us how to teach, besides the subject. I remembered it while planning my lessons and teaching in the AcSIR classes at CSIR-CSMCRI where I taught Research Methodology, Values and Ethics and Marine Natural Products Chemistry. I at times felt so well equipped remembering her!

2. Devoted researcher: Master, as we used to call her, was a devoted researcher and we all know was a great achiever. Her valuable contributions to different fields of Natural Products Chemistry are well known - alkaloids, terpenoids, coumarins, glycosides, carotenoids to name a few. Professor Chatterjee developed the antiepileptic drug Ayush-56, from Marsilia minuta and Nardostachys jatamansi; and the antimalarial, Ayush-64, a combination of four herbs (Alstonia scholaris, Swertia chirata, Picrorphiza kurroa and Ceasalpinna crista), were patented by the Central Council of Research in Ayurveda and Siddha (CCRAS), Union Ministry of Health, Government of India. The drugs have been marketed. She wrote and edited several books and monographs. She was eminently recognized for her scholarly achievements including the prestigious Fellow of the National Academy, Shanti Swarup Bhatnagar Award, Membership of the Rajya Sabha and the Padma Bhusan Award. Professor Chatterjee has left behind distinguished foot prints in the public domain for research information. We knew that we were working in one of the best research groups in the country at that time.

3. Strict disciplinarian: Discipline for one was the first thing that I had learnt in her lab in my early days there. We used to remain glued to our work benches all the while. Someday one would cheer, boys just relax – Master has Senate Meeting today, she would be coming late in the evening. That would follow a big meeting in the Canteen! Once I was absent on a Monday since I was not well. Those days there was no telephone facility at the place in the suburb where I was living. I could not inform. On Tuesday, first thing in the morning she called me in and told me tersely – I do not allow taking French leaves here. I explained the reasons of my absence to her. She was listening to me silently lowering her head on a piece of paper! She said to me you may go now. I remember that I got the message.

4. Forthright and frank: Right after I had joined her laboratory in the autumn of 1975 one day she asked me what subject I would like to work on. I had at that time very little idea about the kind of research that was going

on there. I was surprised as well as impressed for the reason that she spoke to me in a way contrary to the prevailing perception then. I answered to her - drug related work. She asked me - which drug? I replied – no idea! She asked me then to give a presentation in the next group seminar on thyroid drugs. With a great difficulty, with her guidance I prepared on an absolutely uncharted topic for me. I gave the presentation. She was pleased. I kept wondering how she could sense that I might have some thoughts on my choice for work! I had a déjà vu feeling when I was asked by the Director CSIR-CSMCRI in 1990 to take the responsibility of the MoES National Project on Drugs from the Sea project at the institute level.

5. Efficient format for HRD: After I had joined her lab, I went to her seeking an assignment for research. She told me - go and work with Ashoke – Dr Ashoke Banerjee. He was a senior researcher in the lab. Ashokeda trained me on the research practices of the lab and I was helping him in his research work, alongside he mentored me. I realized that I was in the right track. After sometime Master called me in and gave me a measure of roots of a Vinca plant and asked me to prepare extract and analyze. Subsequently, I could isolate a crystalline solid alkaloid in good yield from the plant material. I started feeling confident in the lab. She used to teach us how to make an effective presentation, while speaking where to give stress on and how to compose good photo slides. She would also ask us to draft letters for her, prepare her class lectures or a write up for her to use.

She would ask students to draft a research paper which she would correct before communicating to a Journal. We schooled ourselves on the preparation of PhD theses of our seniors and colleagues, which taught us a lot on writing, editing as well as on publication process management. We used to have group meetings in her presence at regular intervals on Saturdays to review the progress of research work in the lab – student wise. Hers was truly a one of total quality management! I have used this format in my laboratory in Bhavnagar for my students very successfully. Two of my PhD students became senior scientist colleagues in the Natural Products and Green Chemistry Division, who have their own research groups. Several other PhD students are in leadership positions in different organizations. I recon this is the domino effect of Master's teachings and leadership.

6. Sense of ownership: Master had a great sense of ownership and commitment. These are the values I imbibed while working in her lab. I did not get fellowship amount for the first three months. I did not know what to do. Having advised by the seniors in the lab I informed Master. She was surprised. The next day she went to the pro-VC's office, got the necessary approval, while I waited outside the office there. I received the cheque for three months' stipend amount the day after, which was the first ever earning of my life! During my PhD research, when Avijit-da, Professor Avijit Banerji – my PhD supervisor, would be out of town for a while, she would come to the lab at times to enquire with me about the goings on of research work. I never felt having been unattended. After I had returned from the USA, she blessed me with valuable advices before I moved on to join CSIR-CSMCRI at Bhavnagar as a CSIR Pool Officer in 1986. Her blessings have been my precious asset and motivation in my life's onward journey.

7. Working in the lab: Sometimes she would work in the lab with one of the students. In those early days of mine once she asked me to prepare a hydrochloride derivative of a pure sample of an alkaloid. The method was given. I got on with the job and prepared the hydrochloride derivative – towards the end of the experiment she came in to see how I was doing. She started asking questions on the color of the product and all, I was frightened and confused and could not give answers satisfactorily. She was upset with me and started scolding, which made me all the more nervous. Right then Julie-di, Professor Julie Banerji, came to my rescue! I still remember the day with mixed sentiments of frustration, awe and wonder. After that event I had reviewed the situation realizing that I could not handle her curiosities properly and promised myself to do a better job next time – but the opportunity never came.

8. Motherly affection and care: I fondly remember the motherly affection and care that she provided to all of us in the lab. Once we went to the Shibpore Botanical Garden for collecting plant materials. She gave us some amount of cash for spending. When we came back in the evening, the first thing she asked – did you all eat well? I believe this very humane facet of her personality made her an extraordinary teacher, guide, leader and a motivator.

9. Philosophy of life: Once in a sendoff party arranged for one of our senior researchers who was going abroad – she wished him well and concluded saying "whatever you do, always try to have a philosophy of life". I could not quite understand what she had meant. Subsequently, I forgot about it. A few years later, I heard then British Prime Minister Mrs. Margaret Thatcher quote the following poem by Ella W Wilcox on a TV interview in a certain context….

Ship sails east, ship sails west
With the selfsame winds that blow.

Tis the set of the sails
And not the gales
Which tells us the way to go.
Like the winds of the seas are the ways of fate,
As we voyage along through the life:
Tis the set of a soul…..
That decides the goal,
And not the calm or the strife.

I respectfully remembered Master's advice and realized what she had meant by "philosophy of life".

Dr. Arup K. Siddhanta MSc (Chemistry) University of Calcutta; Ph.D. 1980 {with Professor Avijit Banerji}. Postdoctoral work (1980-1985) with Professor Brian Capon, Glasgow University; Professor J R Falck, University Texas Health Science Centre at Dallas; Professor David E Thurston, University Texas Austin. Since 1986 at Marine Biotechnology and Ecology Division, CSIR-Central Salt and Marine Chemicals Research Institute (CSMCRI), Bhavnagar, India – from where he superannuated as Chief Scientist (Scientist G) in March 2014. April 2014-March 2019; former Emeritus Scientist CSIR, Professor AcSIR. Research Papers 100; Patents 6; 5 technologies on value added seaweed products transferred to industries.

By, Dr. Ashoke Banerjee

Professor Asima Chatterjee was an outstanding scientist, teacher and a great human being. Her passion for knowledge, her commitment to teaching and her kindness to everyone around her defined her life and work. To those who knew her, she was not only a mentor, but a guiding light and a deeply compassionate human being who touched their lives with grace.

My intention here is not to recount a detailed biography, but to convey the flavour of this extraordinary personality.

Professor Chatterjee's academic brilliance is well known. She won several awards and scholarships as a student, but her achievements become truly profound when viewed against the backdrop of her time.

In 1947, India had barely a 16% literacy rate and female literacy was half of that. With only 26 universities and less than 4 lakh students in higher education nationwide at that time, a woman pursuing advanced scientific research was almost unheard of. Her journey was therefore not just one of talent, but of tremendous determination and courage, supported initially by a progressive family, parents and later on by her husband who also was a renowned scientist. She crossed barriers that very few women even dared to approach then. Understanding this makes her later accomplishments shine with an even brighter, more inspiring light.

My most enduring memories of her are from the classroom. She had a unique way of teaching, beginning from the basics, slowly building the conceptual foundation brick by brick, assuming nothing, and taking nothing for granted.

I vividly remember her first lecture on reaction mechanisms in our M.Sc. course. She began with the simplest question "What is a reaction?", and then led us gently through bonds, orbitals, hybridization, aromaticity, steric effects and finally into the complex world of Indole chemistry. Even today, decades later, I remember those classes with absolute clarity. That itself is her legacy as a teacher.

She constantly updated her lectures with the latest published papers, preparing for hours every morning before the class. The lists of references she circulated daily were our window into the world of modern research. She also had a gift for sparking curiosity, connecting the colours of butterfly wings to pteridines, or simple everyday observations to complex organic structures. Behind the calm authority of her lectures was the rigour of meticulous preparation, a quality that deeply influenced all of us who trained under her. Professor Asima Chatterjee believed wholeheartedly in the role of university-based research, long before global ranking systems emphasized it. About 50 years back, in her Presidential Address at the Indian Science Congress in 1975, she spoke of university research as a true measure of national scientific progress, an idea far ahead of its time.

Her own contributions to natural product chemistry were phenomenal. In those days, carrying out natural product chemistry was not easy. It involved the isolation of small quantities of chemical compounds from plants and other sources and painstakingly purifying the product. There was not much of spectroscopic and instrumental tools available. Reactions and chemical degradation were the main method of structure elucidation. It required

tremendous experimental skill and thorough knowledge of chemistry. Work often involved transformation reactions and synthesis of natural products. Her work does show its profound originality. She carved out a distinct place for herself among the world's top natural product chemists.

Asima Chatterjee had the opportunity to work with some of the best scientists of her time both in India and abroad. She worked with Prof. L M Parks, University of Wisconsin Madison, Prof. L Zechmeister, Caltech and Prof. P Karrer, Nobel Laureate in ETH Zurich. She was not just a scholar or a scientist, but she also had great administrative capability. She was a visionary builder. This is evident from a number of initiatives she undertook for the Chemistry department.

Her leadership brought the UGC Special Assistance Programme (1972), UNESCO–UNDP support (1975–82), fund from UGC for a new chemistry building and most importantly, the foundation of an institute for research on medicinal plants and an Ayurvedic hospital. She was instrumental in arranging land in Salt Lake City, Kolkata from the Government of West Bengal and fund from the Government of India for construction of building. Thus the Regional Research Institute for Ayurveda was born and this was later upgraded to Central Research Institute. Her ability to coordinate between state and central governments and international agencies remains an outstanding example of academic leadership. She was a riveting speaker and a great communicator. I will never forget what a German Professor told us after hearing her lecture at the University of Bochum — how her voice, command of the subject and presence created an "electrifying experience." I also remember the 1975 conference (Chemistry, Biochemistry and Biogenesis of Natural Products held in Science College, Kolkata) where she transformed an aggressive questioning session into an unforgettable three-minute master-class, grounding the entire discussion with authority and grace. This was an example of how she used to steal the thunder in her speech.

Her written communication was also equally compelling. The way she used to gather all the complex topics, ideas, facts and then she used to synthesise and integrate all the points in a very cohesive way with a common theme, was of very high order. She reminded us often that "review writing is not just collecting facts." Her own reviews and books stand testimony to her ability to weave complex ideas into coherent, insightful narratives.

Prof. Chatterjee strongly believed that chemists must engage with industry. She regularly encouraged students to solve industrial problems, many of which she brought directly into the laboratory. The first time we handled an industrial problem was isolating citral from lemongrass oil and this was under her encouragement. These experiences became the bedrock of my later career in the pharmaceutical industry. I often realise that whatever I achieved in industry, I owe to the scientific discipline and clarity that I learned in her laboratory. Years before "safety culture" became a formal concept, she enforced it meticulously in the laboratory. When I joined industry, my safety training felt like a continuation of what I had already learned under her. That grounding has shaped every decision I made in my professional journey. Her greatest legacy is not just her publications or discoveries, but the school of natural product chemistry she built. Generations of students, research associates and young scientists were shaped by her ideas, her discipline and her uncompromising scientific standards. The true measure of her impact lies in the countless students who carry her training into universities, laboratories, industries and classrooms worldwide.

This brings us to the point of her another quality and value system. She was a demanding mentor, but also deeply caring.

I still remember the 1977 staff strike at the University of Calcutta, when she arranged facilities at the Regional Research Institute – CCRIMH, 14 Jagannath Dutta Lane, and told us to begin writing our thesis instead of wasting time. In hindsight, she must have thought through the situation and found out the best possible use of the time for the students. It also showed her uncanny ability to turn every situation into an opportunity for her students.

I have tried to give an account of different aspects of Prof Chatterjee's personality and it is essentially through my eyes. To me, she was not just "Master," as we affectionately called her, but an enduring source of strength, discipline and inspiration. The elegance of her science, the clarity of her thinking, her remarkable courage and her unwavering commitment to her students left an imprint that time cannot erase.

Let me borrow from what Professor G. H. Hardy of the University of Cambridge said about his extraordinarily talented student and a genius, Ramanujan. Professor Hardy wrote, "He told me that an equation for him had no meaning unless it expressed a thought of God". I tend to believe that all the complex products created at the cellular level of the plants are, in a way, expressions of God. We do not create them. They exist and lie in wait for the brightest, indomitable and courageous minds to unravel them. It is to the credit of Professor Asima Chatterjee that she tried to unravel such mystery of nature.

It is not possible to describe her legacy and its impact in a short space. I have no doubt that she left an indelible impression not only on her numerous students but also on contemporary Chemistry. She was a pioneer in many

senses and I consider it a privilege for me to have been her student. It is with deep respect that I offer my homage to her.

Dr Ashoke Banerjee joined Professor Asima Chatterjee's group in 1973. PhD 1977.

Postdoctoral work (1980-1985) with Professor Brian Capon; Glasgow University. Dr Ashoke Banerjee is a leading pharmaceutical scientist and industry leader. He spent several decades with GlaxoSmithKline (GSK), where he held positions of increasing responsibility, culminating in his role as Senior Executive Director on the Board of GSK India. Following his tenure in GSK, his expertise was sought by global and Indian pharmaceutical companies. He served as Advisor and Senior Life Science Specialist to UK Government bodies (UK Trade & Investment and British High Commission in India), and participated in industry initiatives such as the OPPI Global Sourcing Committee.

Books Published

1. *Madhyamik Rasayan Vidya*, (for Secondary School Students) Volumes 1 and 2, Published by Bangiya Bignan Parishad (1960).
2. *Bharater Banausadhi*, Calcutta University (Originally 2 Volumes) by Dr. K. P. Biswas) Re- edited, Revised and Enlarged, Volumes 1-5 (1973), Volume 6 (1977).
3. *Treatise on Indian Medicinal Plants* published in six volumes earlier by Publication and Information Directorate, C.S.I.R., then by National Institute of Science Communication, C.S.I.R. and later by the National Institute of Science Communication and Information Resources, C.S.I.R. – (Volume 1 – First Edition: 1991 ; Reprinted : 1994, 1997; Revised and Updated Edition: 2005; Volume 2 – First Edition: 1992; Reprinted 1995; Revised and Updated Edition: 2006; Volume 3 – First Edition: 1994; Reprinted: 2003; Revised and Updated Edition: 2006; Volume 4 – First Edition: 1995; Reprinted: 2003; Volume 5 – First Edition: 1997; Reprinted: 2003; Volume 6 – First Edition: 2001

Endowment Lectures by Professor (Mrs.) Asima Chatterjee

1. Khudiram Bose Memorial Lecture (1962) – Calcutta University
2. Hiran Kumar Basu Memorial Lecture (1973) – Calcutta University
3. Sir P. C. Ray Memorial Lecture (1974) – Indian Chemical Society
4. Foundation Day Oration (1974)- University College of Science, Calcutta University
5. Ashoke Bikash Bhattacharyya Memorial Lecture (1976) – Calcutta University
6. Manmatha Basu Memorial Lecture (1976) – Calcutta University
7. 40th Acharya Jagadish Chandra Bose Memorial Lecture (1978) – Bose Institute
8. First Professor Harinarayan Khastgir Memorial Lecture (1979) – University of North Bengal
9. Subodh Mitra Memorial Lecture (1980) – Chittaranjan Cancer Research Institute, Kolkata
10. Convocation Address, (1982) – Indian Institute of Technology, Kanpur
11. Professor T. R. Seshadri Memorial Lecture (1983) – Delhi University
12. Convocation Address (1984) – University of North Bengal
13. Shri Santanu Ghosh Memorial Lecture (1987) – Indian Science News Association
14. Professor P. K. Bose Memorial Lecture (1991) – Indian Chemical Society
15. Professor S. K. Mukherjee 65th. Birthday Commemoration Lecture (1993) – Agricultural Society of India
16. Dr. G. P. Chatterjee Award Lecture (1994) – Indian Science Congress Association
17. Fourth Oration Lecture (1997) – West Bengal Academy of Science and Technology

Awards and Honours

1. Elected Fellow of the National Institute of Sciences of India (now known as the Indian National Science Academy) – 1960
2. Shanti Swarup Bhatnagar Award, CSIR (India) – 1961
3. Sir P. C. Ray Award of the Indian Chemical Society – 1974
4. Honoured on the 60th Anniversary of the University College of Science, Calcutta University, Foundation Day – 1974
5. Honoured as Woman of the Year (in connection with the International Womens' Year) by the Ladies Circle, Chamber of Commerce, and received the medal – 1974
6. Elected General President of the 62nd Session of the Indian Science Congress (held at New Delhi) – 1975
7. Fellow of the Indian Science Academy - Bangalore - 1976
8. Received D. Sc. Degree (honoris causa), University of Burdwan – 1976
9. Received D. Sc. Degree (honoris caua), Benaras Hindu University – 1982
10. Received D. Sc. Degree (honoris causa), University of Kalyani – 1999
11. Received D. Sc. Degree (honoris causa), Vidyasagar University – 2006
12. Honoured with Padma Bhusan, Government of India – 1975
13. Subodh Mitra Memorial Oration Medal, Chittaranjan National Cancer Research Centre, Kolkata – 1979
14. Bhuban Mohini Das Gold Medal of the University of Calcutta – 1981
15. Nominated by the President of India as a Member of Parliament (Rajya Sabha) as a Scientist – Academician – February 1982-84; May 1984-90
16. Nominated as leader of the Indian Delegation by the Indian National Science Academy to the VIIth Indo – Soviet Symposium on Natural Products held at Tbilsi (Georgia) – 1983
17. Sisir Kumar Mitra Lectureship of the Indian National Science Academy – 1984
18. Received Sir C. V. Raman Award of the Hari Om Trust of the University Grants Commission for 1982 – 1985
19. Professor P. K. Bose Lectureship and Oration Medal of the Indian Chemical Society – 1988.
20. Honoured by the Indian Science Congress in the Platinum Jubilee Celebration, Pune – 1988
21. Sri Asutosh Mookherjee Gold Medal of the Indian Science Congress Association – 1989
22. First Goyal Prize and Gold Medal in Chemical Sciences of the Goyal Foundation, University of Kurukshetra – 1992
23. Honoured by the Information and Cultural Ministry, Government of West Bengal, for Life Time Achievement during the completion of the Bengali New Year (1400) – 1994
24. Dr. G. P. Chatterjee Lectureship of the Indian Science Congress Association – 1994
25. Indira Gandhi Priyadarshini Award of the All India Unit Conference – 1994
26. Silver Jubilee Award of the Central Council for Research in Ayurveda and Siddha, Government of India – 1995
27. Eminent Teacher Award of the University of Calcutta – 1997
28. Rathindra Purashkar of Visva Bharati – 1997
29. Honoured by the West Bengal Academy of Science and Technology and awarded the Academy Medal – 1998
30. Awarded the Special Title of "Bijnan Bharati" on the 175th Anniversary of the Sanskrit College, Kolkata – 1999
31. Sir Devaprasad Sarbadhikary Gold Medal, University of Calcutta – 1999
32. Honoured by the Indian Chemical Society in the Platinum Jubilee Celebration in Promoting the Standard of Organic Chemistry Research in India – 1999

33. P. C. Chandra Purashkar of the P. C. Chandra Group for Contribution to Science – 2001
34. Honoured Citizen of Calcutta Award by the First Citizen of Calcutta, the then Mayor of Calcutta, Hon'ble Sri Bikash Ranjan Bhattacharyya – 2006

RESEARCH STUDENTS and ASSOCIATES OF PROFESSOR (MRS.) ASIMA CHATTERJEE

Awarded D.Sc. Degree of the University of Calcutta

1. Late Dr. Anil Bhattacharyya 1956
   Former Reader, Department of Chemistry, Calcutta University
2. Late Professor Sukumar Bose 1956
   Former Professor, National Sugar Institute, Kanpur
3. Professor Mrs. Bani Talapatra 1962
   Former Professor and Head, Department of Chemistry, Calcutta University

Students Awarded Ph.D. Degree of the University of Calcutta

1. Late Professor Subhendu Ghosh Majumder 1953
   Former Professor, Department of Chemistry, Burdwan University
2. Late Dr. Satyesh Chandra Pakrashi 1954
   Former INSA Fellow, Department of Pharmacology, University College of Medicine, Calcutta University; Former Director, Indian Institute of Chemical Biology, Kolkata; Former General President, Indian Science Congress Association
3. Late Professor Tarakeswar Chakrabarty 1955
   Former Professor of Chemistry, Presidency College, Kolkata
4. Late Dr. Mrs. Anima Bhattacharyya 1955
   Former Reader, Department of Chemistry, Bethune College, Kolkata
5. Professor Sunil Kumar Talapatra 1957
   Former Professor and Head, Department of Chemistry, Calcutta University; Former President, Indian Chemical Society
6. Late Dr. Sudhir Kumar Srimany 1958
   Former Reader, Department of Chemistry, Bengal Engineering College (IIEST), Howrah
7. Late Dr. Sunil Kumar Ray 1959
   USA
8. Dr. Chandrachur Ghosh 1959
   Former Reader in Chemistry, Bangabasi College, Kolkata
9. Late Professor Narayan Adityachaudhury 1960
   Former Professor, Bidhan Chandra Krishi Viswavidyalaya, Haringhata
10. Late Professor Sibnath Ghosal 1960
    Former Professor of Pharmaceutical Chemistry, Benaras Hindu University, Varanasi
11. Late Dr. Bhupesh Ch. Das 1960
    Former Head, Mass Spectrometry Division, Institute de Chimie des, Subtances Naturelles 91190 GiF-Sur-Yvette, France
12. Late Dr. Sudhir Kumar Saha 1961
    Former Reader, Presidency College, Kolkata
13. Late Dr. Saral Nath Ghosh 1962
    Former Lecturer, Anandamohan College; former Scientist, BCPW, Kolkata
14. Professor Chiraranjan Ghosal 1963
    Former Professor of Chemistry, Jadavpur University, Kolkata
15. Late Professor Santiranjan Bhattacharyya 1964
    Former Professor, Departmental of Chemistry, Presidency College, Kolkata
16. Professor Rabindranath Mukherjee 1964

Formerly of Faculty De Pharmacia, Universidade Federal do Rio Grande do sul, Porto Alegre, RS Brazil

17. Dr. Gouranga Ganguly 1964
USA
18. Late Professor Anil Bandhu Ray 1965
Former Professor, Department of Medicinal Chemistry, Benaras Hindu University, Varanasi
19. Late Professor Chandi Prosad Dutta 1965
Former Professor of Chemistry, Kalyani University, Kalyani, Nadia
20. Late Professor Priyalal Majumdar 1966
Professor of Chemistry, Calcutta University; Honorary Secretary, Indian Chemical Society
21. Dr. (Mrs.) Sabita Dutta 1966
Former Reader, Department of Home Science, Calcutta University
22. Dr. Samar Kumar Kundu 1966
USA
23. Professor Kali Sankar Mukherjee 1966
Former Professor of Chemistry, Visva Bharati, Santiniketan
24. Late Professor Biswapati Mukherjee 1967
Professor and Head, Department of Pharmacology, Calcutta University; Former Director and Professor of S. N. Pradhan Centre for Neuroscience, Calcutta University
25. Late Dr. Mrs. Mandira Banerjee 1968
26. Dr. Mrs. Rekha Majumder 1968
Former Reader in Chemistry, Lady Brabourne College, Kolkata
27 Late Dr. Mrs. Sibani Chakraborty 1968
Former Reader, Department of Home Science, Calcutta University, Kolkata
28. Dr. Sudam Chandra Base 1968
Former CSIR Senior Scientist, Gr. VI, Regional Research Laboratory, Bhubaneswar
29. Late Dr. Amit Baran Kundu 1968
Former Scientist, II, Chemistry, NRIADD under CCRAS, Govt. of India, Kolkata.
30. Professor Avijit Banerji 1970
Former Professor and Head, Programme Co-ordinator – Centre of Advanced Studies, Department of Chemistry, Calcutta University; former Sir Asutosh Mookerjee Fellow (ISCA-DST) – CARI (CCRAS), Kolkata; Former General Secretary, Sectional President – Chemical Sciences, Indian Science Congress Association; Former Honorary Secretary, Vice-President – Indian Chemical Society
31. Dr. Gopal Chandra Biswas 1970
Former Research Officer, CCRAS, Jamnagar
32. Dr. Mrs. Bani Chandra 1970
33. Professor Mrs. Julie Banerji 1972
Former Khaira Professor and Head, Department of Chemistry, Calcutta University; Former Secretary, Indian Science News Association
34. Professor Mrs. Dhira Ganguly 1972
Former Professor, Department of Home Science, Calcutta University
35. Late Dr. Satya Kinkar Desmukh 1972
Former Joint Director, Ordinance Factory Staff College, Ambajhari, Nagpur
36. Dr. Gobinda Chandra Sengupta 1973
Former Reader in Chemistry, Krishnanagar Govt. College, Krishnanagar, Nadia.

37. Dr. Asis Mukhopadhyay 1973
Institute of Science and Technology, Hatisur Campus, Dharan, Nepal
38. Dr. Rabindranath Rej 1974
Canada
39. Professor Manas Chakrabarty 1974
Former Professor of Chemistry, Bose Institute, Kolkata;
Former Secretary, Indian Science News Association
40. Dr. Mrs. Rajashree Sen
USA
41. Dr. Debasis Malakar 1976
USA
42. Dr. Kali Prasanna Dhara 1978
Former Reader, Department of Chemistry, Calcutta University
43. Dr. Ashoke Banerjee 1978
Independent Director, Kores (India) Ltd, Mumbai;
earlier Director, GlaxoSmithKline, Mumbai
44. Dr. Asim Ghosh 1979
USA
45. Late Dr. Sibabrata Mukhopadhyay 1979
Scientist, Indian Institute of Chemical Biology, Kolkata
46. Dr. Sudipta Bhattacharyya 1980
Scientist, EIPW Ltd., Kolkata
47. Dr. Mrs. Kumudini Padhi 1980
Hyderabad
48. Dr. Mrs. Suvra Mandal 1981
Former Assistant Director, Chemistry, NRIADD, now CARI
under CCRAS, Govt. of India, Kolkata
49. Late Dr. Sankar Saha 1981
USA
50. Professor Somnath Ghosh 1982
Former Professor of Chemistry, Jadavpur University;
Former Vice-Chancellor, North Bengal University, Siliguri
51. Dr. Dhrubajyoti Roy 1983
Former Reader, Department of Chemistry, Palpara College, Palpara, Midnapore
52. Dr. Suchitra Ghosh 1983
USA
53. Late Dr. Biswanath Das 1985
Former Scientist, Indian Institute of Chemical Technology, Hyderabad
54. Late Dr. Tapanjyoti Bhaumik 1986
Former RA, Department of Chemistry, NARADD (CCRAS) - now CARI, Govt. of India
55. Dr. Uttam Kr. Pandit 1986
Former Chemist, National Test House, Kolkata
56. Dr. Mrs. Lila Nayak 1986
Former Reader in Chemistry, Kamarpukar College, Hooghly
57. Dr. Arabinda Sahu
Hyderabad 1993

Student Awarded Ph.D. Degree of University of Agra, U.P.

58. Dr. P. C. Joshi 1992
Former Research Officer, Indian Institute of Drug Research
(CCRAS, Govt. of India Tarikhat, Almora

Student Awarded Ph.D. Degree of the University of Guwahati, Assam

59. Professor Jeevan Kotoky 1986
    Former Professor, Division of Life Science, Medicinal and Economic Plant Section, Institute of Advanced Study in Science and Technology, Jawahar Nagar, Khanapara, Guwahati

Students Who Did M.Sc. Thesis

1. Late Sudhangsu Sekhar Mitra 1943
2. Late Professor Hari Narayan Khastigir 1946
   Professor, North Bengal University
3. Late Dr. Anil Bhattacharya 1950
   Reader, Department of Chemistry, Calcutta University
4. Late Dr. Mrs. Anima Bhattacharyya 1951
   Reader, Department of Chemistry, Bethune College

Former and Present Research Associates

1. Late Professor Sarashi Ranjan Mukherjee
   Former Director, SSKM, Kolkata, Founder Director, Director of Nuclear Medicine, PGIMER, SSKM
2. Late Dr. K. L. Handa
   RRL, Jammu
3. Professor O. P. Mittal
   Former Professor of Pharmacy, BIIT, Pilani, Rajasthan
4. Late Mr. Parimal Ghosh
   Former Lecturer, St. Xavier's College, Kolkata
5. Mr. Jyotirmay Mitra
   Former Reader in Chemistry, Vivekananda College, Kolkata
6. Late Dr. Ramprasad Bhattacharyya
   Former Reader, St. Paul's College, Kolkata
7. Late Mrs. Latika Ghosh
8. Mr. Birendra Nath Ghosh
   Formerly Scientist, Institute of Jute Technology, Kolkata
9. Late Aparna Deb
   Research Scholar, Department of Chemistry, Calcutta University
10. Dr. D. R. Gupta
11. Late Professor Basudev Prasad Das
    Former Professor, Visvabharati, Santiniketan
12. Late Mr. Romesh Biswas
    Former Scientist, Botanical Survey of India
13. Dr. S. Chandra Sekharan
    Formerly ARO in Captain Srinivasmurty Research Institute (CCRIMH); then in *Amrutanjan Ltd,* followed by *Kancor Flavours and Extracts, Procter and Gamble, and Katra Phytochem Pvt. Ltd.*
14. Professor S. P. Hiremath
    Former Professor, Gulbarga University, Karnataka
15. Late Professor Chunilal Kirtaniya
    Former Principal, Mahadevananda College, Barrackpore, North 24-Parganas
16. Dr. Lala Prabir Kumar Roy
    Former Director, Cinchona Factory, Mongpoo, Darjeeling
17. Professor Krishna Chandra Majumder
    Former Professor of Chemistry, Kalyani University, Kalyani, Nadia
18. Late Dr. Phakir Chandra Ghosh
    Former Senior Chemist, State Water Investigation Directorate, Sech Bhavan, Kolkata
19. Late Professor Kshetra Mohan Biswas

Former Professor and Head, Department of Chemistry, Calcutta University

20. Professor A. Patra
    Former Professor and Head, Department of Chemistry, Calcutta University
21. Dr. Ramanuj Goswami
    USA
22. Dr. Kartik Chattopadhyay
23. Mr. Abhijit Bose
24. Dr. Swapan Bhaduri
    Formerly at Jute Technological Research Institute, Kolkata
25. Dr. J. C. Chaudhury
    Formerly of Defence Laboratory, Jodhpur, Rajasthan
26. Late Professor (Mrs.) Sutapa Debkirtaniya
    Former Principal, Vidyasagar College for Women, Kolkata
27. Late Dr. G. Karmakar
    Former Assistant Director, Hygiene Institute, Kolkata
28. Dr. V. P. Arya

Ciba-Geigy, Mumbai

29. Late Dr. (Mrs.) Chitralekha Mukherjee
    Department of Physiology, Calcutta University
30. Late Dr. Chandidas Dey
    Former Reader, Department of Physiology, Surendra Nath College, Kolkata
31. Late Professor B. N. Koley
    Former Professor, Department of Physiology, Calcutta University
32. Professor Prasanta Kr. Dey
    Former Professor of Physiology, Benaras Hindu University, Varanasi
33. Dr. (Mrs.) Purnima Adhikary
    Former UGC House-Wife Research Associate, Department of Chemistry, Calcutta University
34. Professor Arup. Kumar Siddanta
    Former Scientist G, Professor Acsir and Emeritus Sientist, Central Salt and Marine Central Research Institute, Bhavnagar, Gujerat.
35. Dr. Bidyut Basak
    Former, RA, ICMR, Department of Chemistry, Calcutta University
36. Dr. (Mrs.) Munmun Saha
    Former Reader in Chemistry, Ananda Mohan College, Kolkata
37. Late Dr. P. C. Das
    Former Scientist I, Chemistry, NRIADD (under CCRAS) - now CARI, Govt. of India, Kolkata
38. Dr. Bikash Barik
    Former Scientist I, NRIADD (under CCRAS) - now CARI, Govt. of India, Kolkata
39. Late Dr. Asish Kumar Dey
    Former ARO, Chemistry, NRIADD (under CCRAS) - now CARI, Govt. of India, Kolkata
40. Mr. B. Mallik
    Former Scientist III, NRIADD (under CCRAS) - now CARI, Govt. of India, Kolkata
41. Mr. D. N. Mandal
    Former Scientist II, CARI (under CCRAS), Govt. of India, Kolkata
42. Professor K. K. Das
    Former Professor, Department of Chemistry, Dibrugarh University, Assam
43. Dr. Amit Krishna De
    Former Executive Secretary, ISCA; Secretary, ISNA.

Note: RRI, NRIADD, CARIDD all refer to the same Research Institute, now named Central Ayurveda Research Institute (CARI), under the Central Council of Ayurvedic Sciences, Ministry of Ayush, Government of India. For former scientists working in this Institute, the Institute designation at their point of retirement is given.

SIXTY-SECOND ANNUAL SESSION OF THE INDIAN SCIENCE CONGRESS DELHI, 1975

Professor (Mrs.) A. Chatterjee was the first woman scientist to be the General President of the INDIAN SCIENCE CONGRESS. She presided over its Sixty Second Annual Session held in Delhi in 1975 January. She delivered her Presidential Address on 3rd January at the Inaugural Function, which was attended by the then Prime-Minister (Mrs.) Indira Gandhi.

The General Presidential Address was entitled **'SCIENCE AND TECHNOLOGY IN INDIA: PRESENT AND FUTURE'** - the Focal theme for this Session.

Addressing the august gathering, Professor Chatterjee expressed her gratitude to Prime Minister Shrimati Indira Gandhi, who honored the Indian Science Congress by her presence and for delivering her inspiring Inaugural Address.

Professor Chatterjee paid rich tributes to India's first Prime Minister Shri Jawaharlal Nehru, who had laid the foundation of scientific development in independent India. Prime Minister Nehru was the General President of the Indian Science Congress Association on the eve of Indian independence. In his Presidential address delivered in the Session held at Delhi in January 1947 he emphasized the need of establishing research facilities for peaceful use of atomic energy. Prime Minister Nehru delivered his last Inaugural Address at the previous Delhi Session of the Science Congress held in October, 1963, before he passed away in following May. She quoted his remarks at this Science Congress Session about the role of Indian Scientists. He had said that scientists in India have a double role to play - they should contribute on the one hand to general development and thinking in the world, and on the other contribute to solving problems of the country. He emphasized the role of scientists to build a free and self-reliant India.

She mentioned that under the inspiring leadership of Jawaharlal Nehru, the Indian Parliament adopted a Scientific Policy Resolution in 1958 for developing science and technology. Earlier, the Government of India had set up national laboratories, technological institutes, organisations to develop R and D, had increased research facilities at universities and also set up new universities and IITs, thus adopting measures to provide firm infra-structure for advancement in science and technology.

Since Prime Minister Nehru's time, the Inaugural Session of the Science Congress has been addressed by the Prime Minister of India, reflecting the deep commitment of the Government to the development of Science and Technology in the nationwide endeavour to achieve self-reliance. Prime Minister Shri Narendra Modi and before him Dr. Manmohan Singh have upheld this tradition.

Highlights of Professor Chatterjee's Presidential Address are given below, with the sub-headings that appeared in the printed version of her address. Her address revealed that she saw deep into the future - much of what she presented then has great relevance even today, half a century later.

Science and Technology vis-a-vis our Problems

She mentioned that the National Committee of Science and Technology (NCST) had been founded by the Government of India to coordinate the activities of all the research organisations - Council of Scientific and Industrial Research, University Grants Commission (UGC), Indian Council of Medical Research, Indian Council of Agricultural Research, Atomic Energy Commission, Defence and Development Organisation, Electronics Commission and Department of Space as well as other leading research organisations to implement National Policy decisions and steer research in proper direction to meet the immediate needs of our country of 563 million population.

Scientific way of Thinking

University, the Barometer of Science and Technology

She said that in a developing country like India the strengthening of the Universities is of paramount importance. She also mentioned that emphasis has to be placed also on applied research. She considered the **University as the Barometer of Science and Technology.** The university constitutes the platform from where younger talents took their final training. She referred to the famous conversation between the scientist Michael Faraday and Mr. Gladstone, when Faraday demonstrated his famous experiment on electro-magnetism. Mr. Gladstone had asked "After all, of what use is it?" Faraday gave his prophetic reply "There is every chance that you would soon be able to impose a tax on it".

University Training (Teaching and Research)

Employment of Science Graduates

Need for Technicians

Return on Investment

She mentioned about the return on the fairly large investment made by India in science and technology since Independence. She pointed out that the appropriateness of people's doubt on the results of investment was self-evident. She mentioned that there was no dearth of talents or lack of endeavors on

the part of researchers. Hence if the results were not up to expectations, these could be traced to some

deficiency in the organizations where they served. She said that this would call for deeper study with a view to setting things right.

Research Areas to be further developed and Utilization of Natural Resources

Speaking as an organic chemist she mentioned that Pharmaceutical and Drug research had two main aspects to which future financial assistance need be given: (1) Research on basic problems involving the biochemistry and the mechanism of drug action, and (2) Research directly oriented towards the discovery and development of new drugs. She suggested that the research and development in following areas be prioritized -

- Mechanism of drug action,
- Physico-chemical aspects of formulation,
- Quantitative studies of structure-action relationship,
- Research on biologically active substances from the plant and animal kingdom,
- Transport, turnover and metabolism of drugs,
- Development of drug delivery systems,
- **Discovery and development of new drugs -**
  - Anti-cancer and anti-microbial agents, drugs for deficiency diseases,
  - New anti-fertility agents and devices,
  - Anti-helminthic, anti-protozoal, anti-leprotic and anti-viral agents,
  - Drugs to address collagen and connective tissue disorders, arthritic conditions,
  - Drugs to address Senile dementia and mental ill-health.

She mentioned that in 1928 Professor Simonsen in course of his Presidential Address at the Indian Science Congress 'suggested that the chemists of India should study more intensively the wealth of natural materials that lay at their doors and devote less time to the study of problems of only theoretical interest'. She expressed satisfaction that within four and a half decades since then significant investigations 'have embraced the isolation, the determination of the constitution, and in some cases, the synthesis of a large variety of terpenoids, various heterocycles, including alkaloids. glucosides, cardenolides, plant coloring matters and antibiotics', their commercial utilization and their chemical transformation into useful products.

She mentioned that efforts should be made for extensive development in chemical engineering and industry ranging from giant petro-chemical and fertilizer complexes to small sector industries, and those developing downstream products - a variety of chemicals used in the polymers, dyes, agricultural and pharmaceutical industries.

Power Development

She emphasized the need for Development of Alternative Sources of Energy, as she voiced the apprehension that coal and oil resources may be exhausted in future. She opined that alternative source of energy like solar, wind, tidal and geo-thermal will have to be assessed.

Science and Humanism

She asserted that 'all efforts to develop science and technology will be futile if human implications of science are not given due consideration'.

She concluded with the song of Tagore.

"Where knowledge is free;
Where the world has not been broken up
into fragments by narrow domestic walls;
Where words come out from the depth of truth;
Where tireless striving stretches its
arms towards perfection;
Where the clear stream of reason has not lost its way
Into the dreary desert sand of dead habit
Unto that Heaven of Freedom,
my Father, let my country awake".

'May we all join in this quest for such a Heaven of Truth and Freedom'.

Brief CV of Chairpersons

Prof. Brindaban C Ranu, School of Chemical Sciences, IACS

Professor Brindaban C. Ranu received his M.Sc. from Calcutta University and obtained his Ph.D. from Jadavpur University working with Professor U.R. Ghatak at Indian Association for the Cultivation of Science. He did his post-doctoral work in Virginia Tech, USA with Prof. T. Hudlicky during 1982-85 and started independent research at the department of Organic Chemistry, IACS from 1985. He became Professor in 1996, senior Professor in 2006 and served as Head of the Organic Chemistry department during 2003-2008. He retired from regular job in 2013 and currently is continuing as INSA Honorary Scientist in the same department. He is a fellow of West Bengal Academy of Science & Technology, Indian Academy of Sciences, Bangalore and Indian National Science Academy, New Delhi. He received the J C Bose fellowship from DST, Govt. of India. He received N.S. Narasimhan Award in 1993 and Chemical Research Society of India Silver medal in 2009 and Sir J C Ghosh Memorial award of Indian Chemical Society in 2018 among others. His work primarily focuses on the issue of Green Chemistry. He has already published 305 papers in highly reputed international journals and currently his h-index is 71. Professor Ranu's works received considerable appreciation all over the world and he has been invited to deliver key note, plenary and invited lectures in symposia in India and abroad. His research on green synthesis stimulated much interest and inspiration in the chemical community, at large. Professor Ranu has also edited a book entitled, 'Ball Milling Towards Green Synthesis – Applications, Projects, Challenges' published by Royal Society of Chemistry in 2015, which received great appreciation from the practicing chemists.

Prof. Asit K. Chakraborti, IACS, Kolkata, India

Professor Asit. K. Chakraborti obtained his Ph.D. in 1985 from IACS, Kolkata under the guidance of Professor U. R. Ghatak. After postdoctoral studies with Professor R. K. Dieter at Clemson University (1985-1987) and Professor Mark Cushman at Purdue University (1987-1989) he served Burdwan University (1990-1994) as Lecturer of Chemistry. He joined NIPER-Mohali in 1994 as a founder faculty as Assistant Professor of Medicinal Chemistry, became Associate Professor in 1999, and Full Professor and Head of Department in 2001. After superannuating from NIPER in 2019 he joined IIT-Ropar as visiting Professor in Chemistry and moved to IACS as Emeritus/Raja Ramanna Fellow in 2021. He has guided 41 PhD and 130 Masters' students, published 180 research papers (with > 13,000 citation, h index 69), and filed 42 patents. Prof. Chakraborti received the University Gold Medal, Bardhaman Sammilani Gold Medal, ISMAS Eminent Mass-spectroscopist award, Ranbaxy Research Award (Pharmaceutical Sciences), Chemical Research Society of India Silver and Bronze Medals, Indian Chemical Society Professor P. K. Bose Memorial Award, Dr. Nitya Anand Endowment Lecture of INSA, and INSA Distinguished Lecture Fellowship. He also received the Rajnibhai V. Patel PharmInnova Best Research Guide Awards for the most "Innovative Ph. D. Thesis" during 2017-2018 and 2016-2017 and the most "Innovative MS Thesis" during 2015-2016 2014-2015 in "Pharmaceutical Chemistry," Certificate of Appreciation for Ph.D. thesis Advisor of Eli Lilly and Company Asia Outstanding Thesis First Prize Awardee in 2013, 2012, and 2009 and Second Prize Awardee in 2009. He is Fellow of the Royal Society of Chemistry and elected Fellow of Indian Academy of Sciences and Indian National Science Academy. His research interest is synthetic organic and medicinal chemistry with thrust in new drug discovery in tuberculosis, leishmaniasis, and inflammation by developing novel synthetic methodologies in compliance with the green chemistry principles and deriving novel concepts.

Prof. Nikhil Guchhait, HOD, Dept. of Chemistry, University of Calcutta, India

Professor Nikhil Guchhait did his doctoral research under late Prof. Mihir Chowdhury at Indian Association for the Cultivation of Science, Jadavpur. He worked as post doctoral fellow with Prof. Lionel Goodman at Rutgers University, USA, and as JSPS fellow with Prof. N. Mikami at Tohoku University, Japan. As a visiting faculty he worked with Prof. F. Lahmani at University of Paris Sud XI, France and with Nobel laureate Prof. Y. T. Lee at IAMS, Taiwan. Before joining as a faculty member in the Department of Chemistry, University of Calcutta he was faculty member at IIT Guwahati and at Visva Bharati, Shantiniketan Association (2019). He has been engaged in research involving diverse area of Organic Chemistry since 1967: Study of Natural Products on all aspects; [3+2] cycloadditions; Heterocyclic Chemistry; Computational Chemistry; NMR studies; Single Electron Transfer Reactions. He has published more than 170 papers, and has over 190 Abstracts in Proceedings of International and National Conferences/Symposia including several invited and plenary lectures.

Professor Kyoko Nozaki, The University of Tokyo, Japan

Professor Kyoko Nozaki was born in Osaka, Japan, and graduated from Kyoto University with a B.Sc. degree in 1986. She received her Ph.D. in 1991 from the same university under the guidance of Prof. Kiitiro Utimoto. During her Ph.D. studies, she joined Prof. Clayton H. Heathcock's group at the University of California, Berkeley, as an exchange student for 1 year in 1988. Since 1991, she has been a faculty member at Kyoto University, moved to the University of Tokyo in 2002, and has been a Professor at the University of Tokyo since 2003. Her research interests are focused on the development of homogeneous and heterogeneous catalysts for polymer synthesis and organic synthesis.

Awards and honors

International Awards L'Oréal-UNESCO for Women in Sciences in 2021
IUPAC Distinguished Women in Chemistry and Chemical Engineering in 2021
Medal with Purple Ribbon from the Japanese Cabinet Office in 2022
She has been elected to the National Academy of Sciences, the Royal Society, and the American Academy of Arts and Sciences.

Prof. Susanta Sekhar Adhikari, University of Calcutta

Professor Susanta Sekhar Adhikari did his Master's study in 1994 from Indian Institute of Technology, Kharagpur. He obtained his Ph.D. in 2000 from National Chemical Laboratory (NCL), pune under the guidance of Dr Mukund k. Gurjar, former Dy. Director in NCL-Pune. After a 1st postdoctoral study with Professor Stephen Hanessian at Univ. of Montreal, Canada (2001-2003), he did his 2nd postdoctoral studies with Prof. Larry Overman at Univ. of Calfornia, Irvine (2003-2004). He started his independent research career in CSIR-Central Drug Research Institute, Lucknow (2006-2007) as a Scientist "C". Later on he joined as an Associate Professor in the Dept. of Chemistry, University of Burdwan (2008-2009) and then moved to the Department of Chemistry, University of Calcutta in 2010 and continued here as a professor-till date. He has already completed three (3) SERB-DST projects and one US sponsored project. He has published more than 55 in reputed International Journals. In addition to this, he has published six (6) US patents and one Indian patent to his credit. His research interests focused on Design and Development of Target Based New Chemical Entities for Breast-ovarian-colon Cancer and Malaria, Leishmania; Structure-based pharmaceutical drug design and synthesis; Development of novel synthetic procedures and its application towards synthesis of various bio-active compounds; Design and Development of fluorescent probes with nitrogen, oxygen and/or sulfur donor sites for detection of cancer, bio-analytes etc.

Prof. (Dr.) Dhrubajyoti Chattopadhyay, Vice Chancellor, SNU, Kolkata

Prof. (Dr.) Dhrubajyoti Chattopadhyay is currently the Hon'ble Vice Chancellor of Sister Nivedita University, Kolkata from January 2020 onwards and was the Founder Vice Chancellor of Amity University Kolkata from 2015-2019. Prof. Chattopadhyay was the Dean, Faculty of Science at the University of Calcutta from 2003 to 2007. He was the Pro-Vice Chancellor of the University on 2008 till 2015. He was also the Director at the Centre for Research in Nano Science and Nano Technology at the University from 2007 till 2015. Prof. Chattopadhyay has a research experience of more than 37 years and has a teaching experience of more than 41 years. During his research career he had visited numerous places in India and abroad like USA, UK, Brazil, Australia, Japan, South Korea, China, Thailand, Malaysia and Singapore. 35 students obtained their PhD under his direct and joint supervision during their PhD programme. He has around 150 research papers and 9 book chapters to his credit till date. Prof. (Dr.) Dhrubajyoti Chattopadhyay is a scientist and academic par excellence.

Professor Arun K. Ghosh, Purdue University, West Lafayette, USA

Professor Ghosh received his BSc degree in Chemistry from the University of Calcutta and his MSc degree

in Chemistry from the Indian Institute of Technology at Kanpur. He then attended the University of Pittsburgh for his graduate studies, obtaining his PhD degree in chemistry. He pursued postdoctoral research at Harvard University. He was a research fellow at Merck Research Laboratories, West Point, PA. In 1994, he joined the chemistry faculty at the University of Illinois, Chicago as an assistant Professor and became Professor of Chemistry in 1998. In 2005, he moved to Purdue University where he is the Ian P. Rothwell Distinguished Professor at the Department of Chemistry and also in the Department of Medicinal Chemistry & Molecular Pharmacology. Professor Ghosh's broad research interests include exploration of chemistry and biology of bioactive natural products, development of tools and strategies for protein structure-based molecular design, drug-discovery and development, and exploration of new reactions and their applications. He is the inventor of the frontline therapy, Darunavir, for treatment of HIV/AIDS. His laboratory carried out seminal groundwork for BACE inhibitor design and synthesis for treatment of Alzheimers' Disease. His work also laid the foundation for X-ray structure-based design of potent drug-like inhibitors of SARS-CoV-2 3CLpro and SARS-COV-2 PLpro for treatment of pathogenic coronaviruses, GRK5, GRK6 inhibitors for treatment of cardiovascular diseases and cancer. Professor Ghosh received numerous awards and honors including, IUPAC-Richter Prize in Medicinal Chemistry, ACS Medicinal Chemistry Hall of Fame, NIH MERIT Award, ACS Arthur C. Cope Senior Scholar Award, ACS Robert Scarborough Excellence in Medicinal Chemistry Award, Herbert Newby McCoy Research Excellence Award, Fellow of the National Academy of Inventors, Fellow of the American Association for the Advancement of Science, and Fellow of the Royal Society of Chemistry.

Dr. Sitaram Pal, Former Scientist, Syngenta Biosciences Pvt. Ltd.

Dr. Pal got his M.Sc. degree from University of Burdwan and Ph.D. from IACS, Jadavpur University in Organic chemistry in the year 1987, 1993 respectively.

He did his postdoctoral research in the department of chemistry, National Tsing Hua University, Twain (2001-2002) and Department of Chemistry, University of Kentucky, USA (2003-2004), both in synthetic organic chemistry.

He works as group leader in CIBA, Mumbai R&D Centre (1997-2001) and as Principal Scientist, Chemgen Pharma International, Kolkata.

He joined Syngenta Biosciences Pvt. Ltd in 2006 as group leader AI research and analytical department. In Syngenta he was a part of the team which develop several new agro-chemicals!

2024 July Dr. Pal retired from Syngenta as Head Process Research and Analytical chemistry.

His research interests are synthetic method development, natural product synthesis and heterocyclic chemistry and cost-effective sustainable route for new AI.

- He published 30 papers in repute international Journal and 6-patent.
- Wrote one book chapter of 'The Alkaloids".
- Guided five Ph.D. students.

Awards & Honours

1) Syngenta Endowment lecturer 2013, Mangalore University
2) Plenary Lecturer International Conference on Chemistry for Human Development (ICCHD2020) , Kolkata
3) Life member of Indian Association for the Cultivation of Science. IUPAC Affiliate member for the year 1995-96.Life member of Chemical Research Society of India(CRSI)

Prof. A. Stephen K. Hashmi, Heidelberg University, Germany

Professor A. Stephen K. Hashmi obtained his Ph.D. in 1991 from LMU Munich under the guidance of ProfessorG. Szeimies. After postdoctoral studies with Professor B. M. Trost at Stanford University (1991-1993), he started his independent career with Prof. J. Mulzer at Free University of Berlin, University of Frankfurt and University of Vienna, he obtained his Habilitation from Frankfurt University and was visiting Scientist at the University of Tasmania.After Professorships at Marburg University and Stuttgart University (Associate Professor), he became Full Professor at Heidelberg University in 2007.Visiting Professorships at Gakushuin University (Tokyo, Japan, 2008), at Milan University (Milan, Italy, 2010), Tokyo Institute of Technology (Tokyo, Japan, 2012) and Keio University (Tokyo, Japan, 2015).

Awards:

Dr. Otto Röhm Memorial Fellowship
Karl-Ziegler Memorial Fellowship
ORCHEM Prize for natural sciences of the German Chemical Society Hector Research Prize 2010

Prof. Yoichiro Kuninobu, Kyushu University, Japan

Professor Yoichiro Kuninobu received his B.S. and Ph.D. degrees from the University of Tokyo in 1999 and 2004, respectively, under the supervision of Professor Eiichi Nakamura. He was appointed assistant professor at Okayama University in 2003 and worked with Professor Kazuhiko Takai. In 2012, he was promoted to an associate professor at the University of Tokyo and the group leader of ERATO project, JST, and worked with Professor Motomu Kanai. In 2017, he became a full professor at Kyushu University. His research interests relate to the creation of high-performance catalysts, the development of novel and highly efficient synthetic organic reactions, and the creation of π-conjugated molecules.

Awards

Meiji Seika Award in Synthetic Organic Chemistry, Japan (2006); Science and Technology Award in Okayama Foundation of Science and Technology (2007); OMCOS 14 Poster Award (2007); Incentive Award in Tyugoku-Shikoku Branch of the Society of Synthetic Organic Chemistry, Japan (2007); 22th Lectureship award for young chemists at the 88th annual meeting of the Chemical Society of Japan (2008); BCSJ Award (2008); Incentive Award for Young Top Researcher in Okayama University (2009); Banyu Chemist Award (BCA 2010) (2010); The Chemical Society of Japan Award for Young Chemists (2011); Thieme Chemistry Journal Award 2012 (2011); The Young Scientists′ Prize, The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (2012); JST-ERATO Lectureship Award (2015); 20th The Society of Silicon Chemistry Japan Award for Young Chemists (2015); SSOCJ Nissan Chemical Corporation Award for Novel Reaction & Method 2023 (The Society of Synthetic Organic Chemistry, Japan) (2024)

Retd. Prof. Kaliprasanna Dhara, Department of Chemistry, University of Calcutta, India

Prof. Kaliprasanna Dhara is a retired Professor of Chemistry from the University of Calcutta, where he served with distinction in teaching, research, and academic administration. With a long and dedicated academic career, he has made significant contributions to chemical education and research at the undergraduate, postgraduate, and doctoral levels.

His areas of interest include core and applied aspects of chemistry, and he has guided numerous M.Sc. and Ph.D. students during his tenure. Prof. Dhara has been actively involved in curriculum development, examination work, and institutional academic activities of the University of Calcutta.

Dr. Thomas John Colacot, Vice President, Hindustan Platinum

Dr. Thomas Colacot is VP - R&D for the Catalysts & Chemicals business at Hindustan Platinum, driving programs in lean, sustainable novel catalyst development, advanced homogeneous and heterogeneous catalysis, and environmentally responsible organic synthesis. He has over three decades of international experience in precious-metal catalysis shaped by senior R&D roles at Johnson Matthey USA and MilliporeSigma / Merck KGaA, USA. A recognized pioneer in palladium and other precious-metal catalysts and ligand technologies, his work supports critical cross-coupling and catalytic processes across the pharmaceutical, fine-chemical, and materials sectors. He has authored around 170 publications, 3 popular books and holds 65–70 patents and industrial inventions. Dr. Colacot's contributions have been honored with the ACS Award in Industrial Chemistry, IPMI Henry Alfred Medal, RSC Applied Catalysis Award and Medal, CRSI Medal, IIT Madras Distinguished Alumnus Award and Merck KGaA Best Science Curriculum Vite Award. He holds a Ph.D. from IIT Madras with Post-doctoral studies in USA an MBA from Pennsylvania State University and is a Fellow of the Royal Society of Chemistry (UK).

Prof. Dr. Manas Chakrabarty, Retired Professor Bose Institute

Manas Chakrabarty, born on 7th January, 1948, obtained M.Sc. (Chemistry degree) in 1968) and Ph.D. (Sc.) degree in 1974, both from Calcutta University. His Doctoral Supervisor was Late Professor (Mrs.) Asima Chatterjee. After a brief spell of Postdoctoral research (1976-1978) on the Synthesis of Porphyrins with Late Professor A.H. Jackson in the Cardiff University, Wales, U.K., he worked in the fields of Chemistry of Plant and Marine Natural Products and in the R. & D. Division of an Indo-Holland Industry in Kolkata. Finally, he joined Bose Institute, Kolkata as a Faculty member in Chemistry, from where he retired in 2008 and as an Emeritus Scientist (CSIR) in 2013. His fields of specialisation are Chemistry of Natural Products, Synthetic Heterocyclic Chemistry and Green Chemistry. He supervised 12 Doctoral students and has 80 scientific publications in many national and international journals in India and abroad. He presented Papers and Chaired sessions in a number of National and International Symposia / Conferences in India.

He has had been teaching at M.Sc. (Chemistry) / B. Tech. (Polymer Sc. & Technol.) classes at various Universities and Colleges and at M.S. (Pharmacy) classes in NIPER, Kolkata. He is a Fellow of The Royal Society of Chemistry, U.K., Indian Chemical Society, Indian Science Congress Association, IACS, and Zoological Society, all in Kolkata. He is a Member of the Editorial Board of *Arkivoc* (USA) and *Science and Culture* of the Indian Science News Association (in Science College, Rajabazar campus, Kolkata) where he is an Honorary Secretary. He has a number of publications on popular science topics and scientists in *Anandabazar Patrika, Science and Culture, Jnan-O-Bignan, Monthly Bulletin of The Asiatic Society, Kolkata, 4 No.. Platform (webgine), Scientifica Communica and Bignan Kahon (e-Papers)*, etc.

Bimal Krishna Banik

Ph.D., C.Chem., F.R.S.C., F.I.C.S., F.I.S.R.O.S.E.T., F.R.S.C.S., F.I.C., Gold Medalist

Bimal Krishna Banik conducted his doctoral research at the Indian Association for the Cultivation of Science, Calcutta with Professor U. R. Ghatak. Then, he pursued postdoctoral research at Case Western Reserve University (USA) with Professor R. G. Salomon and Stevens Institute of Technology (USA) with Professor A. K. Bose. He was a Tenured Full Professor and First President's Endowed Professor in Science & Engineering at the University of Texas and the Vice-President of Research at the Community Health Systems of Texas. At present, Dr. Banik is a Full Professor, Deanship of Research at the Prince Mohammed Bin Fahd University, Kingdom of Saudi Arabia. Professor Banik has taught Chemistry to B. S., M. S., and Ph. D. Students in USA and Saudi Arabia Universities for many years. His class teaching skills are exceptionally strong and these are certified by several thousand students through their confidential written evaluations. He has developed new courses as a part of curriculum in the USA. In research, he has supervised approximately 300 students, 20 postdoctoral fellows, 7 Ph. D. research scientists and 28 university faculties. He has acted as the Advisor of two students' organizations that have 1400 students. Many of his students have completed Ph. D., D. Pharm. and M. D. degree from US Universities and have been working at national/international institutions, health centers and industries.Professor Banik has conducted synthetic organic chemistry and chemical biology research on cancers, antibiotics, catalysis and natural products. As the Principal Investigator (PI), he has been awarded $7.25 million in grants from USA NIH and USA NCI. Importantly, he has more than 740 publications (US patents, books, book chapters, papers, reviews, name reactions, perspectives and editorials) and 530 presentation abstracts. He has edited 12 and also authored 12 books. The number of citations of his publications is more than 10,000. Dr. Banik is ranked within the Top 2% Scientist every year since this program is initiated. He served as the PI of a joint green chemistry symposium between USA and India. He has chaired 20 symposiums at the American Chemical Society (ACS) National Meetings and over 2 dozen conferences at the National and International level, including 1 at the Nobel Prize Celebration. In the capacity of Chair, he has introduced about 300 Speakers. Dr. Banik is a Reviewer of 93, Editorial Board Member of 26, Editor-in-Chief of 12, Founder of 8, and Guest Editor of 10 research journals. As the Editor-in-Chief, he has recruited approximately 200 Associate Editors and Editorial Board Members. He is an Examiner of NSF, NCI, NIH, NRC, DOE, ACS and International grant applications; Reviewer of promotion & tenure of faculty of national and international universities; Examiner of doctoral theses; and Panel Member of US NSF and US NCI/NIH Funding Sections. He has served as the Chair/Member of more than 100 scientific committees. He was the Chair of the University of Texas M. D. Anderson Cancer Center's drug discovery symposiums and directed their US NCI funded analytical chemistry Core Laboratory. Dr. Banik was given the Indian Chemical Society's Life-Time Achievement Award; First President's Endowed Professorship at the University of Texas in 87 years; Mahatma Gandhi Pravasi Honor Medal from the UK Parliament; US National Society of Collegiate Scholars' Best Advisor Award for students; Professor P. K. Bose Endowment Medal; Dr. M. N. Ghosh Gold Medal; University of Texas Board of Regents' Outstanding Teaching Award; ACS Member Service Award; several Awards on top-cited Papers by Elsevier; and Best Researcher, Teacher and Mentor Awards by the UTPA. Dr. Banik was recognized/honored by numerous organizations including Burdwan University; Bejoy Narayan College; ACS News and SEED; Elsevier, RSC, US NCI-NIH-US Research Foundations; Times of India; AAAS; Stevens Institute of Technology; India and US Newspapers; Bentham Publisher; and Down to the Earth Magazine. Dr. Banik received approximately 200 invitations to deliver keynote and distinguished lectures in 35 countries. He hosted distinguished professionals including Nobel Prize Winners, US White House Secretary, US Senators, and Editors of Top ACS Journals.

Dr. Ashoke Banerjee

Executive Member, Professor Asima Chatterjee Foundation Kolkata

He pursued his Ph.D. degree under the supervision of Prof. Asima Chatterjee and he has long experience in the industry in different capacity

Prof. Nitin T. Patil, IISER Bhopal, India

Prof. Nitin T. Patil currently working as a Professor in Department of Chemistry, IISER-Bhopal, Bhopal

Professional Experience:

- Professor (10/2023 - Present): Department of Chemistry, IISER-Bhopal, Bhopal
- Associate Professor (07/2017 - 10/2023): Department of Chemistry, IISER-Bhopal, Bhopal
- Senior Scientist (08/2013-06/2017): CSIR-NCL, Pune
- Senior Scientist (03/2011-08/2013): CSIR-IICT, Hyderabad
- QRS (09/2008-03/2011): CSIR-IICT, Hyderabad
- Research Fellow (01/2008-07/2008): The Scripps Research Institute, USA
- Research Fellow (06/2006-12/2007): Institute of Chemical and Engineering Sciences, Singapore
- Assistant Professor (04/2005-03/2006): Tohoku University, Japan
- JSPS Postdoctoral Fellow (11/2002-03/2005): Tohoku University, Japan
- Postdoctoral Fellow (03/2002-11/2002): University of Goettingen, Germany

Research Interests: Organic Synthesis, Metal Catalysis, Organocatalysis, Enantioselectivity, Organometallics, Total Synthesis etc.

Awards and Honours:

- Recipient of the J. C. Bose Fellowship, CNR Rao National Prize for Chemical Sciences, SERB Distinguished Investigator Award, CRSI Bronze Medal, INSA Young Scientist Medal, Alkyl Amines – ICT Foundation Day Young Scientist Award, Avra Young Scientist Award etc.
- Fellow of the Indian National Science Academy (FNA), Fellow of The National Academy of Sciences (FNASc), Fellow of Maharashtra Academy of Sciences (FMASc) and fellow of The Royal Society of Chemistry (FRSC).
- Editor of an Elsevier journal - Tetrahedron Letters (Year 2024 - present)

Prof. Laurean Ilies, RIKEN, Japan

Professor Laurean Ilies obtained his Ph.D. in 2009 from The University of Tokyo under the guidance of Professor Eiichi Nakamura. He was appointed Assistant Professor at the University of Tokyo in 2009, then promoted to Associate Professor in 2014. From 2018, he became a Team Leader at the RIKEN Center for Sustainable Research Center (title changed in 2025 to Team Director). From 2021, he is also an Adjunct Professor at Saitama University.

Visiting Professorship at National Chung Hsing University (2024), part-time Lecturer at the University of Tokyo (2020, 2023, 2034), and Tokyo University of Science (2022–2025).

Awards

Japanese Society for Process Chemistry Award for Excellence 2021, 2025
The 6th RIKEN Award for Excellent Achievement
Incentive Award in Synthetic Organic Chemistry, Japan
The Young Scientist Prize by MEXT, Japan
Thieme Chemistry Journal Award
Banyu Chemist Award

Professor Avijit Banerji

Retired Professor, University of Calcutta Conference Chair, ICCHD-2026

Professor Avijit Banerji, FAScT, FISC, obtained his BSc (Honours in Chemistry, 1964), MSc (Chemistry, 1966) and PhD (Organic Chemistry with Prof. Asima Chatterjee, 1970) from the University of Calcutta. He joined the Chemistry Department of the University of Calcutta in 1972 as Lecturer, and became Professor in 1986. He was Head of Department of Chemistry (1996-98), Deputy Programme Coordinator then Programme Coordinator (2003- 11) of the UGC Centre of Advanced Studies in Chemistry, Chairman - Undergraduate Board of Studies in Chemistry, member of Faculty Council and Senate. He worked as Nuffield Fellow at University of East Anglia, Norwich, UK (1974-76), and as UNESCO-UNDP Fellow USA (1982) at Pennsylvania State University and other Universities. He has extensively visited several countries, and delivered invited lectures at a number of Universities and International Conferences. After his retirement from University of Calcutta he was attached as Sir Asutosh Mookerjee Fellow (ISCA-DST) with the Central Ayurveda Research Institute of Drug Development, CCRAS, Kolkata (2016-2021).He was General Secretary, *Indian Science Congress Association* in 2006-2009, having previously served as Treasurer (2004-2006), and Sectional President in Chemistry (1996-1997). He has had a long association with the *Indian Chemical Society*, serving as Council member, Treasurer, Honorary Secretary (1990- 1993) and Vice-President (1996-1997, 2000-2001). He represented the ICS in the *Federation of Asian Chemical Societies*, and was founder-member of the Board of *Asian Network on Research in Anti-Diabetic Plants (ANRAP).*He has received a number of academic awards including the prestigious R. C. Mehrotra Memorial Lifetime Achievement Award {101st Session of ISCA, 2014}; 15th Mukarram Khundker Memorial Lecture (1998 - *Dhaka University*); *Indian Chemical Society* - Basudev Banerjee Award (1991), P. K. Bose Memorial Award (1993). He was nominated Fellow, West Bengal Academy of Science and Technology (from 1990), and Fellow of the Indian Science Congress Association (2019). He has been engaged in research involving diverse area of Organic Chemistry since 1967: Study of Natural Products on all aspects; [3+2] cycloadditions; Heterocyclic Chemistry; Computational Chemistry; NMR studies; Single Electron Transfer Reactions. He has published more than 170 papers, and has over 190 Abstracts in Proceedings of International and National Conferences/Symposia including several invited and plenary lectures.

Prof. Yasushi Nishihara, Okayama University, Japan

Professor Yasushi Hashmi was born in Hiroshima, Japan in 1968. He earned a B.S. degree from Hiroshima University in 1992. He studied at the University of Notre Dame and University of Iowa, USA under the supervision of Professors Thomas P. Fehlner and Richard F Jordan, respectively. He received his Ph.D. (1997) from the Graduate University for Advanced Studies (SOKENDAI) under the supervision of Professor Tamotsu Takahashi. He became an Assistant Professor at the Tokyo Institute of Technology in 1996, working with Professors Tamejiro Hiyama and Kohtaro Osakada; he moved to Okayama University as an associate professor in 2004 and was promoted to full Professor in 2010. His current research interests are organic synthesis mediated and/or catalyzed by organometallic compounds and their application in functional materials such as organic transistors and solar cells.

Visiting Professorships at National Taiwan University (Taiwan, 2009).

Awards

The Chemical Society of Japan Presentation Award 2008 for Industries (2008),
Incentive Award in Synthetic Organic Chemistry, Japan (2009),
Incentive Culture Award in Okayama Prefecture, Japan (2010).

Prof. Masahiro Terada, Tohoku University, Japan

Professor Masahiro Terada was born in Tokyo in 1964. He graduated from Department of Applied Chemistry, Tokyo Institute of Technology in 1986 and completed his Ph.D. degree in 1993 from Tokyo Institute of Technology. During his Ph.D. study, he was appointed as an assistant professor at Tokyo Institute of Technology (1989-2001). He worked as a postdoctoral fellow at Harvard University in 1999-2000 and moved to Tohoku University as an associate professor in 2001. He has been a Professor of Chemistry at the Graduate School of Science, Tohoku University since 2006 and has been appointed to the Dean of Graduate School of Science and Faculty of Science from April 2017 to March 2023. His current research interests are the development of new and useful synthetic methodologies based on the design of novel chiral Brønsted acid and base catalysts as well as the utilization of transition metal catalysts.

Awards:

The Incentive Award in Synthetic Organic Chemistry, Japan (2003)
The Chemical Society of Japan Award for Creative Work (2008)
Mukaiyama Award (2010)
Daiichi-Sankyo Award for Medicinal Organic Chemistry (2011)
The Nagoya Silver Medal (2012)
Molecular Chirality Award 2015 (2015)
Synthetic Organic Chemistry Award, Japan (2017)
Science and Technology, Research Category, the Commendation for Science and Technology by the MEXT Japan (2024).

Prof. Dr. Atul Goel, Head & Chief Scientist, CSIR-CDRI, Lucknow, India

Prof. Dr. Atul Goel did PhD in the area of Bioorganic and Medicinal Sciences from the Central Drug Research Institute (CDRI), Lucknow, India in 1998 and postdoctoral research at the National Institutes of Health (NIH), Bethesda, USA during1999-2001. In November 2001, he joined as faculty in the CSIR-CDRI, where he is currently working as Chief Scientist in the area of development of new drugs, diagnostics and medical devices. He has guided more than 24 doctoral and 15 postdoctoral fellows and has more than 25 years of research experience. He has published >120 peer-reviewed research articles in the journals of high repute and has 18 national and international patents to his credit. He is a Fellow of Indian Academy of Sciences (FASc) since 2021. His research interests encompass the discovery and development of new affordable medicines/devices and his group is actively involved in developing new fluorescent dyes and nanomaterials for their application in biomedical sciences and optoelectronic (OLEDs) devices. He has licensed and transferred five technologies to industries.

1. Technology of CDRI-399 (BonJon) as Medicated Bone Implant Material for Fracture repair.
2. Discovery of Investigational New Drug CDRI-1500 (NCE, Under Phase-I Clinical Trial) for Bone Fracture Repair.
3. Technology of “Fluorescent probes for the development of RT-PCR based detection of COVID-19”
4. Technology of Nucleic Acid Staining Dye ‘GreenR’ for biomedical applications
5. Technology of Fluorescent Quenchers for nucleic acid research and diagnostics He has received many prestigious awards and honours:

Plenary Lectures

PL-1

Synthesis and Biological Evaluation of Novel Anticancer Polyaromatic Compounds

Bimal Krishna Banik
Professor
Deanship of Research Development, Prince Mohammad Bin Fahd University, Kingdom of Saudi Arabia; Former: Tenured Full Professor & First President's Endowed Professor, Science & Engineering, University of Texas, USA; Former: Vice President of Research & Education Development, Community Health Systems of Texas, USA; Designated as "Distinguished Researcher" and "Distinguished Scientist";
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Abstract

Research on polyaromatic hydrocarbons has received recognition because of their diverse applications. But, studies on molecules synthesized from polyaromatic substrates as anticancer agents are not explored. Some scientists believe polyaromatics are carcinogenic in nature. Despite the contradiction, a competitive research program on the synthesis and biological evaluation of polyaromatic compounds as anticancer agents is investigated by our group. This exploration has uncovered numerous useful and fascinating results related to anticancer drug development program on polyaromatic compounds. A few polyaromatic hydrocarbons are used in this study. The aromatic ring of these compounds is functionalized conducting electrophilic substitution reactions using diverse synthetic methods. New methods are employed for the synthesis of structurally diverse polyaromatic compounds. Structure-activity studies of these molecules against various cancer cells are conducted and highly potent compounds are identified. Remarkably, selective anticancer activities of some of these new derivatives against blood, brain, breast, colon, ovary, pancreas, prostate, and skin cancers *in vitro* and *in vivo* are observed. The anticancer data of the new compounds is compared with the current cancer medicines: cisplatin, adriamycin and gentocibine. Interestingly no mutagenicity and carcinogenicity of the lead anticancer polyaromatic molecules are observed. The structurally altered polyaromatic derivatives are capable of mitigating the carcinogenic and mutagenic properties. In contrast, they exert cytotoxicities by interacting with specific cell organelles. Most importantly, these new anticancer agents are not administered for the extended period of time that is required to result in carcinogenic effects. This study confirms that an apoptotic route through various caspase enzymes activation as a pathway in killing the cancer cells. These molecules are also investigated against DNA, RNA and Protein inhibition.

Acknowledgements: B. K. Banik is highly grateful to the US National Institutes of Health and US National Cancer Institute for their financial supports. Because of the success of his competitive grant applications, B. K. Banik was able to recruit 28 Postdoctoral Fellows/Scientists and hundreds of students in his research laboratory in US Universities.

References

Publications and Patents: The subjects presented herein are patented by B. K. Banik in the USA. B. K. Banik has more than seven hundred sixty papers (published and accepted: books, book chapters, US and World patents, papers, reviews, name reactions and perspectives). Out of these about eighty papers are published on this subject in ACS, RSC, Bentham, Wiley, Elsevier, Springer, Springer Nature, CRC Taylor & Francis, Nova, MDPI, ICS, Thieme, and De Gruyter's Books and Journals.

Personal Profile

Bimal Krishna Banik conducted his doctoral studies in Chemistry at Indian Association for the Cultivation of Science (Calcutta). Thereafter, he pursued postdoctoral research in Chemistry at the Case Western Reserve University (USA) and Stevens Institute of Technology (USA). His professional career as an Assistant Professor in Medicinal Chemistry started at the University of Texas M. D. Anderson Cancer Center, Houston. Subsequently, he promoted to a Tenured Full Professor and obtained the First President's Distinguished Professor Position in Science & Engineering at the University of Texas. He was also the Vice-President of Research & Education Development at the Community Health Systems of Texas. Currently, Dr. Banik is a Full Professor in Natural Sciences of the Deanship of Research at the Prince Mohammad Bin Fahd University, Saudi Arabia. He has excelled in his academic career and demonstrated outstanding contributions in all areas of higher education (teaching, mentoring, advising, research, academic service and administration) consistently. Professor Banik has taught organic/medicinal chemistry to class students in the USA and Kingdom of Saudi Arabia Universities for many years. His brilliant teaching skills were proven in several thousand students', peers', and administrators' outstanding written evaluations as well as by exemplary independent comments posted on the "Rate My Professor" Website by the USA students. He mentored approximately 300 students, 20 postdoctoral fellows, 7 Ph. D. research scientists, and 30 university/college faculties in his research activities. He was an Advisor of students' organizations in the USA that had 1400 students. Many Dr. Banik's students successfully conducted higher degrees at premier institutes in the USA. Dr. Banik's research is focused on synthetic chemistry and pre-clinical science of cancers, antibiotics, hormones, catalysis, natural products, and drug discovery. Notably, he is recognized as one of the Leading Scientists in Beta-Lactam Research in the World. As the Principal Investigator and Director, he was awarded $7.25 Million Dollars Research Grants from the most prestigious USA National Institutes of Health and USA National Cancer Institute. Professor Banik has more than 760 peer-reviewed Publications and these include his 30 Books and 210 Book Chapters (Springer Nature, Springer, Elsevier, De Gruyter, Nova, Cambridge Publishing House, Wiley, and CRC Taylor & Francis). He also has 540 presentation abstracts. The citation of his publications is more than 11,700. Dr. Banik chaired 20 symposiums at the American Chemical Society National Meetings and dozens at the International Levels, including one at the Nobel Prize Celebration. He introduced over 300 speakers in these conferences. He also served as a Reviewer of 93, Editorial Board Member of 31, Editor-in-Chief of 12, Founder of 9 and Guest Editor of 11 international journals. Moreover, he was a Panel Member of US NIH and US NCI Grants Study Sections. He recruited 200 journal board members and reviewed about 2600 manuscripts/grant applications. He was the Chair of the Faculty Research Council, Faculty Promotion Committee and Core Research of the US Universities and an Examiner of 26 Doctoral Thesis. Notably, Professor Banik is a "Fellow" of Five International Scientific Societies. He has been ranked among the Top 2% Researchers every year since this program was started. He received the Indian Chemical Society and Shibsankar Seba Samity's Life-Time Achievement Awards; the University of Texas Board of Regents' Outstanding Teaching Award at the Full Professor Level; USA National Society of Collegiate Scholars Best Advisor Award; First President's Distinguished Professorship at the University of Texas; Professor P. K. Bose Endowment Medal; Dr. M. N. Ghosh Gold Medal; ACS Member Service Award; Best Researcher/Mentor/Teacher Awards by the University of Texas-Pan American; Five Top-cited paper Awards by Elsevier; Best Researcher Award by the Prince Mohammad Bin Fahd University; Professor Asima Chatterjee Research Excellence International Award; Best Mentor Award by ACS New Jersey Division; Paper (ChemistrySelect by Wiley) became Top-Viewed and Recognized as an "Outstanding Researcher" by the USA Immigration Department.

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PL-2

2-Keto-1,3-Indandione, a Versatile Ingredient for the Synthesis of Medicinally Important Carbocyclic and Heterocyclic Compounds

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Department of Chemical Sciences, Indian Institutes of Science Education and Research Berhampur, Transit Campus, Industrial Training Institute (ITI), Engineering School Road 760010, Ganjam District, Odisha
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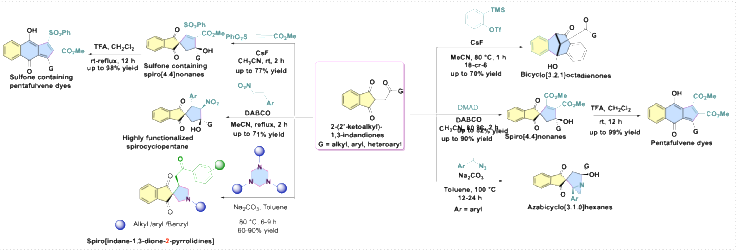
Abstract
2-keto-1,3-indandiones have been serving as an important precursors for the construction of various bicyclic, spirocyclic systems with suitable partners. Accordingly, the reaction of arynes with 2-keto-1,3-indandiones provided dibenzobicyclo[3.2.1]octadienone core[1] and the reaction of dimethyl acetylene dicarboxylate (DMAD) with 2/3-keto-1,3-Indandiones afforded spiro[4.4]nonane, spiro[4.5]decane compounds in the presence of a catalytic amount of DABCO.[2] Moreover, the spiro[4.4]nonanes were transformed into highly conjugated pentafulvene motifs via unprecedented C-C bond rearrangement in an acidic medium. Similarly, we have also developed a catalyst-free three component reaction to access various 1,3-indandione-containing spiropyrrolines.[3] Additionally, we have achieved the synthesis of complex, multiring, spirocyclic, 1,3-dicarbonyl fused, and highly functionalized 5-phenyl-1-azabicyclo[3.1.0]hexanes (ABCH) from 2-keto-1,3-indandiones.[4] Most of these methods are highly sustainable as we have developed under transition metal-free conditions while using a catalytic amount of environmentally benign organic bases.



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Personal Profile
Dr. Thirupathi Barla is an Associate Professor of Chemistry at IISER Berhampur. Born in Madavelli, Telangana (1984), he earned his M.Sc. from Osmania University and completed his Ph.D. at CSIR–IICT, Hyderabad, under Dr. D. K. Mohapatra. He later worked in industry at Aragen Life Sciences and Sai Life Sciences, followed by a postdoctoral fellowship at Harvard University with Prof. E. J. Corey, where he developed advanced fluorinated oxazaborolidine catalysts for Diels–Alder reactions. He joined IISER Berhampur in 2018 and was promoted in 2024. He is a recipient of the 2023 Thieme Chemistry Journals Award, a Life Member of the Chemical Research Society of India (CRSI), and an Associate Fellow of the Telangana Academy of Sciences (2024).

Awards
Thieme Chemistry Journals Award 2023
Associate Fellow of the Telangana Academy of Sciences (2024).

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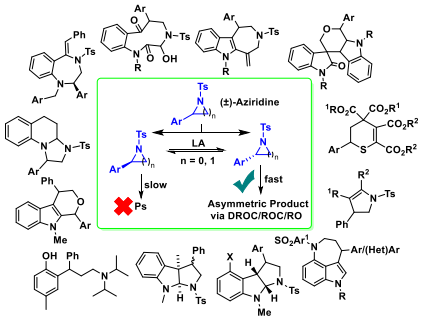
PL-3

Asymmetric Synthesis of Bioactive Compounds *via* DKR

A. K. Sharma, S. Kashyap, B. Singh, S. Singh, P. Mandal, S. Yadav and **M. K. Ghorai***
Department of Chemistry, Indian Institute of Technology Kanpur, Kanpur-208016, INDIA
e-mail: mkghorai@iitk.ac.in

Abstract

Dynamic kinetic resolution (DKR) offers a powerful platform to convert racemic precursors into highly enantioenriched products with theoretical yields up to 100%, making it an ideal strategy for the asymmetric synthesis of complex bioactive heterocycles. In this work, DKR is exploited in Lewis acid- and oxidant-catalyzed SN2-type ring-opening of activated aziridines and azetidines, followed by domino ring-opening cyclization (DROC) or ring-opening cyclization (ROC) sequences, to access diverse chiral N/O-heterocyclic scaffolds of medicinal relevance, including benzodiazepines, hexahydroimidazoquinolines, tetrahydroazepinoindoles, and related frameworks. Recent advances from our group further demonstrate that these protocols can be seamlessly integrated with downstream annulation and oxidation cascades to deliver higher-order architectures such as azepino[4,5-b]indoles and benzo[f]diazecine-2,8(1H,3H)diones, those ten-membered diazecine products exhibit promising anti-cancer activity against cervical (HeLa) and brain (U87MG) cancer cell lines. The presentation will highlight the evolution of this DKR-centric strategy from mechanistic understanding and stereocontrol to gram-scale synthesis and biological evaluation emphasizing its potential for the streamlined construction of pharmaceutically important heterocycles for human health and development.



Scheme 1. Synthetic exploration of small ring Aza/oxa-heterocycles via DKR.

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Personal Profile

Prof. Manas Kumar Ghorai, born on September 7, 1967, serves as Professor (HAG) in the Department of Chemistry at the Indian Institute of Technology Kanpur (IIT Kanpur), Uttar Pradesh, India. He earned his B.Sc. (Chemistry Hons.) from Calcutta University in 1989, M.Sc. from IIT Kharagpur in 1991, and Ph.D. from National Chemical Laboratory, University of Pune in 1998, followed by postdoctoral research at Wuerzburg University (Germany, 1998-1999), University of Siegen (Germany, 1999-2000 as Alexander von Humboldt Fellow), and MIT (USA, 2001-2002). His academic career at IIT Kanpur spans Assistant Professor (2002-2007), Associate Professor (2008-2012), Professor (2012-2019), and Professor HAG (2019-present), with expertise in organic synthesis, aziridine/azetidine/cyclopropane chemistry, enolate chemistry, photochemistry, materials chemistry and organocatalysis.

Awards:

N. C. Nigam Chair Professorship, IIT Kanpur (2022-25)
Fellow of Academy of Sciences, Bangalore (FASc, 2019)
Fellow of West Bengal Academy of Science & Technology (FAST, 2017)
Fellow of National Academy of Sciences, Allahabad (FNASc, 2015)
USV Chair Professorship, IIT Kanpur (2015)

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PL-4

Iridium and Silver Catalyzed Cyclization Reactions

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Abstract

We have developed a method for the asymmetric allylic dearomatization of novel substrates containing secondary racemic allyl alcohol-tethered α- and β-naphthols. Using iridium/Brønsted acid dual catalysis, the resulting naphthalenone spirocarbocycles were achieved in high yields and enantioselectivities with notable diastereoselectivities.[1] Also we have developed iridium catalyzed intramolecular cyclization of allyl alcohol-indole hybrids for the rapid access to photoluminescent 5H-benzo[b]carbazoles.[2] Recently, we have developed highly regio- and diastereoselective (3+3)- and [4+3] -cycloannulation of carbonyl ylides. [3-4]

Reference

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4) G. Jaiswal, S. C. Pan, manuscript sibmitted.

Personal Profile

Professor Subhas Chandra Pan obtained his B.Sc. degree in Chemistry Honours in 2001 from Calcutta University and M.S. degree in 2004 from Indian Institute of Science, Bangalore. During his MS thesis he worked in Prof. Goverdhan Mehta's laboratory on the total synthesis of epoxyquinone natural products. He obtained his PhD degree in 2008 under the guidance of Prof. Benjamin List at the Max-Planck-Institut für Kohlenforschung, Mülheim an der Ruhr, Germany. After doing postdoctoral studies at Harvard University with Prof. E J Corey and at the Scripps Research Institute, Florida with Prof. Glenn C. Micalizio, he joined IIT Guwahati as Assistant Professor in 2011 and was promoted to Associate Professor in 2015 and to Full Professor in 2019.

Awards

DAE Young Scientist Research Award 2012
Thieme Chemistry Journal Award 2018
Fellow of the Royal Society of Chemistry (FRSC), 2021.
CRSI Bronze medal 2025

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PL-5

Redox-Activable Heavy Atom Free Photodynamic Therapy

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Abstract

Photodynamic therapy (PDT) has emerged as a powerful tool to treat skin cancer and other diseases. In PDT, a photosensitizer (PS) is used to produce different reactive oxygen species (ROS) upon photoirradiation, which causes cell death. However, in most cases, the PS consists of metals or heavy-atoms with significant cytotoxicity, even in the dark. Thus, in the recent past heavy atom free organic photosensitizers have gained significant attention. We envisaged the scope and utility of the therapy would be enhanced if such organic PS can be delivered in a dormant state and activated selectively by a biological stimulus, because it provides a secondary shielding if the PS becomes active by a specific biological stimulus, rather than just manual light activation. With this broad objective, we have explored PDT using the thionated naphthalene-monoimide based newly synthesized hydrophobic PS (NMI-S), which showed excellent ROS generation ability. For delivery purpose, it was non-covalently sequestered in a redox-responsive amphiphilic ABA-type block copolymer micelle in which the hydrophobic B block consists of bio-reducible polydisulfides chain. Within a redox-responsive polymer. This encapsulation initially reduces the generation of ROS as the PS remains in the aggregated state by antiparallel stacking inside the hydrophobic confined environment of the polymersome. However, when exposed to glutathione (GSH), a tripeptide commonly overexpressed in cancer cells, the polymer disassembles, releasing NMI-S in its active form, which effectively kills over 70% of cancer cells upon photoirradiation.[1] With such promising results, we went on to systematically optimize the structure of the photosensitizer to achieve (i) NIR absorption for deep tissue penetration and (ii) enhanced singlet oxygen generation. This has been achieved with a thionated acceptor-donor-acceptor (ADA) conjugated chromophore, showing near unity singlet oxygen generation quantum yield.[2] We have recently developed self-deliverable supramolecular systems based on such ADA conjugated chromophore and demonstrated its utility for activable photodynamic therapy. These recent results will be discussed in this talk.

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Personal Profile

Professor Suhrit Ghosh did PhD (2000-2005) under the supervision of Professor S. Ramakrishnan in IISc, Bangalore, India. Then he moved to the group of Professor S. Thayumanavan at the University of Massachusetts, Amherst, USA, for postdoctoral studies (2005-2007). Subsequently he worked as a Humboldt postdoctoral fellow (2007-2008) with Professor Frank Würthner at the University of Würzburg, Germany. In 2008 he joined IACS, Kolkata, India, as an Assistant Professor where he currently holds the position of Senior Professor in the School of Applied and Interdisciplinary Sciences (SAIS). He is the recipients of the B. M. Birla Science Prize (2014), SwarnaJayanti Fellowship (2015), K. Kishore Memorial Award (2016) from the Society of Polymer Science in India (SPSI), Bronze medal (2017), CNR Rao National Prize for Chemical Sciences (2023) from the CRSI and Santappa Award (2023) from SPSI. He is an Elected Fellow of the Indian Academy of Sciences (admitted in 2022). He serves as an Associate Editor in the journal ACS Applied Polymer Materials.

Research interest of his group includes supramolecular polymerization of donor-acceptor π-systems, H-bonding driven assembly of amphiphilic π-systems/ macromolecules and biologically relevant stimuli responsive aggregation of amphiphilic polymers (polydisulfides, polyurethanes).

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PL-6

Real-Time Detection of Chemical Warfare Agents Through Advanced Chemosensor Detection Method

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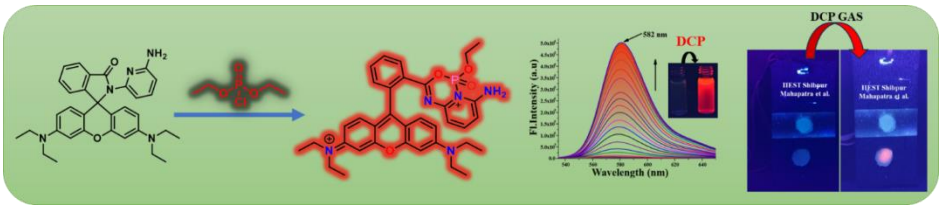
Abstract

The rapid and reliable detection of chemical warfare agents (CWAs) remains a critical challenge for global security, public safety, and environmental protection. Chemosensors and chemodosimeters offer rapid, selective, and sensitive pathways for detecting hazardous chemical species through tailored molecular recognition and reaction-based signaling. Analytical methods that can accurately detect CWAs are essential to global security measures and for forensic analysis. This talk explores recent advances in chemosensor technologies—including optical and fluorescence-based platforms—and highlights how innovations in materials science and supramolecular chemistry are improving detection speed, selectivity, and robustness. We will discuss the underlying principles that allow chemosensors to distinguish target analytes, strategies for enhancing sensor stability in complex environments, and current trends toward miniaturization and portable device integration. Finally, the talk will address our ongoing work that have been designed for the detection of CWAs in our laboratory.[1-7] The designed criteria and mechanism for CWAs detection, change in optical output, and application for each fluorescent probe for live-cell imaging are also highlighted.



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Personal Profile

Professor Mahapatra graduated in chemistry in 1991 from Midnapore College and followed it up with a master's degree in 1994 from the IIT, Kharagpur. He is enrolling in his doctoral studies under the guidance of Prof. Shyamaprosad Goswami at the IIT, Kharagpur as a CSIR fellow. Eventually, his mentor Prof. Goswami transferred from IIT KGP to B. E. College (D.U.) in 1999 and hence he was awarded a Ph.D. degree in February 2001 from BESU. Meanwhile, in April 1998 he was appointed lecturer (WBES) at Jhargram Raj College, Department of Chemistry (UG & PG), where I taught until my appointment in June 2008 as Associate Professor at IIEST, Shibpur (at that time BESU, Shibpur) and was promoted to full Professor in April 2013. Prof. Mahapatra is reported to have done extensive research on the toxic analyte sensing cation, anion, cardiovascular agents, and biothiols sensing. He has developed several chemodosimeter for Chemical Warfare Agents (CWAs) sensing. His research has been documented by way of a number of peer-reviewed articles; Research Gate, an online article repository of scientific articles, has listed 135 of them respectively. He has mentored 26 scholars in their doctoral and post-doctoral studies and has been involved in several projects for agencies such as CSIR, DST-SERB, DST(WB), DBT, BRNS, and UGC. He now currently serving as a HAG Professor from August 2021 and former Head, (i) Department of Chemistry, (ii) School of Community Science and Technology, and Centre for Health Care Science and Technology, IIEST, Shibpur.

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PL-7

Unlocking new chemical space via selective catalysis

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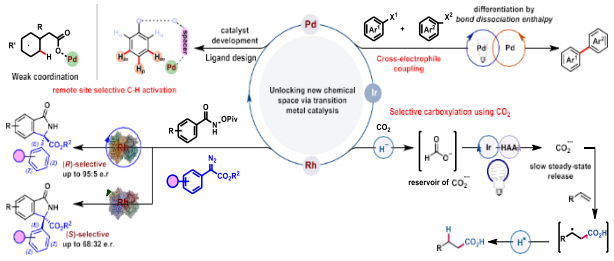
Abstract

The limitations of cross-coupling such as the availability of prefunctionalized coupling partners,instability, and synthesis expense remain, posing significant barriers to unlocking new chemical space for molecular complexity. To solve these underlying problems of cross-coupling we are mainly focused on the development of techniques for direct C–H functionalization and cross- electrophile coupling. Selectively targeting a remote C–H bond in a molecule remains more challenging due to the inaccessibility of these sites in formation of energetically favorable organometallic pre-transition states. We believe that the direct release of the reactive metal catalyst in close proximity to the targeted remote C–H bond could solve this problem. We devised covalently attached template-directed methods that require precise spatial positioning of the directing group in order to selectively activate remote C–H bonds. We recently demonstrated that various non-covalent interactions are also successful in recognizing the perfect orientation of catalyst and the substrate to achieve selective C–H bond activation. In this vein, we have developed a method for the activation of methylene C–H bond in presence of methyl C–H bondsto form unsaturated bicyclic lactones utilizing the weak coordinating nature carboxylic acid towards palladium. Cross-electrophile coupling (XEC) approach would be a powerful tool for theconstruction of (hetero)biaryl moiety because of the widespread availability and stability of (hetero)aryl electrophiles. We have demonstrated a ligand controlled visible light driven monometallic cross-electrophile coupling platform for the synthesis of unsymmetrical (hetero)biaryls directly from (hetero)aryl halides and pseudohalides. In addition, our lab is pursuing the development of a paradigm in which small molecules such CO_2, SO_2 *etc.* can be converted into a wide range of chemicals and materials using renewable visible light photocatalysis.



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Personal Profile

Prof. Debabrata Maiti received his PhD from Johns Hopkins University in 2008 underthe supervision of Prof. Kenneth D. Karlin. After postdoctoral studies at MIT with Prof. Stephen L. Buchwald, he joined the Department of Chemistry at IIT Bombay in 2011. His research interests are focusedon the development of new and sustainable synthetic and catalytic methodologies. Currently he is *Editor- in-Chief, Synlett.*

Awards

Shanti Swarup Bhatnagar Prize (SSB) for Science and Technology 2022 FASc, Fellow of Academy of Sciences
Humboldt Research Fellowship
FRSC, Fellow of the Royal Society of Chemistry

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PL-08

Non-covalent Interaction-Controlled Site-selective C–H Transformations

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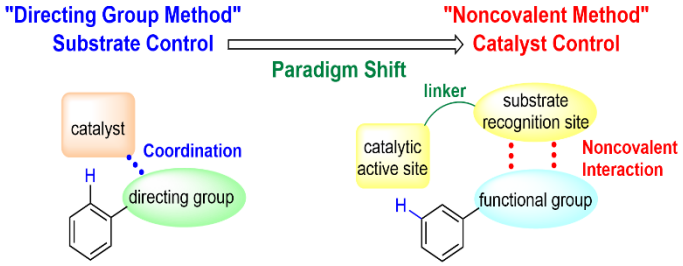
Abstract

Site-selective C–H transformations are important to obtain desired compounds as single products in a highly efficient manner. However, it is generally difficult to achieve such transformations because organic substrates contain many C–H bonds with similar reactivities. Therefore, the development of practical and efficient methods for controlling site selectivity is highly desirable. The most frequently used strategy is "directing group method". Although this method is highly effective and promotes site-selective reactions, it has several limitations. Our group recently reported other methods to achieve site-selective C–H transformations using non-covalent interactions between a substrate and a reagent or a catalyst and a substrate (non-covalent method).[1] In this lecture, I will talk about hydrogen bond[2]-, Lewis acid-base interaction-[3] and host-guest interaction[4]-controlled site-selective C(sp^2)–H borylation of aromatic compound. Electrostatic interaction-controlled site-selective C(sp^3)–H alkylation of anilines,[5] and amino acids and peptides,[6] and C(sp^3)–H oxidation[7] will also be presented.



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Personal Profile

Professor Yoichiro Kuninobu received his B.S. and Ph.D. degrees from the University of Tokyo in 1999 and 2004, respectively, under the supervision of Professor Eiichi Nakamura. He was appointed assistant professor at Okayama University in 2003 and worked with Professor Kazuhiko Takai. In 2012, he was promoted to an associate professor at the University of Tokyo and the group leader of ERATO project, JST, and worked with Professor Motomu Kanai. In 2017, he became a full professor at Kyushu University. His research interests relate to the creation of high-performance catalysts, the development of novel and highly efficient synthetic organic reactions, and the creation of π-conjugated molecules.

Awards

Meiji Seika Award in Synthetic Organic Chemistry, Japan (2006); Science and Technology Award in Okayama Foundation of Science and Technology (2007); OMCOS 14 Poster Award (2007); Incentive Award in Tyugoku-Shikoku Branch of the Society of Synthetic Organic Chemistry, Japan (2007); 22th Lectureship award for young chemists at the 88th annual meeting of the Chemical Society of Japan (2008); BCSJ Award (2008); Incentive Award for Young Top Researcher in Okayama University (2009); Banyu Chemist Award (BCA 2010) (2010); The Chemical Society of Japan Award for Young Chemists (2011); Thieme Chemistry Journal Award 2012 (2011); The Young Scientists' Prize, The Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology (2012); JST-ERATO Lectureship Award (2015); 20th The Society of Silicon Chemistry Japan Award for Young Chemists (2015); SSOCJ Nissan Chemical Corporation Award for Novel Reaction & Method 2023 (The Society of Synthetic Organic Chemistry, Japan) (2024)

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PL-09

Cobalt-Single-Atom Catalyzed Small Molecule Activation

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Abstract

Single-atom catalysts (SACs) have emerged as a promising class of heterogeneous materials that maximize atomic efficiency, offering well-defined and tunable active sites.[1] It establishes a conceptual bridge between homogeneous and heterogeneous catalysis, focusing on catalyst coordination environment engineering with enhanced recyclability. We have synthesized various Co/Ni-SACs by impregnating metal precursors onto nitrogen-doped graphitic carbon support through pyrolysis, followed by an acid wash. I will discuss the reactivity of these catalysts in the transfer hydrogenation of azides, azo compounds, nitroarenes, and α,β-unsaturated ketones, the synthesis of pyrroles, and the reductive amino-formylation (RAF) of carbonyl compounds.[2] Additionally, dual-site synergy in Co/Zn SAC enables selective N–O bond cleavage, and strategically designed porous Co-SACs showcased carbon–heteroatom bond formation via metal-carbene intermediates. Catalyst designing, practical application facets, and mechanistic investigation of these catalytic systems will be presented.

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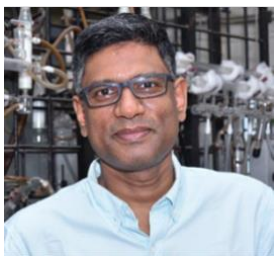
Personal Profile

Professor Sabuj Kundu Sabuj Kundu obtained his PhD in 2009 from Rutgers, The State University of New Jersey, USA, under the supervision of Professor Alan S. Goldman. He worked as a postdoctoral fellow with Professor William D. Jones at the University of Rochester, NY (2009-11) and Professor Maurice Brookhart at the University of North Carolina at Chapel Hill (2011-13). Subsequently, in 2013, he returned to India and joined as an Assistant Professor at the Department of Chemistry, Indian Institute of Technology Kanpur, where he is presently a Professor. His group is focused on various aspects of homogeneous, heterogeneous catalysis, and photocatalysis for sustainable chemical transformations.

Awards

CRSI Bronze Medal, 2026
Advisory Board members of Tetrahedron Green Chem, Elsevier, 2024
P. K. Kelkar Fellowship, IIT Kanpur, 2019



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PL-10

Non-equilibrium self-assembly for living matter-like properties

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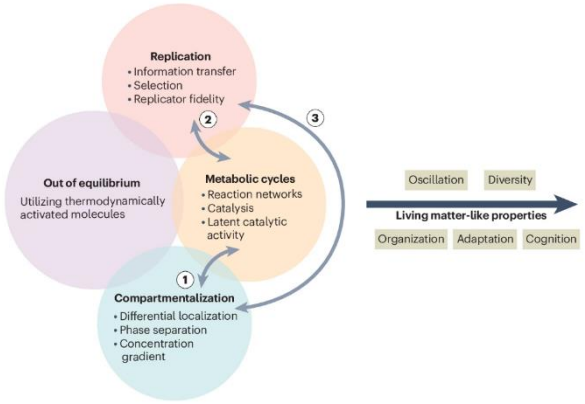
Abstract

Life's soft and wet machinery arose from spatially confined assemblies of biomolecules capable of replication, integrated with metabolic reaction cycles that function far from equilibrium.[1] By methodically synthesizing and integrating these key elements, i.e. replication, metabolism, and confinement under non-equilibrium conditions, we can begin to explore how chemically constructed systems might acquire life-like, evolving properties.[2-5] This ambitious goal lies at the heart of systems chemistry. In this talk, I will outline recent insights into how reaction networks, self-reproduction, and compartmentalization can be brought together under non-equilibrium settings.[1] I will also delve into the interplay between reaction dynamics and transient compartmentalization, and explore the development of self-replicating systems capable of sustained operation in far-from-equilibrium conditions.



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Personal Profile

Prof. Dibyendu Das is a Professor of department of Chemical Sciences IISER Kolkata.
Academic Distinctions (National)
Shanti Swarup Bhatnagar (Vigyan Yuva SSB) Award in Chemistry for 2025
Swarnajayanti Fellowship in Chemical Sciences, 2020, DST, Govt. of India.
Featured in "75 under 50 scientists shaping today's India" compendium
Selected as Indian National Science Academy Associate Fellow in 2025
.Indian Peptide Society-Young Scientist Award (IPS-YSA) for excellence in Peptide Research 2021.
Selected as an Associate of the Indian Academy of Sciences (IASc) 2019.
CRSI Bronze Medal for the year 2023.
Academic Distinctions (International)
Elected Chair for the Gordon Research Conference (GRC) in Systems Chemistry (2028) and as Vice Chair GRC (2026).
Mentored Gordon Research Seminars on Systems Chemistry (2024) for students and Invited Talk at GRC 2024
Article featured in the virtual issue of the JACS Early Career Investigators as an outstanding work published in 2020.
Early Career Advisory Board of ACS Chemical Reviews 2020-2021.
Advisory Board of Materials Horizons from 2021 and Editorial Advisory Board of ChemSystemsChem from 2023 onwards
Represented India as an Early Career Chemist in the 2nd Commonwealth Chemistry Conference In Trinidad & Tobago 2023
International Advisory Board (IAB) of AsianJOC from 2021 onwards and RSC Organic Chem Frontiers, 2024-onwards.

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PL-11

Diclofenac Induced Cardiac-Injury: Protection By Melatonin

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[*]**Debasish Bandyopadhyay**,
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Abstract

Diclofenac, a traditional non-steroidal anti-inflammatory drug, has long been utilized to manage chronic pain and inflammation effectively. However, the potential toxic effects associated with this drug is a major concern for public health systems. The present study explores the molecular mechanism through which diclofenac induces cardiac injury, the pivotal role being played by oxidative stress in this process. Diclofenac results in mitochondrial dysfunction disturbing the mitochondrial homeostasis and altering the expression of metabolic sensors like SIRT3, PGC-1α, and AMPK thereby disrupting the overall cardiac homeostasis. Melatonin, a pineal-derived indoleamine with potent antioxidant properties, alleviates diclofenac induced cardiac injury. Melatonin mediated protection of the oxidative damages in turn, protects the mitochondrial health and maintains the energy metabolism. Furthermore, a favourable binding between diclofenac and melatonin has been observed which probably shields the myocardium from the harmful effects of diclofenac. The findings of the present study holds promising therapeutic potential for the future.

Personal Profile

Dr. Debasish Bandyopadhyay is presently Professor at the Department of Physiology, University of Calcutta. He served this department as the Head for two full tenures. Before joining the University of Calcutta, he was the founder Head of the Department of Biotechnology, Assam (Central) University, Silchar, Assam, India, followed by Head, Centre for Biotechnology, Visva- Bharati University (a Central University), Santiniketan, Bolpur, India. He did his Ph. D. work at CSIR-Indian Institute of Chemical Biology, Calcutta and his post- doctoral work at University of Texas Medical Branch (UTMB) at Galveston, Texas, USA. Prof. Bandyopadhyay has been working on melatonin since last few decades and has made significant research contributions on melatonin in the domains of enzymology, oxidative stress and free radical biology, myocardial ischaemia, gastric ulceration which have been recognized world over. Moreover, he has also made an impact in the field of development of new drug/ antioxidants of synthetic or natural origin. He has National and International collaborations and has published more than 125 research papers till date in national and international peer-reviewed journals. Prof. Bandyopadhyay is a regular reviewer of numerous leading journals published by Elsevier and other internationally renowned publishers. He is one of the editors of the journal named 'Melatonin Research' published from USA. Moreover, Prof. Bandyopadhyay is a recipient of prestigious ‘Parimal Bikash Sen Memorial Oration Award’ from Physiological Society of India, Calcutta. Very recently Prof. Bandyopadhyay has also received ‘Prof. S. C. Mahalanobis Memorial Oration Award’ from Physiological Society of India; the highest award conferred by them. Besides, he is one of the founder fellows of the Physiological Society of India, Kolkata.
Total Citations in Research Gate –4317
Total Reads in Research Gate – h- index [Scopus; Elsevier] – 36
h – index [Google Scholar] – 36 Total Citations Google Scholar – 5249 i-10 index - 88
RI Score – 2177
Total Citations in Research Gate –4317 Total Reads in Research Gate – 53,110

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PL-12

Synthetic Small-Molecule Modulators for the Rare Genetic Disease Friedreich's Ataxia: A Dual-Mechanistic Approach

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Abstract

Rare genetic diseases, though individually uncommon, collectively affect millions worldwide and pose formidable challenges due to their diverse genetic origins and lack of effective therapies. Among them, Friedreich's Ataxia (FRDA) is a debilitating neurodegenerative disorder caused by GAA trinucleotide repeat expansion in the FXN gene, resulting in reduced frataxin expression and mitochondrial dysfunction. Conventional therapeutic strategies largely focus on symptomatic management, without directly correcting the underlying genetic defect. My talk will provide an overview of our recent work on therapeutic strategies for such genetic diseases, we developed a series of positional indolyl-benzodiazepine isomers derived from IBET-762 to investigate how subtle structural modifications influence BET–bromodomain binding, selectivity, and downstream gene regulation. Systematic SAR analysis, surface plasmon resonance assays, crystallographic studies, and long-timescale molecular dynamics simulations revealed that positional placement of the indole ring governs interaction networks within the BD2 cavity, particularly involving His433, Tyr428, and Asn429, leading to distinct binding stabilities. Four optimized ligands were incorporated into Synthetic Genome Readers (SynGRs) targeting expanded GAA repeats within the FXN locus. Consistent with their BD2 affinity, the IND-SynGRs restored frataxin mRNA levels in FRDA patient-derived fibroblasts and lymphoblasts. This dual-mechanistic approach—combining BET protein recruitment with locus-specific targeting—provides a new chemical biology platform for correcting transcriptional silencing in a rare genetic disease.

Reference

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Personal Profile

Prof. Dr. Parasuraman Jaisankar, M.Sc., Ph.D., FIC, FAScT, FRSC (UK), is Chief Scientist and Head of the Pharmacology & Drug Discovery Division at the CSIR-Indian Institute of Chemical Biology (IICB), Kolkata, and Professor of Chemical Sciences at AcSIR. A distinguished Fulbright Fellow (USA) and DAAD Fellow (Germany), he is widely recognized for his multidisciplinary contributions spanning synthetic organic chemistry, medicinal chemistry, chemical biology, and translational pharmacology.With nearly **36 years of research leadership**, Prof. Jaisankar has made significant impact on drug discovery programs targeting infectious diseases, rare genetic disorders, neurodegeneration, cancer, and metabolic diseases, as well as the development of next-generation fluorescent probes and chemical biology tools. His scientific output includes **123 international peer-reviewed publications, 17 patents**, and several book chapters and invited reviews. His research group integrates advanced chemical synthesis with biological evaluation to deliver novel molecular entities and translational innovations.Prof. Jaisankar earned his Ph.D. in Medicinal Chemistry from Jadavpur University and pursued advanced postdoctoral training at prestigious global institutions, including RCMS, Nagoya University under Nobel Laureate **Prof. Ryoji Noyori**; Ulm University and the Technical University of Munich as a DAAD Fellow; and St. Jude Children's Research Hospital, USA, as a Fulbright Fellow. He has also served as Visiting Scientist at Nicolaus Copernicus University, Poland, and at the National Changhua University of Education, Taiwan, under an INSA bilateral programme. Prof. Jaisankar also holds prominent professional positions: President of the **Royal Society of Chemistry (Eastern India Section, UK)**, Founder Member and Vice-President of the **Chemical Biology Society** of India, and Former Global Chair of the **International Chemical Biology Society** (ICBS). He serves as Associate Editor of Frontiers in Chemistry.A dedicated mentor, Prof. Jaisankar has supervised **32 Ph.D. scholars**, **over 23 postgraduate students**, and several postdoctoral researchers and fellows. His recognitions include Fellowships of the Royal Society of Chemistry (FRSC), the West Bengal Academy of Science & Technology (FAScT), the Institution of Chemists (FIC), and the American Society for Microbiology (2023–2025). He is the recipient of the **Dr. B. Mukherjee Memorial Oration Award,** the Bharat **Seva Ratan Gold Medal, and the Best Teacher/Scientist Award from NIPER-Kolkata.**

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PL-13

Alternative Energy Drivers in Metal Catalyzed Coupling Reactions

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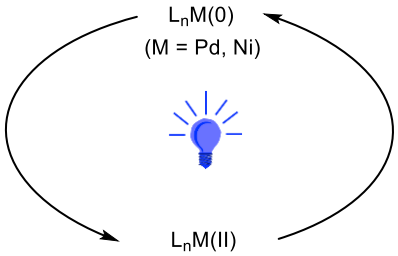
Abstract

The ability of transition metal catalysts to mediate new bond forming reactions has had a dramatic impact on modern molecular synthesis. Nevertheless, a central feature in these reactions is need to balance of reverse operations on the catalyst so it is regenerated at the end of each cycle of product formation, which can limit catalytic activity and the scope of many transformations. This talk will describe our efforts to address these challenges by introducing visible light sources into catalysis, and from this create new bond forming reactions. These include using visible light excitation directly on active palladium or nickel catalysts to drive the oxidative addition/reductive elimination cycle in coupling reactions independent of the classical limits in thermal catalysis.[1] Combining these with the favored energetics of carbon monoxide conversion to carboxylic acid derivatives can be used to drive the build-up of reactive products from stable reagents. The use of this chemistry to create ambient temperature and general catalysts for carbonylative coupling reactions, acyl halide or alkyl isocyanate formation, new avenues to C-H bond functionalization, will be discussed, as will and the ability to merge the photochemistry of active metal catalysts with photoredox systems to further expand the utility of this reactivity.



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Personal Profile

Bruce Arndtsen is a James McGill Professor of Chemistry at McGill University. He obtained his undergraduate chemistry degree from Carleton College in 1988, followed by a Ph.D. in 1993 from Stanford University with Prof. Lisa McElwee-White, and postdoctoral research from 1993-1995 at University of California, Berkeley with Prof. Bob Bergman. In 1995, he began his independent career at McGill University, where he moved to his current position of full professor. Research in his laboratory is at the intersection of metal catalysis, synthesis, and sustainability. This includes recent thrusts using photochemistry and electrochemistry in palladium catalysis, carbonylative electrophile synthesis, C-H functionalization, chiral anions in asymmetric catalysis, new classes of cycloaddition reactions, and multicomponent synthesis. During his career, he has been named a Canadian Research Chair (Tier I and Tier II equivalents) at McGill, received an NSERC Accelerator Award, and two DuPont Research Awards. He is a Fellow of the Royal Society of Canada, and in 2021 received the Alfred Bader Award in Organic Chemistry by the Canadian Society for Chemistry.

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PL-14

N-Heterocyclic Carbene-Catalyzed Synthesis of C-N, C-O and N-N Axially Chiral Molecules

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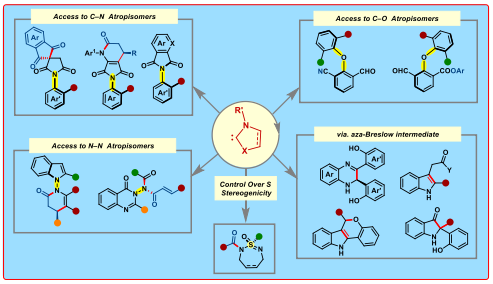
Abstract

Organocatalysis using N-heterocyclic carbene (NHCs) has been widely utilized for the polarity reversal of aldehydes (umpolung).1 Although NHC catalysis is well demonstrated for the enantioselective synthesis of target molecules, related application to the synthesis of axially chiral molecules is limited (especially the heteroatom-containing axis). We have recently reported the NHC-catalyzed atroposelective synthesis of C-N axially chiral N-aryl succinimides,2 phthalimides/maleimides,3 N-N axially chiral 3-amino quinazolinones,4 indoles and pyrroles as well as C-O axially chiral diarylethers.5 In addition, precise control over S(VI)-stereogenic center has recently be achieved by the enantioselective synthesis of N-acyl cyclic sulfonimidamides.6 The details of these works will be discussed.



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Personal Profile

Prof. A. T. Biju received his M. Sc. from Sacred Heart College Thevara (affiliated to MG University, Kerala, India) and Ph.D. under the guidance of late Dr. Vijay Nair at the CSIR-NIIST (Formerly RRL), Trivandrum, India. Subsequently, he has been a post-doctoral fellow with Prof. Tien-Yau Luh at the National Taiwan University, Taipei and an Alexander von Humboldt fellow with Prof. Frank Glorius at the Westfälische Wilhelms-Universität Münster, Germany. In June 2011, he began his independent research career at the CSIR-National Chemical Laboratory, Pune. In June 2017, he moved to the Department of Organic Chemistry, Indian Institute of Science, Bangalore, where he is a professor presently. His research focuses on developing strategies using N-heterocyclic carbene (NHC) organocatalysis, and strain-release driven reactions of arynes, donor–acceptor cyclopropanes and bicyclobutanes.
Associate Editor, Synthesis
Advisory Board, Chem. Commun.
Advisory Board, Org. Chem. Front.
Advisory Board, SynLett.
International Advisory Board, Asian J. Org. Chem.
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PL-15

Application of Green Tools in Modern Organic Synthesis

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Abstract

Synthetic organic chemists are primarily concerned with chemical compounds and their synthetic processes, on which the material basis of a sustainable society largely depends. Hence, designing for chemical products and processes should follow principles that make them conducive to life [1-4]. Among various techniques and strategies used in practising '*green chemistry*,' notable advancements are the development of solvent-free synthesis, organic reactions under aqueous conditions, room-temperature organic synthesis, development of recoverable catalytic systems and also catalyst-free synthesis, and application of energy-efficient *green tools* involving the use of ultrasonication, microwave irradiation, ball-milling, visible lights, and electro-synthetic techniques. The application of *green tools* bears the potential to address not only the most challenging concern relating to energy consumption in chemical manufacturing but also to implement a plethora of organic transformations that could not be feasible under traditional processes, offering several new chemistries. As part of our ongoing research endeavours, we have also been deeply involved in green chemistry research for more than one and a half decades, focusing on designing and developing new approaches for biologically promising organic small molecules, including the effective and fruitful application of green energy tools in implementing a handful of organic transformations of interest [5-18]. A couple of our selected synthetic drives in this domain will be presented in the meeting.

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Personal Profile

Professor Goutam Brahmachari, Ph.D., D.Sc., FRSC, presently holding the position of a full professor (since 2011) of organic chemistry at Visva-Bharati University (India), has been deeply involved in research activities that include synthetic organic chemistry, green chemistry, and medicinal and natural products chemistry. With approximately 28 years of experience in teaching and research, he has produced over 300 scientific publications, including original research papers, review articles, books, and invited book chapters in the fields of synthetic organic chemistry and natural products chemistry. He has supervised 20 doctoral students (PhD programme) so far. Prof. Brahmachari received several awards and accolades, including the Acharya P. C. Ray Memorial Lecture Award-2025 (ISNA, Kolkata), Dr. Satyajit Chakraborti Memorial Award-2025 (IEM, Kolkata), CRSI Bronze Medal-2021, Dr. Basudev Banerjee Memorial Award-2021 (ICS, Kolkata), and INSA Teachers Award-2019, for his teaching and research contributions. Prof. Brahmachari was featured in the World Ranking of the Top 2% Scientists (Organic Chemistry Category) in 2020-25 (both in whole career and single years), in the AD Scientific World Ranking of Scientists -2022-2026, as the ScholarGPS Highly Ranked Scholar-2022-2025 (Lifetime, securing a position in the top 0.05% of all scholars worldwide in the category of "Environmentally friendly"). He is an elected fellow of the West Bengal Academy of Science & Technology (2026). Current citations: 7810, h-index: 46, and i10-index: 149 (as of 15.12.2025).

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PL-16

All-trans Retinoic Acid (ATRA): A Potent Inhibitor of Matrix Metalloproteinases and Cellular Signalling Cascades in Cervical Cancer Cells

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Abstract

Cervical cancer is the second most commonly occurring cancer in women in India and advanced stages of this cancer show poor prognosis. Cellular signalling though phosphatidylinositol 3' kinase (PI3K), focal adhesion kinase (FAK) and mitogen activated protein kinase (MAPK) play crucial roles in promoting cervical cancer progression and metastasis. Although modern treatments like chemotherapy have appreciably improved survival rates for cervical cancer, such treatments often suffer from numerous toxic side effects and show low efficacy for treatment of metastatic cancers. Since using natural compounds to target molecules which promote cervical cancer progression could provide alternatives to conventional treatments, we analysed the anti-tumorigenic potential of the phytochemical all-trans retinoic acid (ATRA), a naturally occurring metabolite of retinol, found in carotenoid rich fruits and vegetables. *In silico* studies showed ATRA has comparatively low toxicity and good binding affinity with human PI3K, MAPK and FAK with its binding affinity comparable to or greater than the binding affinity of synthetic inhibitors like alpelisib, BIRB-796 and defactinib (synthetic inhibitors for PI3K, MAPK and FAK respectively). Treatment of the human cervical cancer cell line HeLa with ATRA caused significant concentration dependent inhibition of MAPK, FAK and PI3K, indicating that ATRA shows excellent potential as inhibitor of these signalling cascades for cervical cancers. Treatment of HeLa cells with ATRA significantly inhibited MMP-2 and MT1-MMP expression and gelatinase activity and molecular docking studies indicated ATRA has high binding affinity for catalytic domains of human matrix metalloproteinases (MMPs) including MMP-2 and MT1-MMP in comparison to synthetic MMP inhibitors like Rebimastat and Batimastat. Treatment with ATRA also inhibited cell survival and cellular invasion of HeLa, indicating its potential efficacy for treatment of cervical cancers. As MMP-2 and MT1-MMP play crucial roles in regulation of metastasis and tumour development in cervical cancers, their downregulation could inhibit tumour progression and metastasis. Thus, targeting cellular signalling through PI3K, FAK and MAPK and expression and activity of MMPs using the natural phytochemical ATRA could lead to development of novel strategies for cervical cancer therapy with possibly lower side effects and better clinical outcomes.

Personal Profile

Dr. Aniruddha Banerji, M. Sc, Ph. D, is an Associate Professor in the Post Graduate Department of Biotechnology at St. Xavier's College (Autonomous), Kolkata. He completed his B. Sc with Zoology Honours from Presidency College (under University of Calcutta) and his M. Sc. in Zoology from University of Calcutta standing 1st class 1st in order of merit in both. He completed Ph. D in Life Sciences from Jadavpur University, pursuing his research at Chittaranjan National Cancer Institute, Kolkata, on the role of MMPs in tumour biology. His primary field of research involves cancer biology and his areas of research interest include the roles of cell surface receptors, matrix metalloproteinases (MMPs) and cellular cell signalling pathways in tumour metastasis and the anti-tumorigenic potential of natural phytochemical compounds. He has published 27 research papers in international and national journals and 14 book chapters. He has delivered invited lectures and oral presentations at a number of national and international seminars of repute and has successfully completed two major research projects as principal investigator. He is actively involved in research and is currently guiding a number of research fellows for their Ph. D. He has a teaching experience of over 18 years at the undergraduate and postgraduate levels and had been involved in administrative responsibilities for over 2 years. Dr. Banerji has been honoured with a number of awards including the A.K. Bhowmick Memorial Medal from The Zoological Society, Kolkata for 1st place in B. Sc Zoology, medal from Calcutta University, for 1st place in M. Sc Zoology, award for Best Young Scientist in Molecular Biology and Genetics, at National Seminar on Dimensions in Zoological Research in Human Welfare, organized by Department of Zoology, University of Calcutta and The Zoological Society, Kolkata in collaboration with the Zoological Survey of India in 2007, award for Best Oral Presentation, at Symposium on Recent Trends in Cancer Research & Treatment, organized by Chittaranjan National Cancer Institute in 2007 and the Ganatantra Diwas Puraskar for Inspiring Contribution in Life Sciences from IMRF in 2025. He was a member of the Executive Committee, Zoological Society, Kolkata from 2015–2019. Born into a family of academicians, he seeks to carry forth the tradition of academic excellence following in the footsteps of his grandmother, Prof. Asima Chatterjee and his parents.

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PL-17

Control of Selectivity and Reactivity in Organic Transformations

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Abstract

Direct functionalization of simple or complex organic molecules through metal-catalyzed C–H bond activation has received much attention for streamlining organic synthesis. However, achieving reaction efficiency and controlling the site-selectivity remain challenging issues.
We are pursuing two approaches to these problems:
(1) A bio-inspired design of catalysts that can recognize an organic substrate through remote, weak noncovalent interactions.[1] Specifically, we designed a new class of SpiroBipyridine ligands[2] that control reactivity and selectivity in iridium-catalyzed borylation of arenes, for example *meta*-selective reaction of simple arenes through remote steric interactions,[3] accelerated reaction of arenes through CH-p interactions,[4] or selective reactions of pyridines through hydrogen bonding.[5]
(2) Activation of an arene or chloroarene through p-coordination to a metal fragment[6] such as chromium, to achieve nucleophilic borylation of arenes,[7] cobalt-catalyzed borylation of electron-rich arenes,[8] or radical cross coupling of chloroarenes with arenes.[9]

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Personal Profile

Professor Laurean Ilies obtained his Ph.D. in 2009 from The University of Tokyo under the guidance of Professor Eiichi Nakamura. He was appointed Assistant Professor at the University of Tokyo in 2009, then promoted to Associate Professor in 2014. From 2018, he became a Team Leader at the RIKEN Center for Sustainable Research Center (title changed in 2025 to Team Director). From 2021, he is also an Adjunct Professor at Saitama University.
Visiting Professorship at National Chung Hsing University (2024), part-time Lecturer at the University of Tokyo (2020, 2023, 2034), and Tokyo University of Science (2022–2025).

Awards

Japanese Society for Process Chemistry Award for Excellence 2021, 2025
The 6th RIKEN Award for Excellent Achievement
Incentive Award in Synthetic Organic Chemistry, Japan
The Young Scientist Prize by MEXT, Japan
Thieme Chemistry Journal Award
Banyu Chemist Award

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PL-18

Photovoltaic Properties of Organic Thin-film Solar Cells Based on Semiconducting Polymers

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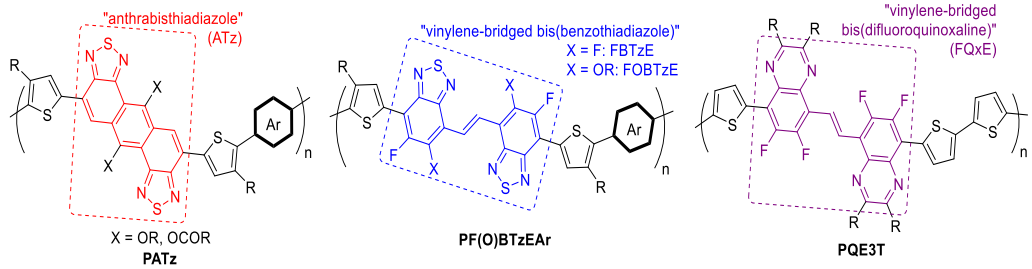
Abstract

Since donor-acceptor (D-A) polymers are crucial for the development of high-performance semiconductors in organic photovoltaics (OPVs), the design and synthesis of novel donor and acceptor units are essential for advancing high-performance electronic materials. Among the various acceptor units that have been explored, o-benzodiimine derivatives—such as benzo[c][1,2,5]thiadiazole (BT) and quinoxaline (Qx)—have been widely utilized in high-performance D-A polymers.[1] These frameworks not only serve as effective electron-deficient units but offer additional functionalities, such as acting as adjacent aromatic π-spacers or facilitating hydrogen bonding between polymer backbones. These interactions contribute to enhanced backbone planarity and ordered molecular packing, critical for optimizing charge transport properties. In this presentation, novel π-extended BT and Qx derivatives, including anthra[1,2-c:5,6-c']bis([1,2,5]thiadiazole) (ATz), vinylene-bridged bis(benzothiadiazole) (F(O)BTzE), and vinylene-bridged bis(difluoroquinoxaline) (FQxE) are introduced. Furthermore, the relationship between these polymers' thin-film morphology and the resulting OPVs' performance, providing insights into structure-property correlations will also be discussed.



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Personal Profile

Professor Yasushi Hashmi was born in Hiroshima, Japan in 1968. He earned a B.S. degree from Hiroshima University in 1992. He studied at the University of Notre Dame and University of Iowa, USA under the supervision of Professors Thomas P. Fehlner and Richard F Jordan, respectively. He received his Ph.D. (1997) from the Graduate University for Advanced Studies (SOKENDAI) under the supervision of Professor Tamotsu Takahashi. He became an Assistant Professor at the Tokyo Institute of Technology in 1996, working with Professors Tamejiro Hiyama and Kohtaro Osakada; he moved to Okayama University as an associate professor in 2004 and was promoted to full Professor in 2010. His current research interests are organic synthesis mediated and/or catalyzed by organometallic compounds and their application in functional materials such as organic transistors and solar cells.
Visiting Professorships at National Taiwan University (Taiwan, 2009).

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PL-19

Enantioselective Catalysis by Higher Order Organosuperbase

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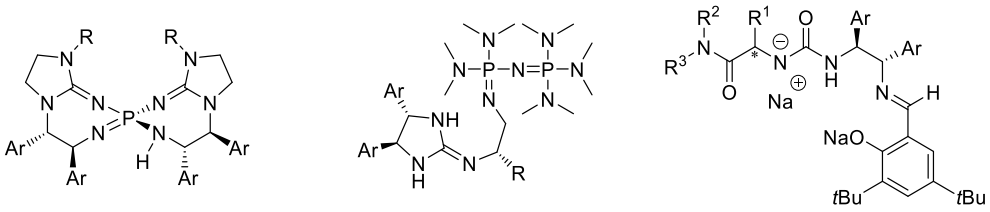
Abstract
The development of new molecular catalysts is one of the keys for paving the way to novel transformations. In the field of chiral Brønsted base catalysis, which is one of the most fundamental and environmentally benign methodologies for the direct synthesis of enantioenriched compounds, a long-standing issue is the expansion of the scope of pronucleophiles that are applicable to the enantioselective reactions. Recently, chiral uncharged organobases with higher basicity than tertiary amines, such as chiral guanidines, P1-phosphazenes, and cyclopentenimines, have also emerged as efficient chiral Brønsted base catalysts. However, the insufficient basicity of these chiral organobases limits the scope of pronucleophiles to highly acidic compounds, such as β-dicarbonyl compounds and nitroalkanes, which restricts the viable enantioselective molecular transformations that are available under chiral Brønsted base catalysis. Therefore, the development of a new generation of chiral Brønsted base catalysts that can overcome the intrinsic limitations of pronucleophiles is highly desirable. In this context, our research program has been focusing on the development of much stronger chiral organobases, namely, chiral higher order organosuperbases. In this presentation, three types of chiral higher order organosuperbase catalysts are introduced as shown in Figure 1. 1) chiral bis(guanidino)iminophosphorane **1** possesses a C_2 symmetrical structure,[a] 2) chiral cooperative binary base catalyst **2** consists of two different organobase functionalities,[b] and 3) chiral ureates **3** having a cooperative function of ureate and phenoxide Schiff base units.[c].



bis(guanidino)iminophosphorane catalyst (*M*)-**1** ooperative binary base catalyst **2** ureate having phenoxide and Shciff base units **3**

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Personal Profile

Professor Masahiro Terada was born in Tokyo in 1964. He graduated from Department of Applied Chemistry, Tokyo Institute of Technology in 1986 and completed his Ph.D. degree in 1993 from Tokyo Institute of Technology. During his Ph.D. study, he was appointed as an assistant professor at Tokyo Institute of Technology (1989-2001). He worked as a postdoctoral fellow at Harvard University in 1999-2000 and moved to Tohoku University as an associate professor in 2001. He has been a Professor of Chemistry at the Graduate School of Science, Tohoku University since 2006 and has been appointed to the Dean of Graduate School of Science and Faculty of Science from April 2017 to March 2023. His current research interests are the development of new and useful synthetic methodologies based on the design of novel chiral Brønsted acid and base catalysts as well as the utilization of transition metal catalysts.

Awards:
The Incentive Award in Synthetic Organic Chemistry, Japan (2003)
The Chemical Society of Japan Award for Creative Work (2008)
Mukaiyama Award (2010)
Daiichi-Sankyo Award for Medicinal Organic Chemistry (2011)
The Nagoya Silver Medal (2012)
Molecular Chirality Award 2015 (2015)
Synthetic Organic Chemistry Award, Japan (2017)
Science and Technology, Research Category, the Commendation for Science and Technology by the MEXT Japan (2024).

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PL-20

Versatile Reactivity of Diazo Carbonyl Compounds Towards Metal Catalysts and Visible Light

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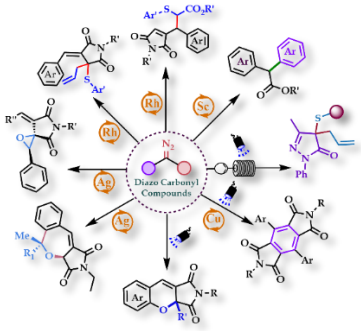
Abstract

Diazo carbonyl compounds have broad and tuneable reactivity.1a Owing to their versatile reactivity, diazo compounds have been utilized in diverse transformations in organic synthesis as well as in interdisciplinary fields.1b Developing catalytic methods for the chemo- and regio-selective C-H bond functionalization is highly desirable as well as challenging. Over the years, we have been exploring the reactivity of diazo carbonyl compounds both under metal and visible light catalysis. We have developed a robust propargyl α-aryl-α-diazoacetate as a new class of reagent for the effective C-H bond functionalization of unactivated arenes, 1,3 diketones & β-keto acids via scandium catalysis to access useful functionalized compounds.2 Likewise, we have been exploring the diverse reactivity of diazo arylidene succinimides (DASs) under metal as well visible light catalysis to access useful compounds like 2H-chormenes, PMDI etc.3 We have also been working in the field of photoredox catalysis.4This presentation will provide an overview of some of the recent advancements from our research group.



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Personal Profile

Professor Ramakrishna G. Bhat (RGB) obtained his PhD degree (2004) from the Department of Organic Chemistry, Indian Institute of Science (IISc) Bengaluru under the supervision of Prof. Srinivasan Chandrasekaran. Subsequently, he joined Prof. Brian M. Pinto's research group as a postdoctoral fellow at the Simon Fraser University, British Columbia, Canada. Later in the year 2006, he began his independent career at the Indian Institute of Science Education and Research (IISER) Pune and he was promoted to Full Professor in 2019. His research focusses on 'Organic Synthesis and Catalysis' encompassing the broad research areas on Photoredox catalysis, Photoinduced as well as metal catalyzed Carbene transfer reactions, C-H bond functionalization and Organocatalysis. He has been actively involved in the outreach educational activities and Teachers' training programs extensively. IISER Pune has conferred on him the very first 'Excellence in Teaching and Contributions to Teaching' award in 2022, the commencement year of the Teaching Award. He is also a member of Early Career Editorial Board in the Tetrahedron Letters and Tetrahedron.

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PL-21

Development of Na_2O Doped Solid State Glassy System for Supercapacitor Applications: Study of Electrical and Electrochemical Properties

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Abstract

In recent years, various oxide glassy systems containing Li_2O have been developed for use as electrolytes in lithium batteries. These systems show higher electrical conductivity and efficiency; however, their stability is a significant concern due to lithium's tendency to oxidize rapidly. Furthermore, the natural abundance of lithium indicates that alternative alkali metals should be explored as replacements. To tackle these challenges in battery electrolyte development, researchers have begun investigating sodium oxide-doped glassy systems as potential candidates for next generation solid-state sodium battery electrolytes. These glassy systems are considered suitable for solid-state batteries due to their higher chemical stability under varying atmospheric conditions. Additionally, the incorporation of V_2O_5 into the sodium-doped glassy system can lead to the formation of various structural groups. This results in a wide range of structures with excellent electrical and optical properties, particularly in accommodating different metal ions. The properties of Na_2O-V_2O_5 glassy systems are typically utilized for advancements in electrochemical batteries, memory-switching devices, and supercapacitors. A series of Na_2O-doped glassy systems (Na_2O - $PbCl_2$ - ZnO - V_2O_5) has been prepared using a melt-quenching method. The electrical conductivity of the as-developed samples has been examined over a wide range of temperatures and frequencies. The AC conductivity spectra indicated high-frequency di persion, characterized by frequency exponent (n) values that suggest a percolation-type motion for charge carriers. To investigate the strong composition dependence of the system, the power law pre-factor (A) has been utilized. Variations in the power factor parameters (n and S values) may be attributed to mixed charge carrier conduction. Additionally, the intercalation of Na^+ ions could facilitate rapid ion diffusion through one-dimensional, two-dimensional, or three-dimensional transport pathways that involve Faradaic charge transfer. Notably, the specific capacitance (Csp) shows a significant increase from 60.51 F g^{-1} to 88.57 F g^{-1} for a slight increment of Na_2O content in the composition, highlighting the enhancement due to a larger open surface area. This suggests that the current system can be classified as a supercapacitor within the category of pseudocapacitance-diffusion-controlled Faradaic systems. Furthermore, with the addition of a small amount of Na to the host system, specific energy increases by 6.3%, while specific power decreases by 20%. These characteristics underscore the potential of this system as an effective supercapacitor.

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The financial assistance for the work by the Anusandhan National Research Foundation (earlier SERB), Govt. of India via Sanction No: CRG/2023/000046 is thankfully acknowledged.

Personal Profile

Dr. Sanjib Bhattacharya is presently working as Associate Professor & Deputy Director of UGC-MMTTC (Physics), University of North Bengal He is also Principal Investigator of major Research Projects, funded by CSIR & DST, Govt. of India. He pursued Ph.D work (Solid State Physics) from Indian Association for the Cultivation of Science, Jadavpur and received PhD degree from Jadavpur University in the year 2008. He has more than 18 years of teaching and research experience. Dr. Sanjib Bhattacharya is the member of professional bodies like MRSI, Neutron Scattering Society etc. He has published 85 journal papers of international standard and many books and book chapters till date. The thrust area of research is the experimental Condensed Matter Physics and Materials Science and 9 no. of PhD students have already completed their PhD thesis under the supervision of Dr. Bhattacharya. He received outstanding paper award in west Bengal State Science and Technology Congress, 2018. For notable contribution, he is recognized as World's Top 2% Scientists by the Stanford University, California, USA and Elsevier.

Awards

World's Top 2% Scientists-2025 by the Stanford University, California, USA and Elsevier.
BHARAT GAURAV PURASKAR in 2024 by KTK Outstanding Achievers and Education Foundation (Govt. Recognised Bodies).
Top 100 Indian Educators of the Year Award-2024 by CKNKH Foundation Education Department (Govt. Recognised Bodies).
INSA Visiting Scientist Award, 2012.
Teacher Award due to significant contribution to the teaching-learning process and research from Maulana Abul Kalam Azad University of Technology, West Bengal on 8th September, 2018.
Outstanding Paper Award in WB State Science & Technology congress in the year 2018 Associate member of Institute of Physics (Membership ID: 80466769)
Lead Member of Editorial Board for a special theme of Frontier in Physics

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PL-22

Catalytic C–C Bond Formation via Aryl C–H Bond Cleavage Using Iron-Phosphine Complexes

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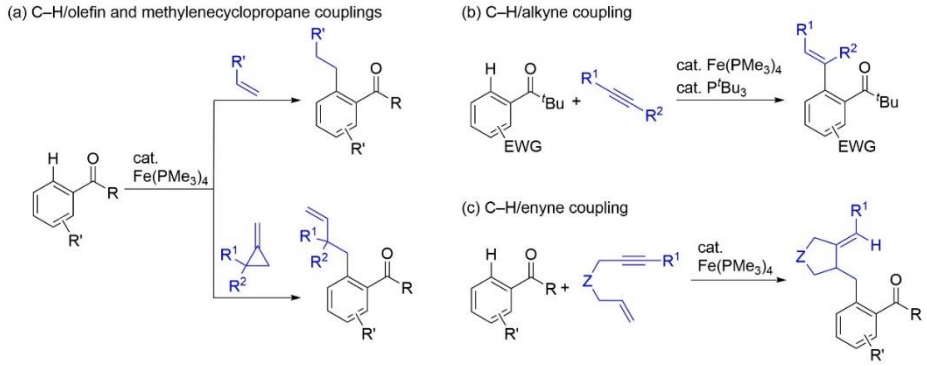
Abstract

Transition-metal-catalyzed C–H functionalization reactions represent a significant advancement in sustainable organic synthesis.[1] Various strategies have emerged, with the use of inexpensive, safe 3d metals—especially iron—providing an environmentally friendly catalytic approach.[2] Building on these advances, our group investigates C–H functionalization using the iron-phosphine complex $Fe(PMe_3)_4$ as a catalyst and reports reactions of aromatic ketones with alkenes and methylenecyclopropanes (MCPs) that yield linear alkylation and homoallylation products (Scheme 1a).[3] Here, we discuss $Fe(PMe_3)_4$-catalyzed coupling reactions of aromatic ketones with alkenes, MCPs, alkynes,[4] and enynes[5] via C–H bond cleavage.



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Personal Profile

Professor Fumitoshi Kakiuchi obtained his Ph.D. in 1993 from Osaka University under the guidance of Professor Shinji Murai. He was appointed as an Assistant Professor at Osaka University in 1993. He did postdoctoral work with Prof. Eric N. Jacobsen at Harvard University in 1996-1997. In 2000, he was promoted to the rank of Associate Professor at Osaka University. In 2005, he moved to Keio University as a Professor.

Awards:

Incentive Award in Synthetic Organic Chemistry, Japan, 2002
Young Scientist Award, Japan, 2005
Mukaiyama Award 2011

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PL-23

Engineering Supramolecular Channels for Responsive Ion Transport and Biomedical Applications

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Abstract

The development of artificial ion channels represents a rapidly evolving area at the interface of supramolecular chemistry, materials science, and biology. Supramolecular channels, constructed through the rational design and self-assembly of organic building blocks,[a] offer unique opportunities to emulate and expand upon the functions of natural membrane proteins. In particular, selective and stimuli-responsive ion transport has emerged as a powerful strategy to achieve controlled regulation of transmembrane processes. This approach provides insight into the fundamental principles of ion conduction and enables the creation of functional platforms for applications in sensing, energy conversion, and therapeutics. The presentation is aimed to highlight our designs of organic building blocks that respond to different stimuli, such as light,[b] enzymes, redox,[c] or pH environment,d allowing dynamic control over nanotubular self-assembly in lipid bilayer membranes. This presentation will also address their high fidelity in ion recognition and transport, while emphasizing their potential therapeutic application in cancer.[e]

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Personal Profile

Professor Pinaki Talukdar obtained his Ph.D. in 2005 from University of Geneva. After completing a Postdoc from the University of Illinois at Urbana Champaign, USA (2005-2006), he worked as a Senior Research Scientist at AMRI Global (Presently Curia Global), Hyderabad (2006-2007) and then at the Institute of Life Sciences (Presently Dr. Reddy's Institute of Life Sciences), Hyderabad (2007-2009). He joined the Chemistry Department at IISER Pune as an Assistant Professor in 2009. He was re-appointed as Associate Professor in 2015 and Professor in 2020. Additionally, he is serving as the Dean of Faculty at IISER Pune. He is also an Adjunct Professor at Shiv Nadar University.

Awards:

CRSI Bronze Medal (2018), SERB DIA Award
Fellow of the Royal Society of Chemistry
C. N. R. Rao National Prize by the Chemical Research Society of India
Fellow of the Indian National Science Academy (FNA)

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PL-24

Exploring Hydrogen-bonded Supramolecular Materials for Catalytic Transformations

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Abstract

Hydrogen-bonded systems including low molecular weight gelator (LMWG)-based supramolecular gels are an intriguing class of soft materials, arising from the self-assembly of small molecules into anisotropic structures that subsequently entangle to form a network that immobilizes solvent molecules via surface tension & capillary forces. 1,2 These materials are attracting widespread interest across academia and industry owing to their properties that are quite different from polymer-based gels, and multiple potential applications. These hydrogen-bonded systems combine the qualities of heterogeneous catalysts, and offers the advantages of multi-functionality owing to the facile installation of desired task-specific moieties on the surface and along the channels of the gels. Presence of metals can incorporate additional metal-specific properties in the metallogels. 3 In this regard, we have designed supramolecular organogel and organic–aqueous gels using primary amine appended triazole ligand, where hydrogen bonding plays an important role in the gelation process. 4 Considering the availability of pendant –NH2 groups in close proximity to the Lewis acidic metal centres, the metallogels were utilized as a heterogeneous catalyst for a set of organic transformations including CO2 activation and C-heteroatom coupling reactions. This work emphasizes the effective amalgamation of metals with purpose-built hydrogen-bonded systems and their utility as heterogeneous catalysts for desired organic transformations.

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Personal Profile

Dr. Joyee Mitra obtained her Ph.D. in 2012 from Indian Institute of Technology Kanpur under the guidance of Prof. Sabyasachi Sarkar, Department of Chemistry. After postdoctoral research under the mentorship of Prof. Thomas B. Rauchfuss at the University of Illinois, Urbana Champaign (2012-2014), she started her independent career as a DST-INSPIRE Faculty at CSIR-Central Salt & Marine Chemicals Research Institute Bhavnagar. Subsequently, she was employed as a Senior Scientist at CSIR-Central Salt & Marine Chemicals Research Institute Bhavnagar, (Assistant Professor under the Academy of Scientific and Innovative Research, AcSIR), and is presently working as a Principal Scientist (Associate Professor under AcSIR) since 2023. Her research interests include hydrogen-bonded smart functional materials and their applications in catalysis/ electrocatalysis. She is also involved in the recovery of critical metals from waste, including electronic waste (spent lithium ion batteries) in a waste-to-wealth initiative.

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PL-25

Ion Transport-mediated Molecular Communications

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Abstract

Effective communication among cellular components is crucial for identifying and cooperating with helper cells while combating and resisting competitor cells. Cellular communication through ions and signaling molecules is essential for coordinating various processes, including cell division, growth, differentiation, protein expression, and enzyme catalysis. The stimuli-responsive signal transduction is one of the fascinating aspects of the cellular communication system. For example, in plant cells, the precursor of protochlorophyllide oxidoreductase (pPOR) is imported into plastids in a protochlorophyllide-dependent manner. Inside plastids, POR catalyzes the light-dependent conversion of protochlorophyllide to chlorophyllide, a crucial step in the biosynthesis of chlorophyll and photosynthesis.[1] This process illustrates a hierarchical signal cascade with mass transport and light-dependent enzyme-gated catalytic activation. Molecular communication systems have emerged as a promising approach to replicate cellular communication pathways using engineered nanochannels and synthetic biomolecules to transmit and amplify chemical signals across cell membranes.[2] This approach holds significant potential for developing intelligent, cellular-like platforms that enable controlled information exchange for targeted therapy, biosensing, synthetic cell-to-cell coordination, and other applications. Recently, we found that the synthetic ionophore self-assembles into nanochannels within lipid bilayers and selectively transports ions. This selective movement of ions across the lipid bilayers through these supramolecular ion channels allows the in situ generation of a water-soluble catalytic system with tyrosine and other biomolecules. This catalytic system promotes enzyme-like activity, generating fluorescent reporters from non-fluorescent compounds within the intravesicular environment. Furthermore, this process enables the monitoring of the chemical-to-optical signal amplification or chemical-to-chemical signal transfer process, similar to its biological counterparts.[3] Developing these molecular communication systems to replicate the complexity of natural cellular processes opens up exciting opportunities for designing advanced biomimetic tools and exploring the fundamental principles underlying cellular communication.

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S. Srimayee, B. M. Prusty, M. K. Kar, M. Winterhalter, D. Manna, *Angew. Chem.* **2025**, *64*, e202501634.

Personal Profile

Professor Debasis Manna obtained his Ph.D. in 2008 from the University of Illinois at Chicago, USA, under the supervision of Professor Wonhwa Cho. After completing his postdoctoral studies with Professor Gautam Basu at the Bose Institute in Kolkata, India, he began his independent research career in the Department of Chemistry at the Indian Institute of Technology, Guwahati, in 2009. Currently, he serves as a professor at the Indian Institute of Technology, Guwahati.

Awards:

DAAD Research Stays Fellowship, Hamburg University, Germany, 2024
Young Scientist Research Award (YSRA), Board of Research in Nuclear Sciences (BRNS), Mumbai, India, 2010.
Young Investigators Award (RGYI Scheme), Department of Biotechnology (DBT), New Delhi, India, 2010.

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PL-26

Metal-Free Approaches for the Synthesis of Bioactive Molecules

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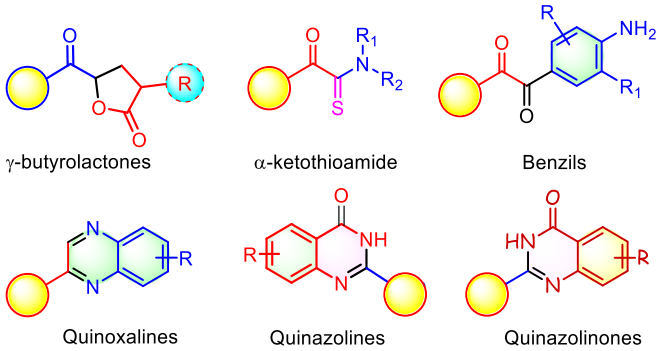
Abstract

Metal-catalyzed transformations of sulfoxonium ylides have become valuable tools for constructing heterocyclic frameworks such as pyrroles, indoles, furans, pyrimidines, and quinolones. Despite this progress, their potential in metal-free synthesis remains relatively underexplored. In our work, we have shown that sulfoxonium ylides can serve as effective precursors for accessing a wide range of bioactive molecules. These studies have enabled the mild, metal-free synthesis of γ-butyrolactones, α-ketothioamides, α-ketoamides, benzils, quinoxalines, quinazolines, quinazolinones, and related scaffolds. The talk will highlight recent advances in sulfoxonium ylide chemistry with an emphasis on metal- and reagent-free strategies for the synthesis of bioactive molecules and other valuable compounds.



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Personal Profile

Prof. Satyendra Kumar Pandey was born in Kushinagar and grew up in India. He received his B.Sc. and M. Sc. degrees from DDU Gorakhpur University, Gorakhpur. In 2008, he obtained his Ph.D. from the CSIR-National Chemical Laboratory, Pune, India, under the supervision of Dr. Pradeep Kumar. After working as a Postdoctoral Researcher at Purdue University, IN, USA, with Prof. Arun K. Ghosh, he joined Dr. Reddy's group at Aurigene Discovery Tech. Ltd., India, as a Scientist in 2010. In 2012, he was appointed as Assistant Professor in the School of Chemistry and Biochemistry, Thapar University, Patiala, India, and was promoted to Associate Professor in 2017. In 2017, he moved to the Department of Chemistry, Institute of Science, Banaras Hindu University (BHU), Varanasi and joined as Associate Professor, and since 2020, he has been working as a Professor of Organic Chemistry. His broad research interests include the development of new synthetic methods, the total synthesis of biologically active natural products, and medicinal chemistry. He has published 71 papers and three patents to date. Furthermore, 9 students have received Ph. D. degrees under his supervision, while 6 research fellows are now pursuing Ph. D. degrees. He has also guided 30 Master's students in their dissertation work.

Awards

Recipient of the Eli Lilly Asia Outstanding Thesis Award in 2009.
Recipient of the CRSI Bronze Medal award in 2024.

Prof. Satyendra Kumar Pandey
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PL-27

Synthetic Methodology for the Construction of Functionalized Heterocyclic Ring Systems

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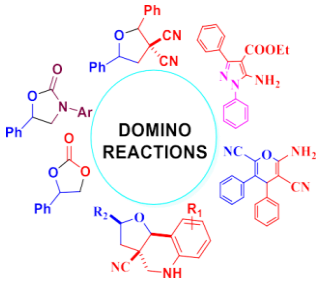
Abstract

Domino reactions could be defined as an efficient synthetic tool for the construction of two or more chemical bonds in a single reaction step.[1] This technique has been frequenty utilized by the synthetic organic chemists for the synthesis of complex molecular entity in a very simple, and step economic ways in the presence of either a metal or organo-catalyst.[2] In this continuation, our group is focused in developing newer catalyst system for the synthesis of functionalized heterocyclic derivatives via the utilization of suitable domino reaction strategy. We have successfully installed CO_2 to obtain cyclic carbonate from epoxide in the presence of ketimine based Hydrogen Bond Donor (HBD) catalyst. This methodology has also been utilized for the synthesis of highly functionalized, tetrahydro furan isooxazolidine derivatives and pyran derivatvies.[3] Furthermore these functionalized heterocyclic compounds were further converted to tetrahydro-[3,2]-c Quinolines and Oxa-Aza-[3.2.1] Octanes.[4]



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Personal Profile

Dr. Sandipan Halder obtained his Ph.D. in 2012 from Indian Institute of Technology, Kanpur, India under the supervision of Professor Manas K. Ghorai. After having postdoctoral research with Professor Shmaryahu Hoz at Bar Ilan University (2013-2014), Israel and with Professor
T. V. RajanBabu at The Ohio State University, Columbus, Ohio, USA, he has started his independent career in the Department of Chemistry, Visvesvaraya National Institute of Technology (VNIT), Nagpur, India in the year of 2016 as an Assistant Professor. His research interest involves the development of metal and organo catalyst for the catalytic installation of CO2 in organic small molecules, development of organic functional materials for chemo sensing and biomedical applications.

Awards

Early career research Award from Science and Engineering Research Board (SERB), Govt. of India.
Fulbright-Nehru Post-doctoral research fellowship from United States India Educational Foundation (USIEF).
International travel grant from DST and CSIR for attending conference.

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PL-28

From Inhibition to Degradation: Targeting E3 Ubiquitin Ligases with Small Molecules and PROTACs for NAFLD Therapy

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Abstract

Non-alcoholic fatty liver disease (NAFLD) is a multifactorial metabolic disorder driven by dysregulated lipid homeostasis, inflammation, oxidative stress, and hepatocellular injury. Current therapeutic strategies largely rely on modulating discrete signaling pathways; however, approaches that directly control protein abundance are emerging as a promising paradigm for disease intervention. Here, we describe a dual strategy that exploits the endogenous ubiquitin–proteasome system (UPS) to restore hepatic homeostasis. In the first approach, we targeted lipid accumulation, a defining hallmark of NAFLD resulting from impaired intracellular triglyceride turnover. Adipose triglyceride lipase (ATGL), a key regulator of hepatic lipid catabolism, is destabilized in liver through COP1-mediated ubiquitination.[b] We hypothesized that pharmacological stabilization of COP1 would enhance ATGL protein levels, reduce aberrant ubiquitination, and attenuate hepatocellular lipid burden. Consistent with this hypothesis, a rationally designed COP1-binding small molecule increased ATGL abundance at nanomolar concentrations and, upon oral administration, markedly reduced hepatic triglyceride accumulation and fibrosis in a preclinical NAFLD model. In parallel, we employed a targeted protein degradation strategy using PROteolysis TArgeting Chimeras (PROTACs) to eliminate apoptosis signal-regulating kinase 1 (ASK1), a central mediator of inflammatory and fibrotic signaling in metabolic liver disease. Our optimized PROTACs induced efficient, proteasome-dependent degradation of hepatic ASK1 in a dose- and time-controlled manner, suppressing pathological p38/JNK signaling in both cellular systems and mouse models.[b] Together, these findings establish UPS-centric modulation as a powerful therapeutic framework for NAFLD and related liver disorders.

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Personal Profile

Dr. Arindam Talukdar is a trained Medicinal Chemist. He obtained his Master's degree in Pharmaceutical Chemistry from Panjab University, Chandigarh and PhD degree in Chemistry from National Chemical Laboratory (NCL), Pune. He spent six years in USA as a postdoctoral fellow and obtained training in glycobiology and various aspects of drug discovery from The Ohio State University and Purdue University, USA. Thereafter, in 2010, Dr. Talukdar started working in the Industry as a Senior Research Scientist at Albany Molecular Research Inc, Singapore. Dr. Talukdar joined CSIR-Indian Institute of Chemical Biology (IICB) in January 2013 and currently, his position is Senior Principal Scientist. His research lab aims to answer fundamental questions that lie at the interface of chemistry and biology to perform rational design, synthesis and validation of novel chemical entities to unravel the molecular mechanism and develop a potential treatment for human diseases.

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PL-29

Electrochemical 3d-Transition Metal Catalyzed C-Cl Bond Activation

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Abstract

Cross-coupling of aryl halides with various nucleophiles, catalyzed by transition metals, is a powerful method for forming the sp2 carbon-heteroatom bonds that are ubiquitous in natural and medicinal products playing a pivotal role in the synthesis of pharmaceuticals, agro-chemicals, and materials. Although Pd-catalyzed cross-coupling reactions are a well-established topic, the greater range of easily accessible electrophiles and the inherently more sustainable characteristics of earth-abundant 3d metal have increased interest. Historically, the development of these techniques has focused on designing elaborate and specialized ligands to make the metal center's stereoelectronic characteristics amenable to the elementary steps that constitute across the coupling cycle. However, recent developments have shown that these transformations can be accomplished under sustainable and mild conditions using simple, commercially available ligands, by combining synergistically electrochemistry with a transition-metal cross-coupling cycle. Furthermore, reactions with the more prevalent aryl-Cl chloride at room temperature or milder reaction conditions is still largely underdeveloped despite their great diversity, affordability, and ease of access. This is likely due to their low reactivity, which is generally attributed to their higher bond dissociation energy making the activation by transition-metal catalysts more challenging [bond dissociation energies (kcal mol 1) for PhX: Cl (95); Br (80); I (65)]. Thus, the field continues to seek a more generalized solution that can accommodate a wide range of nucleophiles with good catalytic efficiency under mild reaction conditions. As such, a more general approach would prove especially beneficial in early-stage drug-discovery settings, where practical, time-efficient protocols allow for faster diversification of important building blocks. Towards this goal we are exploring C-Cl bond activation and functionalizations under milder reaction conditions by merging electrochemistry with 3d-transition metal catalysis.

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Personal Profile

Dr. Valmik S. Shinde obtained Ph.D. in 2015 from CSIR-National Chemical Laboratory under the guidance of Prof. Nitin Patil. He was postdoctoral research associate at Aix-Marseille University, Marseille, France, 2015–2016. He then worked as research scientist at Unichem Laboratories Ltd. Goa about a year before joining for second postdoc at KAUST Catalysis Center, Saudi Arabia, with Prof. Magnus Rueping (11/2016–02/2022). Since March 2022, he is working as senior scientist in Medicinal, and Process Chemistry Division at CSIR-Central Drug Research Institute, Lucknow.

The central focus of his research group is to establish sustainable organic transformations with broad applications in medicinal chemistry and drug discovery with main research areas are:

Electro-organic synthesis

Development of new synthetic strategies based on transition metal-catalysis

Asymmetric synthesis

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PL-30

Gold Catalysis: Extended π-Systems and Azulenes

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Abstract

In materials science, specifically in organic electronics, extended □-systems are essential building blocks. In 2000 the two first papers showing a high increase in molecular complexity in gold-catalyzed organic reactions,[1,2] triggered the development of homogeneous gold catalysis to a frequently used tool in different sectors of organic synthesis, e.g. for total synthesis or materials science.[3,4] The crucial influence of reactive intermediates like gold vinylidene intermediates[5,6] or other functionalized gold carbenes[7] on the outcome of gold-catalyzed reactions is well documented. This also involves "gold only"-catalyzed photoreactions,[8,9] which typically go along with a change of oxidation state in the catalytic cycle. We now report new bi-directional and modular syntheses of extended π-systems, the latter containing heteroatoms such as nitrogen, oxygen, sulfur, selenium and tellurium. Furthermore, new and innovative approaches to azulene derivatives are presented, the presentation will address the methodology development, strucrural assignments, scope studies, mechanistic experiments and detailed computational results.

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Personal Profile

Professor A. Stephen K. Hashmi obtained his Ph.D. in 1991 from LMU Munich under the guidance of ProfessorG. Szeimies. After postdoctoral studies with Professor B. M. Trost at Stanford University (1991-1993), he started his independent career with Prof. J. Mulzer at Free University of Berlin, University of Frankfurt and University of Vienna, he obtained his Habilitation from Frankfurt University and was visiting Scientist at the University of Tasmania.After Professorships at Marburg University and Stuttgart University (Associate Professor), he became Full Professor at Heidelberg University in 2007.Visiting Professorships at Gakushuin University (Tokyo, Japan, 2008), at Milan University (Milan, Italy, 2010), Tokyo Institute of Technology (Tokyo, Japan, 2012) and Keio University (Tokyo, Japan, 2015).

Awards:

Dr. Otto Röhm Memorial Fellowship
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ORCHEM Prize for natural sciences of the German Chemical Society Hector Research Prize 2010

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PL-31

Unifying Carbene Precursors: Synthetic Opportunities with Vinyl Sulfoxonium Ylides and Diazo Esters

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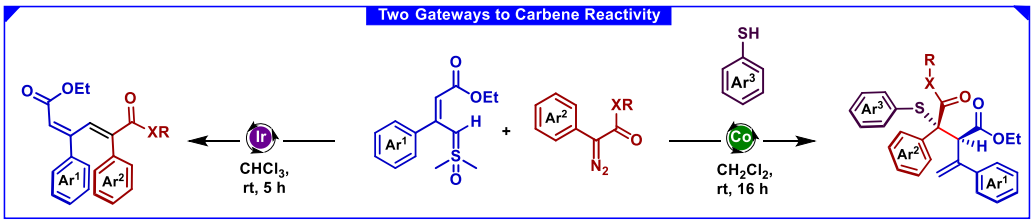
Abstract

Carbene transfer reactions play a pivotal role in modern organic synthesis, enabling the construction of complex molecular frameworks with high precision. Among carbene precursors, vinyl sulfoxonium ylides[1] and diazo compounds have recently emerged as versatile and complementary platforms for developing stereoselective transformations. This study explores the unique reactivity and selectivity arising from the interaction of these two carbene sources through distinct mechanistic paradigms. A carbene-mediated stereoselective cross-olefination strategy was established,[2] coupling vinyl sulfoxonium ylides with diazo compounds. This transformation proceeds under mild conditions to deliver substituted alkenes with excellent stereochemical control and broad substrate compatibility.[3] Complementarily, a metalloradical catalytic approach was developed to achieve gem-difunctionalization of diazo compounds with vinyl sulfoxonium ylides and thiols. Utilizing cobalt(II)-based metalloradical catalysis, this method orchestrates concurrent C–C and C–S bond formation via controlled radical intermediates, affording densely functionalized products with high stereoselectivity.[4] Together, these complementary methodologies demonstrate the untapped potential of combining vinyl sulfoxonium ylides and diazo esters as dual carbene precursors. By integrating carbene and radical reactivity modes, these studies expand the synthetic toolbox for the selective formation of carbon–carbon and carbon–heteroatom bonds. The insights gained underscore the strategic value of sulfoxonium ylides in stereoselective carbene chemistry and open new avenues for the design of complex molecular architectures through cooperative carbene-mediated transformations.



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(4)S. Bhardwaj, D. K. Gopalakrishnan, S. Deshwal, R. Sen, V. Tiwari, T. Karmakar, and J. Vaitla ACS Catal., 2024, 14, 2805-2815.

Personal Profile

Dr. Janakiram obtained his Ph.D. in synthetic organic chemistry from the CSIR-National Chemical Laboratory in 2015, under the mentorship of Dr. Ganesh Pandey. Following his doctoral studies, he pursued postdoctoral research at the University of Tromsø, Norway, working with Prof. Hopmann and Prof. Bayer. In 2019, he joined Emory University, Atlanta, USA, as a postdoc in the group of Prof. Huw M. L. Davies. Returning to India in 2020, he joined as an assistant professot at department of chemistry, IIT Delhi. Currently, he is an Associate Professor in the same department. Dr. Janakiram's research focuses on ylide- and carbene-mediated transformatins in organic synthesis and the total synthesis of natural products.

Awards

Teaching Excellence Award at IIT Delhi (2022),
Thieme Chemistry Journal Award (2020)

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PL-32

Synthesis of Functionalized N-Heterocycles via Electrochemical Synthesis and Annulation Reactions

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Abstract

Dibenzoxazepines, benzazepines, benzoxazines, benzosultams, acridines, and tetrahydroisoquinolines are ubiquitous structural motifs in a wide range of natural products and pharmaceutical agents, making them highly valuable molecular scaffolds. Accordingly, the development of efficient, selective, and sustainable strategies for their synthesis and functionalization is of significant interest. In this presentation, I will discuss our recent efforts toward the direct and selective C–H functionalization of these heterocycles using electrochemical methods, metal-catalyzed transformations, and spiro-annulation strategies. These mild and efficient approaches enable access to densely functionalized, potentially bioactive heterocyclic architectures.1-11

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Personal Profile

Dr. Indu Bhusan Deb completed his M.Sc. in Organic Chemistry from Banaras Hindu University (BHU). He earned his Ph.D. in 2008 at the Indian Institute of Technology Bombay (IITB) under the supervision of Professor I. N. N. Namboothiri. Following this, he pursued postdoctoral research at Rutgers University, USA, with Professor Daniel Seidel, focusing on the synthesis of chiral heterocycles.

After spending three years at Rutgers, he joined Professor Naohiko Yoshikai's research group at Nanyang Technological University (NTU), Singapore, for his second postdoctoral research. In April 2013, Dr. Deb became a Research Investigator (Project Leader) in the Process Chemistry Division at Bristol-Myers Squibb Research Center, Bangalore. In January 2014, he joined the Organic and Medicinal Chemistry Division at CSIR-IICB as a Senior Scientist. He became a Principal Scientist in 2018 and has been serving as a Senior Principal Scientist in the same division since 2022. He also holds the position of Associate Professor at the Academy of Scientific and Innovative Research (AcSIR).

Research Interests:

Dr. Deb's research group has substantially contributed in the field of catalysis in the organic chemistry area (electrochemical synthesis/C-H bond activation/functionalization) to develop efficient, and innovative processes for the synthesis of functionalized potential bio-active molecules. Dr. Deb's research group is dedicated to developing novel methods in asymmetric synthesis and synthetic methodology, including transition-metal–catalyzed C–H bond activation chemistry, metal-free reactions, and organo-electrosynthesis. His work is aimed at the synthesis of potential bioactive small molecules.

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PL-33

Development of Visible Light-Mediated Sustainable Cross-coupling Reactions

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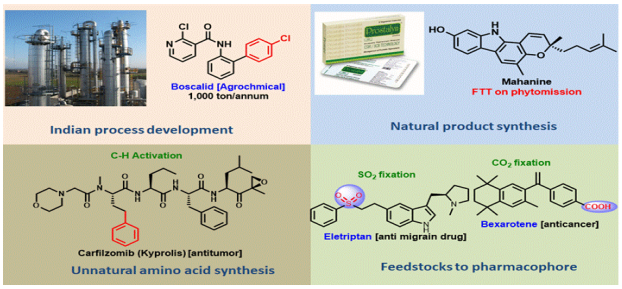
Abstract

While chemistry is often blamed for environmental footprints, health and accidental hazards, the negative impact on the environment due to excessive energy consumption during chemical manufacturing is ignored. Owing to technological evolution, increased lifestyle and market demand, the production of commodity chemicals and energy consumption has increased exponentially in recent years. Therefore, a holistic, innovative approach is required in chemical research and manufacturing units to resolve this burning issue. Nature is the most sophisticated laboratory and photosynthesis is one of the greenest transformations to convert inert carbon dioxide into glucose and oxygen at ambient conditions, harvesting renewable solar energy. Inspired by nature, we are developing visible light- mediated sustainable cross-coupling reactions for the conversion of amino acids and other biomass materials into the value-added chemicals including active pharmaceutical ingredients (APIs), agrochemicals, monomers for the bulk polymeric materials and other commodity chemicals. Presently, we have initiated a niche creating research area of the activation of CO2, SO2 and incorporation into the organic backbone as a C1 and SO2 source. This project has tremendous potential to mitigate aerial CO2 and "waste to wealth" generation to bring about societal, economic and environmental impact.



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Personal Profile

Dr. Ranjan Jana obtained his Ph.D. in 2007 from The Indian Association for the Cultivation of Science (IACS) under the guidance of Professor B. C. Ranu. He did his first postdoctoral research at Bar-Ilan University, Israel, with Prof. S. Braverman. Subsequently, he did his 2nd and 3rd postdoctoral research at Kansas University, USA, with Prof. J. A. Tunge and at the University of Utah, USA, with Prof. M. S. Sigman respectively. In 2012, he joined the CSIR-Indian Institute of Chemical Biology as a senior scientist and was promoted to Senior Principal Scientist in his current position. His research area is Green Chemistry, Catalysis, Medicinal Chemistry and Chemical Biology. C-H activation photoredox catalysis for the development of carboxylation and decarboxylative reactions is his current research interest.

Awards

(i)Fellow of the West Bengal Academy of Science and Technology (WAST), 2020
(ii)Ramanujan fellowship; award no. SR/S2/RJN-97/2012; SERB, India, 2013-2019.

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PL-34

Chemoenzymatic Synthesis of complex Sialoconjugates of Chemotherapeutic Potential

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Abstract

Carbohydrates containing sialic acid play pivotal roles in many pathologically and physiologically important biological processes such as cellular recognition, adhesion, migration, invasion, and communication, bacterial and viral infection, and tumor metastasis etc. Compared to five- or six- carbons monosaccharides, sialic acids contain a 9-carbon backbone and are much more structurally complex molecules. They have been predominantly found as the terminal carbohydrate units on glycoproteins and glycolipids of vertebrates, as well as components of capsular polysaccharides or lipooligosaccharides of pathogenic bacteria and represent the most important recognition elements as terminal sugars. Three basic forms of sialic acids include Neu5Ac, Neu5Gc, KDN, and their structural modifications with different substitutions lead to more than 50 different naturally occurring sialic acids that further increases the complexicity of sialic acid-containing structures. To investigate their biological significances, homogenous sialosides especially naturally occurring sialic acid variations on disialyl structures are needed. In this text a detailed discussions about an efficient two-step multienzyme approach for the synthesis of a series of GD3 ganglioside oligosaccharides and other disialyl glycans containing a terminal Siaα2−8Sia component with different natural and non-natural sialic acids will be presented. Further, we explored modular and highly efficient Click Chemistry and developed a selective Sialo-Porphyrin Dendrimer as Potential Inhibitors for SARS CoV-2 Infection. Our investigation result that SARS-CoV-2 binds preferentially to AcSA porphyrin dendrimer in 3.02 μM and able to efficiently block SARS-CoV-2 infection. A dendrimer may be effective for other respiratory viral syndromes like SARC-CoV, MERS-CoV, VSV-SARS–CoV-2.

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Personal Profile

Vinod K. Tiwari is associated with Banaras Hindu University (since 2005) as professor of organic chemistry. He earned his MSc from BHU (in 1998), PhD from CSIR-Central Drug Research Institute (Mentor: Dr R P Tripathi) followed by postdoctoral experience at University of Florida, USA (Mentor: Prof. Alan R Katritzky), University of California-Davis, USA (Mentor: Prof. Xi Chen), and Universitat Konstanz, Germany (Mentor: Prof. Richard R Schmidt). Dr. Tiwari has supervised 18 PhDs, completed 11 major grants, and contributed to 196 publications (Citations: 10171, h-index: 48, i10 index: 142), several patents, 26 invited book chapters, as well 6 books of high repute. Dr Tiwari is a highly travelled scientist (delivered > 321 invited lectures in india and abroad) and his research has been recognized with many honors/awards/medals from various societies. Dr. Tiwari holds Hony. Secretary, ACCT(I), council member of the CRSI, and editorial board/Guest editor of Carbohyd. Res., J. Carbohyd. Chem., Synthesis, Synlett, COC, COS, CSIR-NISCAR, Ind. J. Het. Chem., Molecules, Scientific Rep., etc. His current research is focused on 'Synthetic Carbohydrate Chemistry and Carbohydrates in Drug Discovery & development'.

Awards

Council Member, CRSI (2023-2026; 2026-2029); Hony. Secretary, ACCT(I) (2022-2026)
Listed in Top 2% Scientist Ranking for the Years 2021, 2022, 2023, & 2024
ACT-Prof PB Panjabi Award-2025 for outstanding contribution in chemistry
Prof. S P Hiremath Award-2024, Indian Council of Chemists
Chemical Research Society of India (CRSI), Bronze Medal for the Year 2021
C G Merchant Memorial Award-2022 for contribution to Click Chemistry in Glycoscience
Most Productive Researcher Award-2019, Banaras Hindu University
Excellence in Carbohydrate Research Award-2019, ACCT(I)

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PL-35

Methanolic Extract of *Acorus calamus* Rhizome Loaded Nanostructured Lipid Carriers: Preparation, Physicochemical Properties and *In Vivo* Anti-allergic Activity Studies

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Abstract

Allergic reactions are increasing globally, necessitating the development of effective and safe therapeutic approaches. In this study, we investigated the potential of Nanostructured lipid carriers (NLCs) loaded with methanolic extract of *Acorus calamus* rhizome (ACE) as a novel strategy for the treatment of allergic reactions. NLC formulations were prepared using stearic acid, tripalmitin, soya lecithin (1:2:2; M/M/M) by cold homogenization and ultrasonic dispersion technique and where polyvinyl alcohol (PVA), polyethylene glycol (PEG), Tween-60 (T-60), poloxamer-188 (P188), were separately used as stabilizers. The ACE, known for its anti-inflammatory and anti-allergic properties, was incorporated into the NLCs to improve its bioavailability and therapeutic efficacy. Combined Fourier transform infrared (FT-IR) spectroscopy, X-ray diffraction (XRD), X-ray photoelectron spectroscopic (XPS), dynamic light scattering (DLS), atomic force microscopy (AFM), scanning electron microscopy (SEM), transmission electron microscopy (TEM), differential scanning calorimetry (DSC), UV–vis absorption spectroscopy and method of dialysis were adopted in characterizing the both bare and ACE loaded NLC formulations. Comparative studies on different formulations were assessed, among all formulations poloxamer- 188 stabilized NLC was smaller than other stabilizers. AFM, SEM and TEM images revealed the spherical and smooth surface morphology of NLCs. The encapsulation efficiency and drug payload were higher for poloxamer-188 stabilizer. In- vitro release profile of systems exhibited sustained release and followed Krosmeyer-Peppas model. The formulations were non-cytotoxic to human blood lymphocytes, as demonstrated by the MTT assay. In vivo anti-allergic activity of ACE loaded NLC formulations were evaluated in a BALB/c mice model of black tiger prawn extract (BTP) induced allergic rhinitis. All ACE loaded NLCs significantly reduced Th2 cytokine levels in the blood serum and inflammatory cell infiltration in the gut mucosa compared to the free ACE.

Personal Profile

Professor Amiya Kumar Panda obtained his Ph.D. in 1998 from Tripura University, Agartala, Tripura, India under the guidance of Professor Ajit Kumar Chakraborty. After postdoctoral studies with Professor Satya Priya Moulik at Jadavpur University (1997-1998), he started his independent career as an Assistant Professor, Behala College, under University of Calcutta (1998-2007), followed by serving as Associate Professor and Professor in Chemistry in University of North Bengal (2007-2015). He then moved to Vidyasagar University in 2015. Afterwards, he served as the founder Vice-Chancellor of Sadhu Ram Chand Murmu University of Jhargam for a period of two years during 2021-2023. Presently Prof. Panda is the Vice-Chancellor of Rani Rashmoni Green University since December 2024.

Awards

I. BOYSCAST Fellowship, Department of Science and Technology, Govt. of India,2000
II. Indian Science Congress Association Young Scientist Award, 2001
III. Visiting Scientist: Ian Wark Research Institute, University of South Australia, 2006.
IV. Endeavour Award – 2007, Govt. of Australia.
V. Best Teacher Award Chemical Research Society of India-2012
VI. DST-JSPS short term visiting fellowship 2014.
VII. Bronze Medal 2015, Chemical Research Society of India.
VIII. Endeavour Ambassador Award, 2017, Govt. of Australia
IX. Hyogo Overseas Research Network Fellowship, Govt. of Hyogo, to work in the University of Hyogo, Japan. **Publications: 114, Ph.D. students awarded: 17**

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PL-36

Dual Cobalt/Photoredox Catalysis: Toward Sustainable Synthetic Methodologies

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Abstract

Metallo-photoredox chemistry has emerged as a powerful strategy for the construction of structurally complex molecules in the recent times.[1] This approach enables the rational design of novel catalytic systems by leveraging the redox properties of both the substrates and the metal centers involved in the transformation. Consequently, this strategy has been adopted by synthetic chemists as a more sustainable and environmentally benign alternative for generating both high-valent and low-valent metal complexes (e.g., Co(III) Co(I), Co(0)), circumventing traditional methods that typically rely on organometallic reagents, metal-based oxidants or reductants.[2] In a similar vein, we have employed a dual cobalt/photoredox catalytic system to develop novel one-pot synthetic strategies for the regio- and stereospecific synthesis of highly functionalized molecules. The high-valent cobalt(III) chemistry has been utilised for the C−H bond functionalisation whereas the low-valent cobalt(I) intermediate has been utilised for reductive coupling reactions. In this talk, I will review the progress made over the past decade in dual Co(III)/photoredox catalysed C−H bond functionalization[3] and dual Co(I)/photoredox catalysed reductive coupling reactions.[4]

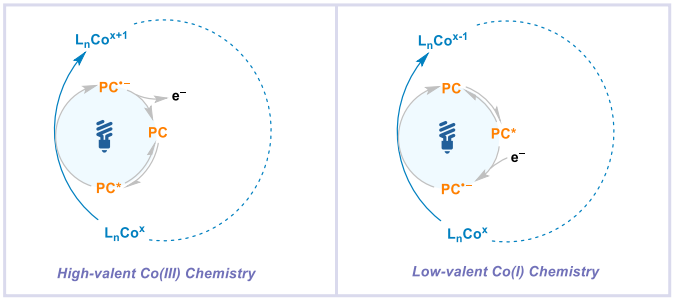

Figure 1. General schematic presentation of dual cobalt/photoredox strategies

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Personal Profile

Professor Basker Sundararaju is worked as a Prof. of the Department of Chemistry, Indian Institute of Technology Kanpur, Kanpur, Uttar Pradesh, India – 208016. Since 2022
2018-2022 Associate Professor, Department of chemistry, IIT Kanpur, Kanpur, India 2014-2018 Assistant Professor, Department of chemistry, IIT Kanpur, Kanpur, India
2013-2018 Assistant Professor (cont), Department of chemistry, IIT Kanpur, Kanpur, India
2011-2013 Postdoctoral Fellow at Max-Planck Institute of Coal Research, Muelheim (with Prof. Alois Fuerstner)
2008-2011 PhD, Université de Rennes1, Rennes, France
2008 MS, Université de Rennes1, Rennes, France
Research Interests: Catalysis driven organometallic chemistry, 3d Metal Asymmetric catalysis, C-H bond Functionalization, Hydrogenation, Asymmetric Photocatalysis.

Awards and Recognitions

Thieme Chemistry Journal Award 2014
BRNS Young Scientist Award 2014
PK Kelkar Young faculty fellow 2017
Merck Young Scientist Award 2019
Fellow of Royal Society of Chemistry 2022
Bronze Medal, Chemical Research Society of India 2023
Invited Guest professor at LCC-Université de Toulouse III – Paul Sabatier (Oct-Nov) 2024
Associate Fellow of Indian National Science Academy (INSA-IAF) 2025

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PL-37

Nanocatalysis: Direction for Photo-mediated Organic Transformations

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Abstract

Over the past decade, the applications of nanomaterials have significantly expanded into the field of organic synthesis. The unique properties exhibited by these systems, particularly in lower dimensions, have allowed for their wide usage in synthetic methodology development. The higher surface-to-volume ratio inherent to nanomaterials confers a greater number of active sites, significantly escalating catalytic output. Furthermore, surface engineering—via doping, functionalization, composite formation, or size/shape modulation—allows the same core system to be adapted for diverse reactions. Industrially, these heterogeneous catalysts are both economical and readily separable from the reaction mixture, facilitating easy product purification and catalyst recycling. Concurrently, visible light has emerged as a cleaner and greener energy source, capable of driving organic transformations via electron or energy transfer processes. This approach provides access to critical, unstable, or high-energy intermediates and can activate relatively inert substrates. Bringing these two features together in the domain of nanomaterials-mediated photocatalysis offers immense advantages for designing sustainable and benign strategies for a plethora of organic reactions. In this talk, I will focus chiefly on our contributions towards utilizing nanomaterials as (photo)catalysts in organic transformations. We will first discuss the application of layered Transition Metal Dichalcogenide (TMD)-based systems, ranging from two-dimensional sheets to quantum dots (QDs), as efficient photocatalysts for Single Electron Transfer (SET) reactions. Subsequently, the development and application of a suitable Quantum Dot (QD) for a specific, challenging transformation, such as the Newman–Kwart rearrangement, will be presented. These studies collectively exemplify the potential of engineered nanomaterials in mediating otherwise critical and complex synthetic strategies.

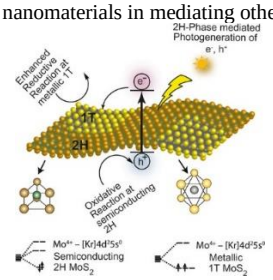

Figure. SET and energy transfer mechanisms governing TMDs photo-mediated catalytic processes.

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Personal Profile

Dr. Mrinmoy De is an associate professor at the Department of Organic Chemistry at the Indian Institute of Science, Bangalore, India. He completed his BSc degree from Vidyasagar University with Gold medal. He received his M.Sc. from the Indian Institute of Technology, Bombay, and Ph.D. from the University of Massachusetts at Amherst under the supervision of Prof. Vincent M. Rotello. He was a CCNE (Center of Cancer Nanotechnology Excellence) and NSEC (Nanoscale Science and Engineering Center) postdoctoral fellow at Northwestern University. Since 2014, he has been at the Indian Institute of Science, Bangalore, where he is an associate professor in the Department of Organic Chemistry. His research focuses on the preparation of various nanomaterials and their application toward the development of biomaterials, nanoantibiotics, nanozymes, sensors, photocatalysis etc. Mrinmoy De is the associate member of American Material Research Society (MRS), American Chemical Society (ACS), Material Research Society of India (MRSI), Chemical Research Society of India (CRSI) and Society of Biological Chemists, India (SBCI). He is recipient of Young Scientist Award by Science and Engineering Research Board (SERB), Outstanding Researcher Award by NSF Nanoscale Science & Engineering Center, CRS Silver Medal and CRSI Bronze Medal.

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PL-38

Catalysis via SET-Induced Formation of C-Centered Radicals

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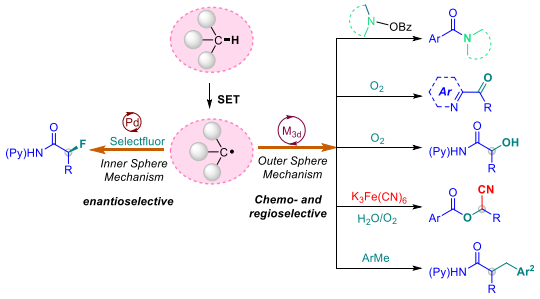
Abstract

The single electron transfer (SET) is a common process in biological systems and has found wide-ranging applications in synthetic chemistry lately. In general, 3d metal catalysts are used as a one-electron acceptor (or radical initiator) for the oxidative cleavage of specific C–H bonds to form a C-centered radical via SET-induced processes.1 We use 3d-metal catalyzed SET induced formation of C-centered radicals as the tool for catalytic □-functionalization of organic compounds, specifically carboxylic acid equivalents, ketones and alkyl heteroarenes.2 Subsequent reactions of the C-centered radical species with either a dissimilar radical species, via radical cross-coupling process, or with a nucleophile, under oxidative condition, give rise to numerous coupled products in desirable chemo- and regioselectivity. However, these processes failed to result in enantioinduction in the presence of a chiral ligand, possibly because the C–C and/or C–X bond formation does not take place on the metal catalyst (outer sphere mechanism). To attain enantioinduction, we have relied on a palladium catalyzed approach. We have recently observed that enantioinduction in a SET induced □-fluorination of arylacetic acids can be attained by using a palladium based catalyst system, wherein the one-electron oxidation process and subsequent C–F bond formation takes place on the palladium catalyst (inner sphere mechanism) giving □-fluorinated acids in highly chemo-, regio- and enantioselective manner. The merits of these strategies combine the broad scope and scalability with high chemo-, regio-, and enantioselectivity giving expedient access to structurally diversified compound range in step- and atom-economic manner.



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3. R.D. Shinde, V. H. Parmar, S. Bhadra, Unpublished work.

Personal Profile

Dr. Sukalyan Bhadra earned a PhD degree under the supervision of Professor Brindaban C. Ranu at IACS (India) in 2011 and moved to TU Kaiserslautern (Germany) for postdoctoral research in the group of Professor Lukas J. Goossen. In 2013, he joined Chubu University (Japan) as a JSPS postdoctoral fellow in the group of Professor Hisashi Yamamoto. He returned to India, in 2016, to begin his independent career at CSIR-CSMCRI Bhavnagar, where he currently works as a Principal Scientist. In 2025, He was a visiting professor at Nagoya University, Japan. His research interest revolves around exploring radical promoted organic transformations, asymmetric catalysis and the synthesis of fine chemicals, APIs and agrochemicals having industrial significance.

Awards

2025: JSPS BRIDGE Fellowship
2023: Thieme Chemistry Journal Award
2010: Green Talent Award

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PL-39

Total Synthesis of Complex Alkaloids of Biological Relevance

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Abstract

The natural product chemical diversity is more closely aligned with drugs than synthetic libraries, thus making them ideal candidates for drug discovery projects.[1a-b] Marine organisms can be considered the most recent source of bioactive natural products in relation to terrestrial plants and nonmarine microorganisms.[2a-c] The beauty of Nature is that she produces a variety of complex natural products in entioenriched form (Figure).[3-4] In the above context, naturally occurring alkaloids with impressive diversity of biological activities drew our interest for the development of bio-inspired strategies. [5-6] Towards this, we explored Nature-Inspired strategies that will be discussed in this talk.

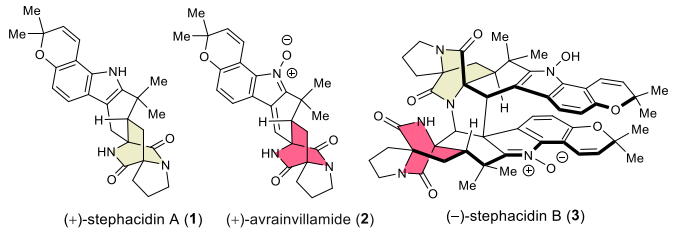

Figure. Architecturally intriguing secondary metabolites of biological relevance.

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4. (a) S. Kundu, D. Jana, N. Mandal, A, Mondal, A. Dutta, A. Bisai *Chem. Sci.* **2024**, *15*, 14946. (b) S. Pal, S. Majumder, P. Shyamal, D. Mondal, B. Das, A. Bisai *Chem. Sci.* **2024**, *15*, 19851. (c) D. Jana, A. Khatua, S. Noskar, M. Nandy, A. Bisai *JACS Au* **2025**, *5*, 1376-1381.
5. (a) N. K. Roy, R. Murmu, M. Munda, S. Niyogi, A. Bisai, *Chem. Commun.* **2025**, *61*, 11053. (b) A. Mondal, A. Mondal, T. Roy, A. Bisai, *Org. Lett.* **2025**, *27*, 6878.
6. (a) R. Nandi, R. Murmu, S. Sadhukhan, D. Pal, S. Biswas, B. Das, A. Bisai, *Org. Lett.* **2025**, *27*, 1531. (b) K. Shaw, A. Roy, D. Mondal, P. Shyamal, A. Khatua, A. Bisai, *Chem. Commun.* **2025**, *61*, 12944. (c) N. K. Roy, R. Murmu, M. Majhi, S. Biswas, A. Bisai, *Org. Lett.* **2025**, *27*, 9281.

Personal Profile

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Postdoc (2006 – 2009) @ UC Berkeley, CA [Advisor: Prof. Richmond Sarpong]

Independent Career:

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@IISER Kolkata [2019 – on-going: PhD Thesis Guided: 06 and MS Dissertations: 11]
Current PhD Students: 12 and MS Students: 08

Research Focus: Strategies for Structurally Intriguing Marine Natural Product of Biological Relevance. Research Highlights in SYNFACTS: [Narcipavlines A & B: Synfacts **2025**; *21*, 115] [Codeine: Synfacts **2024**; *20*, 1209]; Research Highlights in '*Organic Chemistry Portal*' as '*The Bisai Synthesis of (-)-Physovenine*' (**2018**); '*The Bisai Synthesis of Lycoramine*' (**2023**); '*Alkaloid Synthesis: Codeine (Bisai)* (**2025**); and '*The Bisai Synthesis of Oridamucin B*' (**2025**).

Position held:

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Professor (2019 - 2025): Dept. of Chemical Sciences, IISER Kolkata
Professor (2018 - 2020): Dept. of Chemistry, IISER Bhopal
Associate Professor (2013 – 2018): Dept. of Chemistry, IISER Bhopal
Assistant Professor (2009 – 2013): Dept. of Chemistry, IISER Bhopal
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PL-40

A Sustainable Atom Economical Approaches to Selective π-Functionalization of Allenes towards Synthesis of Bio-active Molecules

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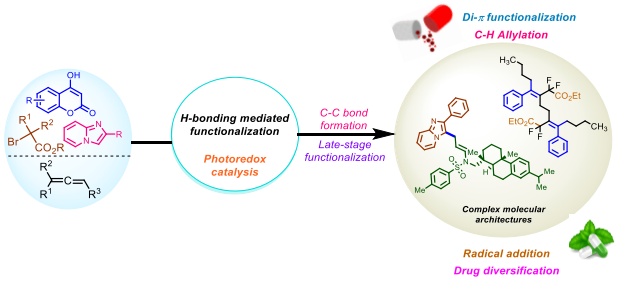
Abstract

A family of diene having two continuous orthogonal π-bonds, allenes, have shown themselves to be highly useful precursors to access wide range of chemical diversity. A cost-effective method for utilizing allene's reactivity to synthesize various complex bio-active molecules without producing minimal byproducts is the selective functionalization of specific π-bond. The selective π-functionalization of allenes is of significant modern interest for the synthesis of commercially relevant compounds in the pharmaceutical and agrochemical industry. Our recent developments on H-bonding network mediated heteroarylation, di-π-functionalization, and photoredox catalyzed selective allene functionalizations are described here.1 Alongside reaction development, comprehensive mechanistic studies were conducted to establish a plausible reaction mechanism. Together, these advancements highlight the integration of catalytic innovation with sustainable practices to enhance efficiency and environmental compatibility in organic synthesis. These transformations proceeds under mild, environmentally benign conditions, highlighting the potential of organocatalysis and photoredox catalysis as a green and efficient strategy for constructing complex molecular frameworks.



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Personal Profile

Dr. Milan Bera received his Ph.D. from IIT Kharagpur in 2011 under the supervision of Prof. Sujit Roy. After several postdoctoral studies (Kyushu University, Japan with Prof. Kuwano and IIT Bombay with Prof. Maiti) and industrial research (Sun Pharma, India), he joined as Research Professor in the Department of Chemistry at Chung-Ang University, Seoul, South Korea. In 2023, he moved to India and joined as Assistant Professor (Ramanujan Faculty Fellow) at Amity University, Noida, Uttar Pradesh. His group's research interests are focused on the development of new and sustainable synthetic and catalytic methods for molecular diversification.

Awards:

DST-Fast track young scientist Fellowship (2014)
Best Scientist (Sun Pharma, 2019)
Ramanujan Fellowship (2022)

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PL-41

Hybrid Nanocomposite Designs for Superior Performance and Long-Term Stability in Perovskite Solar Cells

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Abstract

The present study focuses on advancing thin-film perovskite solar cells by addressing critical challenges, including degradation, instability, and toxicity, which currently limit the commercialization of perovskite photovoltaics. Lead (Pb)-replaced and Pb-free perovskite solar cells were successfully fabricated under ambient conditions through a newly developed route for producing highly efficient and air-stable devices. The carcinogenic Pb was replaced within an excess chlorine (Cl)-rich environment to suppress degradation in Pb-free perovskites. Post-deposition annealing at varying temperatures revealed that nanostructure formation strongly depends on the annealing temperature. Thermal engineering under a Cl-rich atmosphere enhanced stability, surface morphology, crystallinity, optical properties, and overall photovoltaic performance. This led to the development of a dual-step thermal engineering approach, which outperforms the conventional one-step spin-coating method by yielding improved efficiency and stability in $CH_3NH_3PbI_3$-based perovskite solar cells. Comprehensive characterization and Rietveld refinement confirmed the structural and morphological evolution associated with this process.

Keywords: Perovskite; solar cells; thermal engineering, efficiency

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Personal Profile

Dr. Subhasis Roy is currently serving as an Assistant Professor in the Department of Chemical Engineering at the University of Calcutta. He obtained his Ph.D. in Materials Science from the IIT, Kharagpur. Prior to joining Calcutta University as a faculty member, he gained research experience as a Postdoctoral Researcher at SKKU, South Korea, and as a Research Associate at IISER Kolkata. He was also a visiting researcher and Raman Fellow at Ohio University, USA. Dr. Roy has an extensive academic portfolio, with over 150 publications, including 100 peer-reviewed scientific research papers, 50 conference publications, and 40 invited talks. He has authored over 60 book chapters, 6 books, and has served as editor for 4 books. In addition, he holds 18 national and international patents (published/granted). Dr. Roy has supervised 1 postdoc, 4 PhD dissertations, 12 M.Tech theses, and 26 B.Tech projects. A recipient of numerous accolades, Drr. Roy is a recipient of prestigious research grants, including the Mission Innovation Programme (DBT–DST, India), the SERB–TARE award, and the Star-2 Grant from the Ministry of Education, India. He is a Fellow of the Indian Chemical Society and the International Society for Research and Development, and serves as an editorial board member and reviewer for leading international journals such as ACS Nano, Advanced Materials, and Chemical Engineering Journal. He is also a member of the several professional bodies such as Royal Society of Chemistry, London, the NASc, India. His research focuses on photocatalysis, green synthesis of nanomaterials, perovskite solar cells, water-splitting hydrogen generation, surface chemistry, high-dielectric materials, supercapacitors, and nanocomposites for energy and environmental applications

Awards

1. Young Scientist awarded, NTU@One-North, Singapore
2. UGC-Raman Post-Doctoral Fellowship, USA.
3. ECS Travel Grant Award (USA)
4. Postdoctoral fellowship, Sungkyunkwan University, South Korea.
5. DST Young Scientist awarded in Fast Track scheme.
6. Teachers Associateship for Research Excellence (TARE) by the Science and Engineering Research Board.

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PL-42

Green Approaches for Synthesis of Fine Chemicals and Biologically Relevant Organic Compounds

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Abstract

The development of green approaches for synthesis of fine chemicals and biologically relevant organic compounds is an extremely important area of research in the field of organic synthesis and medicinal chemistry. Over the past decades, various environmentally benign synthetic methodologies have been designed and developed according to principles of green chemistry and these green methods have subsequently been implemented to synthesize various fine chemicals and pharmaceuticals.[1a-c] The synthesis of organic fine chemicals and biologically relevant organic compounds via green approaches have several advantages including environmental and economic benefit. In continuation of our research efforts toward the synthesis of organic fine chemicals and biologically active compounds, we wish to present our recent research outcomes on the development of green organic transformations by using various catalytic systems including natural organocatalysts, metal catalysts, and nanocatalysts. Furthermore, solvent-free reactions, use of water as green solvent, microwave-assisted organic synthesis will be highlighted.[2] The developed synthetic methodology offer several advantages including simple and eco-friendly procedure, shorter reaction times, high yields, inexpensive catalysts, catalyst recoverability and recyclability, and the reaction can be carried out in water and open-air conditions. In this presentation, the development of green and catalytic processes, the mechanism of catalytic reactions, and their applications in the synthesis of fine chemicals and biologically relevant organic compounds will be discussed.[2a-f]

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Personal Profile

Dr. Kalpataru Das obtained his Ph.D. in 2008 from IIT Kanpur under the guidance of Professor Manas K. Ghorai. He worked as a post-doctoral fellow under the supervision of Professor Michael Schmittel at University of Siegen, Germany (2008-2009) and subsequently as GCOE Post-doctoral research fellow under the guidance of Professor Kazushi Mashima at Graduate School of Engineering Science, Osaka University, Japan (2009-2011). After post-doctoral research he joined as Senior Research Scientist at TCG Lifesciences Private Limited (Chembiotek), Kolkata for short time in the year 2012 and then joined as an Assistant Professor (ad-hoc), at the Department of Chemistry, Guru Ghasidas Central University, Bilaspur (C.G.), (2012-2013). In Sept. 2013, he joined as Assistant Professor at the Department of Chemistry, Dr. Harisingh Gour Vishwavidyalaya, Sagar (M.P.) and started independent research career. His research group is working on the development of new synthetic methodologies, asymmetric synthesis, catalysis, green chemistry, and synthesis of bio-active molecules. He is a regular Member of the American Chemical Society (ACS), Life Member of the Indian Science Congress Association (ISCA).

Awards:

Global Centers of Excellence Post-Doctoral Research Fellowship, Osaka University, Japan
Post-doctoral Fellowship, University of Siegen, Germany
SERB Research Grant and Seminar Grant
CSIR-UGC NET-JRF

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PL-43

Development of functionalized porous materials and their catalytic applications

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Abstract

Catalysis plays a significant role in the growing demand for industrial processes. Synthesis of cyclic carbonates via CO2 cycloaddition reaction with epoxides is one of the promising strategies to valorize greenhouse gas CO2, thereby fixing it to the value-added chemicals. It is one of the most 'green' approach for the preparation of fine chemicals which have been highlighted in several publications [1-3]. Application of covalent organic framework based catalysts in carbon dioxide fixation reactions has been received attention in recent years due to their potential advantages over the homogeneous ones [4-8]. The present work consists of synthesis, characterization and catalytic evaluation of different porous materials based catalysts and their applications in CO2 fixation reactions. These catalysts have been characterized by powder XRD, TEM, EDX, FT-IR, EPR, BET, XPS, SEM-EDX, UV-vis spectral studies and thermo gravimetric analysis. The catalytic activities were tested on various epoxides. Influences of various reaction parameters were studied. The catalyst exhibits significantly high turn over numbers (TON, order of 105) and more than 99 % selectivity towards synthesis of cyclic carbonates with exceptional recyclability. Moreover, these catalysts acted as a truly heterogeneous catalyst and can be reused for several times without significant loss in activity. Thus good catalytic activity and efficiency of these catalysts in the carbon dioxide fixation reaction suggest that the present catalytic systems would be useful to synthesize industrially important fine chemicals.

Keywords: Carbon dioxide fixation; CO_2 cycloadditions, COF; heterogeneous catalyst

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S Roy, P.Bhanja, A. Bhaumik, and Sk. Manirul Islam, *Chemical Communications, 2016*, 52, 1871.

Personal Profile

Prof. Sk. Manirul Islam did his M.Sc. in Pure Chemistry, from University of Calcutta during 1991-1993. He did his Ph.D. from IIT Kharagpur during 1994-1999 and postdoctoral research from State University of New York, USA during 2000-2002. At present he is serving as a Professor in the Dept. of Chemistry, University of Kalyani. The major focus of our research is to design and synthesis of functionalized porous materials, COFs, MOFs, POPs, and their catalytic applications towards CO_2 chemistry, CO_2 fixation to value-added chemicals, in situ transformation of CO, catalytic conversion of CO into value-added chemicals, CO_2 reduction reactions. etc. Prof. Islam has published his research work in various reputed international journals and he is a reviewer of various reputed journals. Prof. Sk. Manirul Islam has published 204 research articles in reputed international journals. His H-index is 51 and total citation is 8976. He has completed ten major projects from different funding agency (DST, CSIR, UGC). Twenty five students already awarded Ph.D. degree under Prof. Islam.

Awards

(i.) FRSC in Chemical Science in 2023 (ii) Fellow of West Bengal Academy of Science and Technology in Chemical Science in 2024 (iii) Name included in top 2% Scientists of the world according to the updated list published by Stanford University in 2020, 2021,2022,2023, 2024,2025 in Chemical Science.

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PL-44

A New Strategy for Transition-Metal-Free C-N Cross-Coupling

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Abstarct

Over the past few decades, transition metal-catalyzed coupling, such as C-C, C-N, and other heteroatom functionalization, has been developed using harsh and expensive materials. [1] In recent years, metal-free coupling reactions with readily available reagents have gained attention in both academic and industrial applications. [2] Among them, the Smiles rearrangement has emerged as a complementary reaction for constructing C-C and C-N bonds using photocatalysts [3] and metal-free systems. In this presentation, I will discuss a new technique for carbon-nitrogen [4] and carbon-carbon bond formation via the Smiles rearrangement for key building from a simple starting material. Carboxylic acids and carboxamides [5] are used for biarylamine synthesis for the first time, and will be discussed in detail. The mechanistic insights into these processes are discussed. Second, the use of dearomatization techniques for synthesizing value-added indoline and oxindole scaffolds [6] for antibacterial studies is discussed in detail. Sustainable processes for APIs and natural product synthesis will be discussed at the end of my talk, implicating our novel developed method.

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Personal Profile

Dr. Srimanta Manna obtained his Ph.D. in 2017 from Max Planck Institute of Molecular Physiology under the guidance of Prof. Andrey P. Antonchick and Prof. Herbert Waldmann. After postdoctoral studies with Prof. Matthew Gaunt (2022-2023), Prof. Jan-Erling Bäckvall (2020-2022) and Prof. David Procter (2017-2020), he started his independent career at NIPER Mohali as Ramanujan Faculty Fellow. Now, Dr. Manna is focusing on a new strategy for C-N and C-C coupling development and their implication for APIs and antibacterials studies

Awards

Ramanujan Fellowship, 2022
Wellcome Trust Fellow, University of Cambridge, 2022
Marie Skłodowska-Curie Individual Fellowship, 2018
Awarded Summa Cum Laude grade (An outstanding achievement) in PhD, 2017
Awarded Best Cited Paper at the Indian Institute of Technology Bombay, India, 2014

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PL-45

Manipulating Reactivity Paradigms by Light

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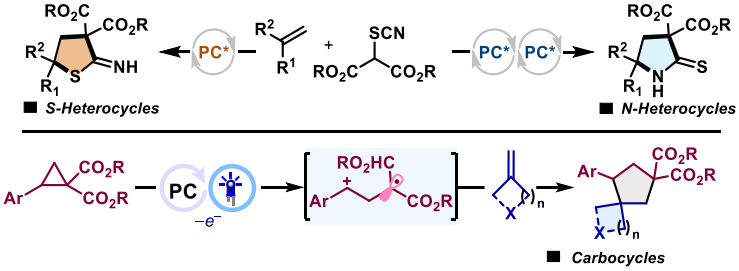
Abstract

The world of synthetic organic chemistry is currently undergoing a visible light-powered revolution. As the world jumps onto the photocatalytic bandwagon, new inroads into near-impossible transformations are revealed on a daily basis, redefining our understanding of organic synthesis. A major component of this new-age strategy focuses on the light-induced alteration of the traditional reactivity patterns of molecules, a phenomenon known since ancient times. Here, we shall embark on a short journey describing two such classes of molecules, namely, Thiocyanomalonates and Donor-Acceptor Cyclopropanes, whose fates were changed by harnessing the power of photocatalysis. While the ambident nature of thiocyanate was successfully tamed in the former case, the later describes a brand-new activation strategy for an old workhorse, unlocking hitherto unachievable cycloadditions**.**



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Personal Profile

Professor Soumitra Maity obtained his Ph.D. in 2010 from IACS, Kolkata, under the guidance of Professor Subrata Ghosh. After completing postdoctoral studies with Professor Nan Zheng at the University of Arkansas, USA (2010-2012), and Professor Thomas J. Maimone at UC Berkeley, USA (2012-2013), he began his independent career at the Central Salt and Marine Chemical Research Institute, Bhavnagar, as an INSPIRE Faculty member. In 2015, he moved to IIT(ISM) Dhanbad, where he currently serves as an associate Professor.

Research Interest:

Methodology development based on light-induced free radical generation and its application in organic synthesis.

Awards/ Honors/ Membership:

2025 Thieme Chemistry Journals Award

2018 Fellow, Indian Chemical Society

2013 INSPIRE Faculty Award, DST – New Delhi

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PL-46

Synthesis of Sesquiterpenoids through Siteselective Functionalization

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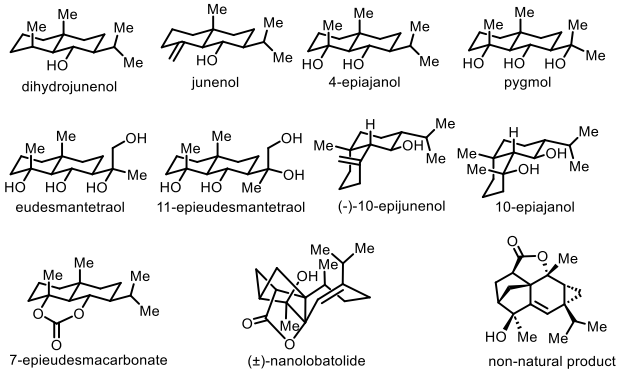
Abstract

Natural products remain a rich source of inspiration for synthetic chemists, combining intricate architectures with remarkable biological activities. Among them, sesquiterpenoids represent one of the most structurally diverse and synthetically demanding classes. In this talk, I will describe our recent efforts to streamline the synthesis of Eudesmane sesquiterpenoids and the guaiane terpenoid nanolobotalide through selective olefin functionalization–based strategies that emphasize efficiency and elegance. By integrating domino reactions, stereocontrolled olefin transformations, and biomimetic approaches, we have developed concise synthetic routes that enable the rapid assembly of these complex targets. These methods not only minimize the number of steps but also broaden opportunities to access structurally diverse and bioactive natural product scaffolds.



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Personal Profile

Dr. Kiran Kumar Pulukuri earned his M.Sc (Chemical Sciences) in 2007 from Pondicherry University. He subsequently joined the CSIR-IICT for his Ph.D. program, focusing on synthesis of complex natural products and glycopeptides under the guidance of Dr. T. K. Chakraborty. In 2013, he completed and submitted his thesis at CDRI-Lucknow, before proceeding to Rice University for post-doctoral studies. There, he spent six years in the lab of Prof. K. C. Nicolaou as a postdoctoral fellow and research scientist.
In 2019, Dr. Kiran started his independent career as an assistant professor in the Department of Chemistry at IISER-Tirupati. His research interests encompass a diverse range of topics, including Total Synthesis of Natural Products, Synthetic Methodology, Asymmetric Catalysis, Electro Organic Synthesis, and Natural Product-based Drug Discovery.

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PL-47

Sustainable Chemical Production via Catalytic Dehydrogenation Strategy

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Abstract

In the realm of synthetic organic chemistry, the pursuit of novel methods for complex chemical synthesis presents both intriguing opportunities and formidable challenges. Traditionally, alcohols serve as alkylating agents in forming C-C and C-N bonds through a dehydrogenative borrowing hydrogen approach in transition-metal catalysis. However, their use as acylating agents in C-C bond formation is notably difficult and infrequently documented. This study introduces the dehydrogenative coupling of benzylic alcohols with internal alkynes under nickel(II) catalysis, employing alcohols as acylating agents. The process yields an array of α-branched aryl ketone derivatives, achieving zero waste via an umpolung borrowing hydrogen technique. Additionally, the study showcases the versatile applications of the resulting α-di-substituted ketones as precursors for other valuable compounds, including the large-scale production of β-deuterated branched ketones. To shed light on the underlying reaction mechanism, a series of spectroscopic analyses, the identification of intermediates, and density functional theory calculations were conducted.

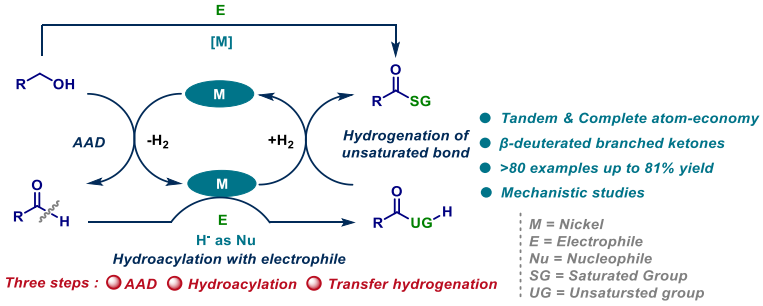

Figure 1. Nickel-catalyzed dehydrogenative coupling of alcohols with internal alkynes.

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Personal Profile

Prof. (Dr) Ekambaram Balaraman received his M.Sc in Chemistry from R.K.M. Vivekananda College, Chennai (2002), and Ph.D from the Central University of Hyderabad (2008). Subsequently, he has been an FGS-Post Doctoral Fellow at the Weizmann Institute of Science (2008-2012). In July 2013, he started his independent career as a senior scientist at the CSIR-National Chemical Laboratory. In Dec'2018, he moved to the IISER-Tirupati as a faculty in chemistry. Presently, he is an Associate Professor and Chair of the Department of Chemistry at IISER Tirupati. Dr. Balaraman's research primarily focuses on generating resources for green energy and recycling atmospheric waste. Specifically, he works on the design and development of catalytic materials for hydrogen generation from feedstocks, sustainable chemical synthesis, and conversion of CO2 to value-added products.

Awards

• RSC-ChemComm's Pioneering Investigators – 2023 & 2024.
• Featured in the book 75 Under 50: Scientists Shaping Today's India, published by the Department of Science and Technology, Govt. of India.
• SwarnaJayanti Fellowship from the DST-SERB, Govt. of India - 2020.
• CRSI-Bronze Medal – 2020.
• MRSI Medal - 2021.
• The Asian and Oceanian Photochemistry Association (APA) for Young Scientist 2019.
• AV Rama Rao (AVRA) Young Scientist Award (2018).
• Professor A. S. R. Anjaneyulu 60th Birthday Commemoration Award, ICS-Kolkata – 2021.
• Fellow of the Royal Society of Chemistry (FRSC).
• Thieme Journal Award – 2020.

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PL-48

Modeling *oxy*-Tyrosinase Activity: Intramolecular Phenolic H-Atom Abstraction by a Side-on Peroxo Dicopper(II) Species

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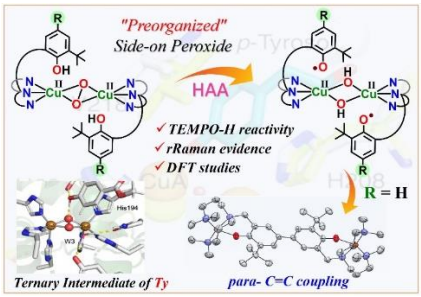
ABSTRACT

Synthetic side-on peroxide-bound dicopper(II) $\{Cu_2O_2\}^{2+}$ species (^{S}**P**) are important for understanding the active site structure/function of coupled binuclear polyphenol oxidases (CB-PPO). One important CB-PPO enzyme is Tyrosinase (Tyr), which catalyzes the *ortho*-hydroxylation of tyrosine-type substrates (on the path to melanin pigment biosynthesis). Unlike the earlier proposed deprotonation of tyrosine followed by its coordination to one of the Cu(II) centers to initiate the catalytic path,[1] recent simulation studies by Solomon and coworkers[2] suggested that the monophenol and the ^{S}**P** form a well-defined ternary (Tyr/O_2/monophenol) intermediate, where a precisely aligned H-bond between those (i.e., "preorganization") establishes a favorable path for H-atom transfer to the ^{S}**P** moiety, critical for regioselective hydroxylation. In this context, the newly designed model system, featuring a tripodal N_3ArOH-ligand bound ^{S}**P** moiety, facilitates the spontaneous H-atom abstraction (HAA) from the intramolecularly appended ArOH group by the ^{S}**P** unit at -135 °C in 2-methyl tetrahydrofuran (Scheme below).[3] This second-sphere HAA has been corroborated by spectroscopic analyses, radical-trapping experiments, and computational studies. The observed chemistry not only reinforces the recent proposal[2] of direct HAA from monophenol by a similar ^{S}**P** moiety in *oxy*-Tyr but also demonstrates the potential of inserting relevant functional groups into ligands for future modeling of other metalloenzymes.

Keywords: *oxy*-Tyrosinase; Model study; Spectroscopy; DFT.



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Personal Profile:

Dr. Sanjib Panda received his MSc degree in 2015 from IIT Madras, India. He completed his PhD under the supervision of Prof. Goutam K. Lahiri at the IIT Bombay, India, in 2020, focusing on the inorganic reaction mechanisms of metal-bound redox non-innocent ligands. Afterwards, he conducted remote-bridging postdoctoral research with Prof. Kuo-Wei Huang at KAUST, SA, from 2020 to 2021, investigating small molecule activation using organometallic complexes. Since 2021, he was working with Prof. Kenneth D. Karlin at Johns Hopkins University, USA, where he gained expertise on the synthetic modelling of the active-site structure-function of heme-copper oxidase and tyrosinase enzymes. He joined IIT Madras as an Assistant Professor in 2025. His research interests include modeling Cu- and Ni-dependent metalloenzyme active sites using synthetic inorganic complexes, designing sustainable bio-inspired catalysts, and developing new classes of bistable systems for potential applications in memory devices

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PAC Award Lecture

PACA Lecture-1

Bioactive Natural Products and Their Enduring Molecular Templates for Innovative Molecular Design

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Abstract

Bioactive natural products continue to drive innovation in synthesis and development of synthetic technologies. The synthesis of bioactive natural products remains an important part of our group's research. Our objectives in this area have been to carry out the synthesis of rare, structurally complex natural products and investigate their structure-activity relationships, design novel molecular probes, and delineate their biological mechanisms of action. This line of research led to some significant developments, particularly the development of tools and strategies for molecular design and drug design leading to new therapeutic possibilities. Another key research objective is to develop new and practical carbon-carbon and carbon-heteroatom bond forming reactions. In this context, we developed a variety of asymmetric reactions based upon intermolecular and intramolecular metal chelation. These include asymmetric aldol reactions, Diels-Alder and hetero Diels-Alder reactions, asymmetric multicomponent reactions, Prins, and Sakuri-type cyclizations. Our longstanding interest in the exploration of synthetic chemistry and biology of natural products brought a unique perspective in our design of novel molecular probes inspired by natural product structures. This presentation will encompass the development of synthetic technologies, their application in the synthesis of bioactive targets, and medicinally relevant designed molecules for today's medicine.

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Personal Profile

Professor Ghosh received his BSc degree in Chemistry from the University of Calcutta and his MSc degree in Chemistry from the Indian Institute of Technology at Kanpur. He then attended the University of Pittsburgh for his graduate studies, obtaining his PhD degree in chemistry. He pursued postdoctoral research at Harvard University. He was a research fellow at Merck Research Laboratories, West Point, PA. In 1994, he joined the chemistry faculty at the University of Illinois, Chicago as an assistant Professor and became Professor of Chemistry in 1998. In 2005, he moved to Purdue University where he is the Ian P. Rothwell Distinguished Professor at the Department of Chemistry and also in the Department of Medicinal Chemistry & Molecular Pharmacology. Professor Ghosh's broad research interests include exploration of chemistry and biology of bioactive natural products, development of tools and strategies for protein structure-based molecular design, drug-discovery and development, and exploration of new reactions and their applications. He is the inventor of the frontline therapy, Darunavir, for treatment of HIV/AIDS. His laboratory carried out seminal groundwork for BACE inhibitor design and synthesis for treatment of Alzheimers' Disease. His work also laid the foundation for X-ray structure-based design of potent drug-like inhibitors of SARS-CoV-2 3CLpro and SARS-COV-2 PLpro for treatment of pathogenic coronaviruses, GRK5, GRK6 inhibitors for treatment of cardiovascular diseases and cancer. Professor Ghosh received numerous awards and honors including, IUPAC-Richter Prize in Medicinal Chemistry, ACS Medicinal Chemistry Hall of Fame, NIH MERIT Award, ACS Arthur C. Cope Senior Scholar Award, ACS Robert Scarborough Excellence in Medicinal Chemistry Award, Herbert Newby McCoy Research Excellence Award, Fellow of the National Academy of Inventors, Fellow of the American Association for the Advancement of Science, and Fellow of the Royal Society of Chemistry.

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PACA Lecture-2

Alcohol as Renewable Reagent for Sustainable Organic Transformations

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Abstract

Alcohol is ubiquitous with unparalleled structural diversity and has wide applications as a native functional group in organic synthesis. It is highly prevalent among biomolecules and offers promising opportunities for the development of chemical libraries. Over the last decade, alcohol has been extensively used as an environmentally friendly chemical for numerous organic transformations.[1,2] Direct application of renewable alcohols as electrophilic coupling partner represents a sustainable alternative, as they can be readily available in industrial scale production from lignocellulose biomass. Recently, there is a potential drive to replace the precious noble-metal catalysts using earth abundant and inexpensive non-noble metals for sustainable organic transformations. We have studied a general and practical applications of various primary alcohols, including diols and amino alcohols for selective construction of C-C bonds or N-heterocycles using (de)hydrogenation strategies. . Further, our group has developed several new approaches on Redox-switchable catalysis (RSC), dual-catalysis for C-H bond functionalization, activation of small molecules, and perfluoroalkylation technologies for the synthesis of fluorinated drugs. A detailed mechanistic studies were also established for such transformations using Ni or Fe-based catalysts.[3]

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Personal Profile

Prof. Debasis Banerjee obtained Ph.D. in organic chemistry from Indian Institute of Technology Kanpur in 2011. Thereafter he moved to LIKAT, Germany for a postdoctoral position with Prof. Matthias Beller (2011-14) and subsequently held another postdoctoral position (2014-2015) at the Stockholm University, Sweden with Prof. Jan-Erling Bäckvall. Since March 2025, he is serving as Professor at the Department of Chemistry, IIT Roorkee. His research interests include redox-switchable catalysis (RSC) relates to tuning the catalytic activity of a transition metal by designing a suitable ligand in combination with more abundant non-precious metals, an attractive road for further catalysis development. Banerjee group has employed such technology for the synthesis of fluorinated drugs, selected fluorinated based natural products having high biological activities.

Representative Publications: >75 Publications and >10 Patents

Debasis Banerjee is a recipient of Early Career Research Award (ECR), DAE-Young Scientist Research Award, and Thieme Chemistry Journals Award. He has received Chemical Research Society of India (CRSI) Bronze Medal of 2023. Recently he has been awarded Humboldt Research Fellowship for Experienced Researchers (Germany-2024) and serving as Visiting Professor at the Georg-August-Universität Göttingen in Germany. He has published >75 journal publications.

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PACA Lecture-3 (Industry)

Advancing Human Development with Next-Gen Sustainable Palladium Catalysts for Pharmaceuticals

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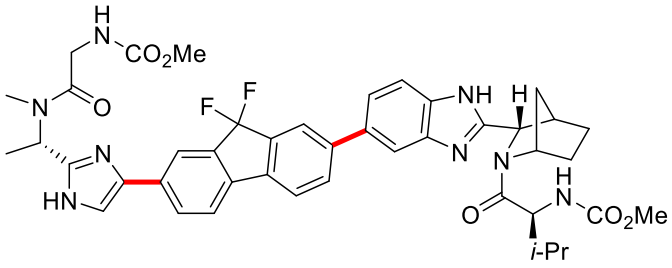
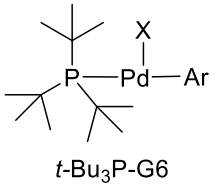
Abstract

Palladium remains one of the most powerful metals in modern catalysis, and despite being considered an "endangered" element, its remarkable recyclability (up to ~98% from spent catalysts) continues to support its widespread use across pharmaceutical, agrochemical, and electronic materials industries. Efficient Pd-catalyzed processes are essential for minimizing synthetic steps, improving sustainability, and expanding global access to life-changing medicines. In this presentation, we highlight the use of an optimized Pd catalyst system in the preparation of a key intermediate for Harvoni™, the first highly effective combination therapy for Hepatitis C. In addition, we discuss the development of a novel *t*-Bu$_3$P-based G6 catalyst—a significant and more sustainable advancement toward replacing "state-of-the-art" Ad$_3$P-based systems—which exhibits exceptional performance in challenging C–C and C–N bond-forming cross-coupling reactions. Further details will be presented.



ledpasvir, one of the two ingradients of Harvoni™, the first most effective Hep-C drug



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Personal Profile

Dr. Thomas Colacot is VP - R&D for the Catalysts & Chemicals business at Hindustan Platinum, driving programs in lean, sustainable novel catalyst development, advanced homogeneous and heterogeneous catalysis, and environmentally responsible organic synthesis. He has over three decades of international experience in precious-metal catalysis shaped by senior R&D roles at Johnson Matthey USA and MilliporeSigma / Merck KGaA, USA. A recognized pioneer in palladium and other precious-metal catalysts and ligand technologies, his work supports critical cross-coupling and catalytic processes across the pharmaceutical, fine-chemical, and materials sectors. He has authored around 170 publications, 3 popular books and holds 65–70 patents and industrial inventions. Dr. Colacot's contributions have been honored with the ACS Award in Industrial Chemistry, IPMI Henry Alfred Medal, RSC Applied Catalysis Award and Medal, CRSI Medal, IIT Madras Distinguished Alumnus Award and Merck KGaA Best Science Curriculum Vite Award. He holds a Ph.D. from IIT Madras with Post-doctoral studies in USA an MBA from Pennsylvania State University and is a Fellow of the Royal Society of Chemistry (UK).

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PACA Lecture-4

Magneto-Electrochemical Ammonia Synthesis via NOx Reduction

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Abstract

Ammonia, a versatile chemical with applications spanning from agriculture to future fuel, can be sustainably synthesised through green electrocatalysis. However, problems persist due to the subpar reaction kinetics of the nitrogenous species reduction process to ammonia and the scarcity of an efficient, economical catalyst. Besides engineering an electrocatalyst, facilitating the charge transfer process by modulating the spin structure of the catalyst provides a nuanced layer of control towards the electrochemical ammonia synthesis. Here we use a low and optimised magnetic field to modulate the spin structure of the catalyst. Under 105 mT of external magnetic field, spin polarised Fe (II, III) oxide shows almost 2.2-fold enhancement in the ammonia yield rate, driven by 17.7% enrichment of electrokinetic activity compared to a non-polarized system. 56.4% drop in the charge transfer resistance and corresponding 61.37% elevation in current density is observed at a constant potential of -0.4 V (vs. RHE) for a 105 mT magnetic field. By integrating COMSOL Multiphysics simulations with experimental magneto-electrochemical analysis, we elucidate the role of magnetohydrodynamic (MHD) effects in enhancing mass transport via reduction of the diffusion boundary layer and aligning in-situ ATR-FTIR, EPR study, magneto-electrochemical study and theoretical study (DFT), we establish radical interconversion in favourable form is responsible for the enhanced electrochemical performance under low magnetic fields. Combining a series of experiments, this work delivers comprehensive mechanistic insights into the reasons and mechanisms by which using a low magnetic field, alongside a readily available magneto-electrocatalyst, enhances the kinetics of the NO_2RR reaction

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Personal Profile

Dr. Uttam K. Ghorai is currently serving as Assistant Professor and Head of the Department of Industrial Chemistry and Applied Chemistry at Ramakrishna Mission Vidyamandira, Belur Math, Howrah, India. He completed his PhD in 2016 from Jadavpur University, Kolkata. He has made significant research contributions to the development of sustainable processes and products. The major emphasis of his research includes the synthesis of green ammonia, green urea, and nitric acid under ambient conditions using electrochemical pathways. He recently completed a technology licensing agreement for his electrocatalytic green ammonia synthesis process with a multinational company under royalty terms. His contribution to electrocatalytic CO2 capture and conversion to green urea technology aligns with the crucial contemporary challenge of carbon capture and utilization (CCU). The impact of his research is evident from the quality of publications in the last 8 years and the number of national/international recognitions he has received.

Awards and Honours

INSA Young Associate in 2025, Indian National Science Academy (INSA)
Society for Materials Chemistry (SMC) Bronze medal in 2024
Winner of the Merck Young Scientist Award 2023 in Chemical Sciences.
Associate of the Indian Academy of Sciences 2021
NASI Young Scientist Platinum Jubilee Award (in Chemical Sciences) National Academy of Sciences (NASI) in 2020.
Associate Fellow in 2020, West Bengal Academy of Science & Technology (WAST)
INAE Young Engineer Award 2019 and INAE Young Associate 2019, Indian National Academy of Engineering (INAE)

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PACA Lecture-5

Turning CO_2 into Opportunity: Designing Catalysts for Versatile Applications

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Abstract

Turning CO_2 into opportunity requires the development of catalysts that move beyond single-purpose reactivity and enable versatile roles for CO_2 across chemical transformations. This work centers on the rational design of adaptable catalysts that unlock CO_2 utilization as a carbon source, a catalytic promoter, and a functional oxidant, while enabling pathways toward fuels, fine chemicals, and pharmaceuticals. Realizing this vision requires catalysts that not only enable diverse CO_2 transformations, but also operate robustly with CO_2 sourced directly from air or untreated emission streams such as vehicle exhaust. This work focuses on the rational design of multifunctional catalysts that convert CO_2 from dilute and impure sources into fuels, fine chemicals, and pharmaceuticals. We explore catalyst platforms capable of activating CO_2 for direct fixation into organic molecules, providing atom-economical routes to value-added products. Beyond its role as a reactant, CO_2 is leveraged as a transient catalyst or reaction mediator to steer selectivity and suppress side reactions in organic synthesis. In parallel, we investigate the use of CO_2 as a mild and sustainable oxidant for key bond-forming reactions relevant to pharmaceutical synthesis, replacing stoichiometric and hazardous oxidants. Complementary strategies are developed to convert CO_2 into energy-dense fuels through catalytic reduction and coupling processes, integrating carbon utilization with renewable energy inputs. In parallel, catalytic strategies are advanced for converting CO_2 into energy-dense fuels through reduction and coupling pathways, integrating carbon utilization with renewable energy inputs. Particular emphasis is placed on catalyst tolerance to common impurities (e.g., N_2, O_2, H_2O, NO_x, and SO_x), enabling direct utilization of real-world CO_2 streams without energy-intensive purification. By correlating catalyst structure, electronic properties, and reaction environments with multifunctional performance, this work establishes design principles for catalysts that enable switching between CO_2 fixation, catalysis, oxidation, and fuel synthesis. This unified approach advances a flexible CO_2 utilization paradigm, supporting the development of scalable and sustainable chemical technologies for a circular carbon economy.

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Personal Profile

Prof. Shoubhik Das obtained his PhD under the guidance of Professor Matthias Beller in 2012 at Leibniz Institut of Catalysis (LIKAT), Germany and followed by this, he did postdoctoral research with Professor Matthew Gaunt at the University of Cambridge, UK and with Prof. Paul Dyson at the EPFL in Switzerland. He started his independent research career (habilitation) in the University of Göttingen, Germany in 2015 and after four years, he moved to the University of Antwerp as a tenure track professor. Since August 2023, he is a chair professor at the Department of Organic chemistry at the University of Bayreuth, Germany. His current research interests are the development of homogeneous and heterogeneous photo-/electrocatalysts and their applications into organic synthesis as well as fuel type molecules.

Awards

CRS Gold medal
Odysseus Award
Francqui lecturer award
EuChemS young investigator
JSP Fellowship
Liebig Fellowship
UK- India Education and Research Initiative (UKIERI) Fellowship

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PACA Lecture-6 (Industry)

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PACA Lecture-7

Enantioselective Gold Redox Catalysis

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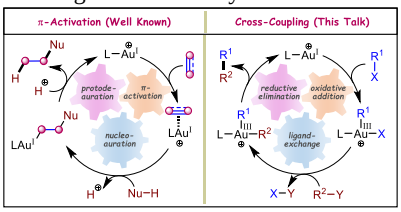
Abstract

Traditionally, gold complexes have been recognized as Lewis acid catalysts for the activation of C-C multiple bonds (Scheme, LHS). Over the years, there has been a considerable shift, and Au(I)/Au(III) redox catalysis is now recognized as an established technique for achieving cross-coupling reactivities (Scheme, RHS). The pioneering work by Zhang and Toste group revealed the role of external oxidants to overcome the high redox potential of Au(I)/Au(III) couple (E0 = +1.41 V) and to facilitate two-electron redox cycle in gold catalysis. Later, the Glorius group introduced the merged gold/photoredox strategy to circumvent the need for a stoichiometric oxidant in these processes. Recently, ethynylbenziodoxolones (EBXs) have also been used for accessing redox gold catalysis serving dual role as oxidant and alkyne surrogate. All the above strategies were not amenable to the use of aryl halides, and thus their use in gold-catalyzed cross-coupling reactions remained forbidden. In recent years, ligand-enabled gold redox catalysis have emerged as a valuable tool, allowing for the use of aryl halides as cross-coupling partners. In this talk, I will present some of our recent work on enantioselective gold redox catalysis.



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Personal Profile

Prof. Nitin T. Patil currently working as a Professor in Department of Chemistry, IISER-Bhopal, Bhopal

Professional Experience:

- Professor (10/2023 - Present): Department of Chemistry, IISER-Bhopal, Bhopal
- Associate Professor (07/2017 - 10/2023): Department of Chemistry, IISER-Bhopal, Bhopal
- Senior Scientist (08/2013-06/2017): CSIR-NCL, Pune
- Senior Scientist (03/2011-08/2013): CSIR-IICT, Hyderabad
- QRS (09/2008-03/2011): CSIR-IICT, Hyderabad
- Research Fellow (01/2008-07/2008): The Scripps Research Institute, USA
- Research Fellow (06/2006-12/2007): Institute of Chemical and Engineering Sciences, Singapore
- Assistant Professor (04/2005-03/2006): Tohoku University, Japan
- JSPS Postdoctoral Fellow (11/2002-03/2005): Tohoku University, Japan
- Postdoctoral Fellow (03/2002-11/2002): University of Goettingen, Germany

Research Interests: Organic Synthesis, Metal Catalysis, Organocatalysis, Enantioselectivity, Organometallics, Total Synthesis etc.

Awards and Honours:

- Recipient of the J. C. Bose Fellowship, CNR Rao National Prize for Chemical Sciences, SERB Distinguished Investigator Award, CRSI Bronze Medal, INSA Young Scientist Medal, Alkyl Amines – ICT Foundation Day Young Scientist Award, Avra Young Scientist Award etc.
- Fellow of the Indian National Science Academy (FNA), Fellow of The National Academy of Sciences (FNASc), Fellow of Maharashtra Academy of Sciences (FMASc) and fellow of The Royal Society of Chemistry (FRSC).
- Editor of an Elsevier journal - Tetrahedron Letters (Year 2024 - present)

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PACA Lecture-8

Supramolecular System for Gene and Drug Delivery

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Abstract

Supramolecular systems have emerged as powerful platforms for gene and drug delivery owing to their ability to form dynamic and functional assemblies through non-covalent interactions. These systems enable molecular-level control over binding specificity, environmental responsiveness, and biocompatibility. Their tunable nature, achieved through rational molecular design, allows for multifunctionality such as selective encapsulation, imaging capability, and even naked-eye detection. In this presentation, supramolecular systems based on amphiphilic chitosan derivatives and synthetic host molecules are showcased. The biopolymer-based carriers include amphiphilic chitosan bearing doubly fatty acid chains for nucleic acid delivery and pyrene labeled chitosan for fluorescence-trackable gene transfection. These systems exhibit efficient cellular uptake and allow real-time visualization of intracellular delivery. In parallel, synthetic host molecules are employed for small molecule recognition and drug complexation. These include resorcinarene and pillararene scaffolds designed for the inclusion of therapeutic agents, offering potential applications in chiral separation, drug delivery, toxicity and molecular sensing

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Personal Profile

Assistant Professor Dr. Kornkanya Pratumyot received her diploma in Chemistry from Chulalongkorn University, Thailand, in 2009. She earned her Ph.D. in Organic Chemistry from The Ohio State University, USA, in 2016. In 2017, she joined the faculty at King Mongkut's University of Technology Thonburi (KMUTT). Dr. Pratumyot co-founded the Supramolecular Research (SUPRA) Group at KMUTT and has been leading the group since 2023. Her research lies at the intersection of material science and biotechnology, focusing on the study and development of polymers and molecular cages for the encapsulation and delivery of genetic materials and drugs, including pDNA, siRNA, bacteriophages, chiral drugs, and natural products. Current research areas include:

• Developing novel chiral resorcin[4]arene-based cavitands for the encapsulation, resolution, and sensing of small chiral drugs and chiral bioactive compounds from plants.
• Creating amphiphilic chitosan derivatives that assemble into nanoparticles with positively charged surfaces for the delivery of pDNA, siRNA, antibiotic drugs, and bacteriophages.
• Developing cyclodextrin-based cavitands for the encapsulation of bioactive compounds.
• Conducting a comparative study on the chemical compositions of genuine and artificial red edible bird's nests.
• Developing 3D scaffolds for cultured meat.

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PACA Lecture-9

N-Capped Short Peptides for Therapeutic Applications

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Abstract

Recent research in therapeutic design is converging on a central goal of delivering active agents or reactive species precisely at disease sites, maximising efficacy while minimising systemic toxicity. The key challenge lies in balancing therapeutic potency with site-specificity. One promising solution is the creation of *stimuli-responsive therapeutics*—molecules and assemblies engineered to activate selectively in response to disease-specific cues.[1] Advances in molecular recognition-based synthons have accelerated the development of tailored drug delivery systems, enabling improved therapeutic indices and reduced off-target effects. Building on these advances, our work focuses on the rational design of short, purpose-built peptides as versatile scaffolds for therapeutic innovation.[2] In this lecture, I will present proof-of-concept studies where we have developed prodrugs and molecular composites that respond to defined biological triggers, offering new strategies for the treatment of challenging diseases.[3] These efforts highlight how rationally engineered peptides and their assemblies perhaps transform precision therapeutics, bridging the gap between molecular design and clinical relevance.

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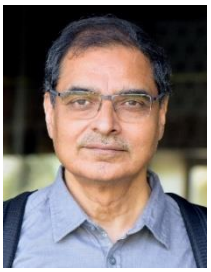
Personal Profile

Prof. Amitava Das obtained his Ph.D. from Jadavpur University, Kolkata, in 1989, followed by postdoctoral research at the Universities of Birmingham and Bristol, UK, with Prof. Jon A. McCleverty and Prof. M. D. Ward. He began his independent research career at CSIR–CSMCRI in 1993 and retired in 2019 as its Director and Distinguished Professor of AcSIR. He also served as Chief Scientist at CSIR–NCL, Pune, from 2013 to 2016. From 2020 to July 2025, he was Senior Professor of Chemical Sciences at IISER Kolkata and currently continues there as a Visiting Professor. He is an elected Fellow of all three major Science Academies of India and a recipient of several prestigious honours, including the ANRF–J. C. Bose National Fellowship (since 2017) and the CRSI Bronze (2009) and Silver (2017) Medals. His research interests span supramolecular chemistry, biomolecular recognition, and therapeutic nanostructures. He has been serving as an Associate Editor of *iScience* since 2022.



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PACA Lecture-10

Efficient Recycling of Plastic Wastes Using Controlled-Active-Site Catalysts

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Abstract

In recent years, recycling and upcycling of plastic wastes are recognized as an emerging research target for academia and for industry. While polyalkylene terephthalate, often used as PET bottles, can be subjected to material recycling and polystyrene and polymethylmethacrylate can be decomposed into monomers by heating, there are many persistent plastics for which environmentally friendly recycling methods have not yet been established. In 2021, we started a project focusing on catalyst development for degradation of tough materials such as thermosetting resins and engineering plastics. Our efforts are also devoted to the introduction of triggers for degradation to polyolefins by catalyst development.

1. Degradation of thermosetting resins[1]

Catalytic degradation of thermosetting resins, specifically epoxy resins, polyurethanes, and polyureas will be presented. By employing strategies that enable selective and efficient bond cleavage using energy of dihydrogen, we have successfully recovered monomeric components in good yields, thereby demonstrating a potential route toward circular material use for these otherwise difficult-to-recycle materials.

2. Design and synthesis of degradable olefin-based materials[2]

The design and synthesis of degradable olefin-polymers will be presented offering new possibilities for materials with built-in end-of-life solutions. Introduction of side-chain carboxylic acid groups and in-chain ketone groups facilitated the oxidative degradation. Hydrogenatice degradation of polyolefins will be briefly mentioned.

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Personal Profile

Professor Kyoko Nozaki was born in Osaka, Japan, and graduated from Kyoto University with a B.Sc. degree in 1986. She received her Ph.D. in 1991 from the same university under the guidance of Prof. Kiitiro Utimoto. During her Ph.D. studies, she joined Prof. Clayton H. Heathcock's group at the University of California, Berkeley, as an exchange student for 1 year in 1988. Since 1991, she has been a faculty member at Kyoto University, moved to the University of Tokyo in 2002, and has been a Professor at the University of Tokyo since 2003. Her research interests are focused on the development of homogeneous and heterogeneous catalysts for polymer synthesis and organic synthesis.

Awards and honors

International Awards L'Oréal-UNESCO for Women in Sciences in 2021
IUPAC Distinguished Women in Chemistry and Chemical Engineering in 2021
Medal with Purple Ribbon from the Japanese Cabinet Office in 2022
She has been elected to the National Academy of Sciences, the Royal Society, and the American Academy of Arts and Sciences.

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PACA Lecture-11

Drug Discovery and Diagnostic Research for Improving Human Health

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Head, Industry Research Alliance Group
Division of Medicinal and Process Chemistry,
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Abstract

According to the global status report on road accidents by world health organization, India has the worst traffic accident rates worldwide with over 1.3 lakhs deaths annually. Many of these accidents lead to fractures of delayed union or nonunion type that can result in multiple surgeries and cause significant patient morbidity and loss of limb function. With increasing burden of trauma, it is pathetic that No FDA approved orally active drug is available in the world for repairing of bone fractures. Taking leads from natural product medicarpin isolated from medicinal plant Butea monosperma, our group designed and synthesized new pterocarpans by systematic variations of functional groups and evaluated them in several in vitro and in vivo assays for the treatment of bone fractures. After several years of extensive research work, a potential molecule CDRI-1500 was discovered for rapid healing of bone fractures (Goel et al.: US Patent Granted US-8686028 dated 01-04-2014). This new chemical entity CDRI-1500 showed significant stimulation of callus formation and exhibited accelerated fracture healing at only 1.0 mg/kg/day dose in adult ovariectomized (OVX) rats. New bone formation at the fracture site was increased by ~40-50% in rats and rabbits treated with CDRI-1500 compared to vehicle control. The technology of CDRI-1500 for bone regeneration has been licensed and transferred to Industry (CDSCO approval received on 22 May 2025) for conducting Phase-I to Phase-III trials and commercialization. The discovery of CDRI-1500 drug candidate taking lead from plant source is a major breakthrough in the area of Bone Fracture treatment. Over the last few years, our group has been developing key building blocks such as novel universal quencher and multicolour fluorescent dyes for the synthesis of indigenous Taqman-like probes to develop RT-PCR diagnostics for the detection of SARS-CoV-2 and arbo-viruses (dengue, chikungunya, Zika). Our patented platform technology[1] with a novel quencher 'RBQ' and fluorescent dyes was successfully demonstrated for the development of two qRT-PCR Diagnostic Kits INDICoV (SARS-CoV2) and INDICoV-Om (Omicron variant) and validated by the government agencies and institutions. Furthermore, our group is engaged in the development of new fluorescent materials with absorption and emission at variety of wavelength for biomedical and diagnostics applications.[2-6] After thorough basic research, we have discovered[3] a new nucleic acid staining dye GreenR to stain nucleic acids like genomic DNA, PCR products, plasmids and RNA. Our indigenous dye GreenR has been launched in the market in India. These results will be discussed during the presentation.

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3. Goel et al. Indian Patent No IND-202211040311; PCT/IN2023/050682 dated 12-07-2022.
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Personal Profile

Prof. Dr. Atul Goel did PhD in the area of Bioorganic and Medicinal Sciences from the Central Drug Research Institute (CDRI), Lucknow, India in 1998 and postdoctoral research at the National Institutes of Health (NIH), Bethesda, USA during1999-2001. In November 2001, he joined as faculty in the CSIR-CDRI, where he is currently working as Chief Scientist in the area of development of new drugs, diagnostics and medical devices. He has guided more than 24 doctoral and 15 postdoctoral fellows and has more than 25 years of research experience. He has published >120 peer-reviewed research articles in the journals of high repute and has 18 national and international patents to his credit. He is a Fellow of Indian Academy of Sciences (FASc) since 2021. His research interests encompass the discovery and development of new affordable medicines/devices and his group is actively involved in developing new fluorescent dyes and nanomaterials for their application in biomedical sciences and optoelectronic (OLEDs) devices. He has licensed and transferred five technologies to industries.

1. Technology of CDRI-399 (BonJon) as Medicated Bone Implant Material for Fracture repair.
2. Discovery of Investigational New Drug CDRI-1500 (NCE, Under Phase-I Clinical Trial) for Bone Fracture Repair.
3. Technology of "Fluorescent probes for the development of RT-PCR based detection of COVID-19"
4. Technology of Nucleic Acid Staining Dye 'GreenR' for biomedical applications
5. Technology of Fluorescent Quenchers for nucleic acid research and diagnostics He has received many prestigious awards and honours:

Honors/Awards:

1. Vasvik Award -2023 for development of indigenous affordable technologies.
2. Dr. Mridula Kamboj Award-2022 for Technology of a Novel orally active Fracture Healing Drug
3. CSIR-CDRI Technology Award 2022 for technology of Fluorescent Dyes and Quenchers
4. NASI Reliance Industries Platinum Jubilee Award 2019
5. CSIR Technology Award 2019 by Honorable President of India Shri Ram Nath Kovind Ji
6. CRSI Bronze Medal 2016 by The Chemical Research Society of India.

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Invited Lectures

IL-1

Molecular Editing of Azaheterocycles

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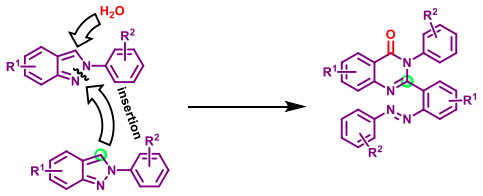
Abstract

Molecular editing is an appealing approach to modifying the target molecules either *via* editing peripheral sites (C-H functionalizations) or *via* skeletal editing. Compared to peripheral editing, skeletal editing is a more challenging phenomenon that conveniently enables complex molecular frameworks by the direct modification of core skeletons. Among the *N*-containing heterocylces, azole frame fused heterocyclic compounds are recognized as a privileged structural unit in bioactive natural compounds and in many pharmacophores. Imidazopyridine is one of the important fused bicyclic 5–6 heterocycles and it is recognized as "drug prejudice" scaffold due to its wide applications in medicinal chemistry. In this lecture, I will discuss our recent works on molecular editing of imidazo[1,2-*a*]pyridines,[1,2] and indazoles.[3,4]



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Personal Profile

Prof. Alakananda Hajra graduated (M.Sc) from the Department of Chemistry, Indian Institute of Technology, Kharagpur India in 1998. After completing his Ph.D in 2002 under the supervision of Prof. B. C. Ranu from Indian Association for the Cultivation of Science (IACS), Kolkata he joined in SUNY at Albany, USA as a postdoctoral research fellow with Prof. Frank M. Hauser (2002-04). He was also a JSPS research Fellow in the University of Tokyo and worked with Prof. Eiichi Nakamura and Prof. Masaharu Nakamura from November 2004 to May, 2006. He also worked with Prof. N. Yoshikai, NTU, Singapore for one year (2011-2012) as a visiting scientist. He has published more than 235 peer-reviewed articles with more than 12,400 citations, giving him a *h*-index of 62.

Research Interest: Development of new synthetic methodologies and green synthetic procedures; Visible light mediated functionalization of heterocycles; Molecular Editing

Awards / Honors / Membership:

2019: Professor D Nasipuri Memorial Award by Indian Chemical Society
2018: JSPS Bridge fellowship
2018: Chemical Research Society of India (CRSI) Bronze Medal Award
2015: Prof. D. K. Banerjee Memorial Lecture Award from Indian Institute of Science

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IL-2

Transition Metal-Free Synthesis of Oxime Ethers

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Abstract

Oxime ethers widely exist as the key components in numerous synthetically viable organic compounds as well as many pharmaceutically active ingredients. This highlights the increasing significance of their synthesis and exploration. The present works herein are dedicated towards the transition metal-free straightforward strategies for the effective synthesis of oxime ethers. First, we describe the synthesis of oxime ethers from various oxime derivatives and secondary/tertiary aryl alcohols in the presence of 1,1,1,3,3,3-hexafluoro-2-propanol (HFIP) at 30 °C. Along with transition metal-free reaction conditions, this protocol refrains itself from the use of any base or additive. Here, UV-Vis spectroscopy supported the formation of a triphenylmethyl carbocation as an intermediate. Next, we describe the reaction of various aldoximes and ketoximes with aryl-substituted primary, secondary and tertiary alkyl chlorides in the presence of CH3CN. Apart from playing the role of a solvent, CH3CN triggered halogen bonding to eventually achieve the O-alkylation of oximes. In both the cases, a broad substrate scope along with good to excellent yield was observed. Also, successful gram scale synthesis further revealed the potential of our developed strategies towards industrial applications.

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Personal Profile

Professor Utpal Bora received his Ph.D. in 2005 under the guidance of Dr R. C. Boruah at CSIR-NEIST Jorhat. He was a recipient of JSPS postdoctoral fellowship to work with Professor Hironao Sajiki at Gifu Pharmaceutical University, Gifu, Japan during 2005–07. In 2008, he joined Syngene International Limited, Bangalore as Associate Scientific manager and later moved to the Department of Chemistry, Dibrugarh University, Dibrugarh as Assistant Professor in 2008. In 2013 he joined the Department of Chemical Sciences, Tezpur University, Tezpur, where he is currently working as Professor. His research interests include catalysis and green organic synthesis.

Awards

JSPS Postdoctoral Fellowship
JSPS Bridge Fellowship
DBT Overseas Associateship

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IL-3

Synthesis of 3-Substituted 5,5-Dimethyl Isoxazolines: Towards Agrochemical Lead Generation

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Abstract

The isoxazoline moiety has emerged as a privileged pharmacophore in both animal health and agrochemical sectors, with leading agrochemical companies including Syngenta having successfully developed and commercialized multiple products incorporating this structural motif.[1] Among these, 3-substituted 5,5-dimethyl isoxazolines constitute a particularly important class featured in several commercial herbicides. Traditional synthesis of 5,5-dimethyl isoxazolines relies on the reaction between nitrile oxide and isobutene gas, which presents significant safety concerns due to handling requirements and the need for excess reagent quantities. To address this challenge, we developed a safer and more convenient synthetic method using diversely functionalized chlorooximes and di-tert-butyl dicarbonate (Boc_2O), where the reaction proceeds via [3+2] cycloaddition between isobutene (generated in situ from Boc_2O) and nitrile oxides (formed from chlorooximes). Additionally, tert-butyl acetate (*t*-BuOAc) proved to be an equally efficient alternative isobutene source, delivering comparable yields under similar conditions. Using this methodology[2], we successfully synthesized a library of 3-substituted 5,5-dimethyl isoxazoline compounds, which have been tested in agrochemical screening to evaluate their efficacy as insecticides, fungicides, and herbicides, making it a valuable and practical approach for agrochemical research applications.

References

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2.R. Mandadapu, V. M. Hapse, P. S. Wagh, S. Pal, M. Phadte, and S. K. Ghorai, *J. Org. Chem.*, **2025**, *90*, 11115-11123.

Personal Profile

Dr. Sujit Ghorai received his PhD in 2001 from IIT, Kharagpur, under the supervision of Professor D. Mal. He subsequently pursued postdoctoral research in medicinal chemistry at Wayne State University, Michigan, USA, and served as a JSPS postdoctoral fellow at Kyoto University, working on iron-catalyzed cross-coupling reactions with Professor Nakamura.

He currently serves as Principal Team Leader in the Process Research Department at Syngenta, Goa. His research portfolio includes 25 publications, 4 patents, one review article and one book chapter.

His Current Research Interests:

- Total synthesis of natural products and development of novel agrochemicals for crop protection
- Process research and development of greener methodologies

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IL-4

Smart Nanosensors at the Interface of Environmental Sustainability and Human Health

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Abstract

The project focuses on developing nitrogen-doped carbon quantum dots (N-CQDs) as innovative nanosensors for real-time monitoring of agricultural and environmental risks. These risks include toxic gases, harmful food adulterants, and pesticide residues, all of which pose serious threats to ecological balance, agricultural productivity, and human health. Traditional detection methods are often expensive, complex, toxic, and unsuitable for field applications. In contrast, N-CQDs offer distinct advantages such as enhanced photoluminescence, high sensitivity, affordability, and biocompatibility, making them highly suitable for scalable and portable sensing systems.

The project's objectives are to synthesize and characterize N-CQDs, design sensors for detecting pollutants and hazardous substances, apply fluorescence-based assays for identifying pesticide residues, and ultimately develop a field-deployable prototype. The anticipated outcomes include safer agricultural practices and improved environmental sustainability through cost-effective, real-time monitoring solutions. These advancements are also expected to support the broader goals of sustainable agriculture and global food security.

Keywords: Nanosensors, Carbon quantum dots, Environmental and agricultural hazards, spectroscopic detection and engineering devices, Environmental sustainability and health care

Personal Profile

Dr. Prithidipa Sahoo is an assistant Professor at Visva-Bharati, Shantiniketan.

Qualification

B.Sc. (Honours) in Chemistry, Vidyasagar University, 2001.
M.Sc. in Chemistry (Organic Chemistry Spl.), Vidyasagar University, 2003.
PhD (Science) with Professor Shyamaprosad Goswami and Professor Ajit K Mahapatra, IIEST, Shibpur, 2010.
Post-doctoral Fellow with Professor Ralf Waumuth, Rutgers University, USA, 2010 –2012.

Teaching Experience

Assistant Professorship (Dec. 2012- Till date); Visva-Bharati, Shantiniketan
Lectureship (October 2011 - July 2012); Department of Chemistry and Chemical Biology, Rutgers University, NJ, USA.

Research Interests

Molecular Recognition and Supramolecular Chemistry, exploration of the different biological applications of important biomolecules, drugs, and antibiotics through molecular recognition and drug delivery systems.
Recognition of some toxic/ hazardous elements associated with food, industry, agriculture, and the environment, with chemosensing and chemodosimetric approach.
Synthesis of Carbon Quantum dots and their applications in advanced monitoring of environmental toxicants, and neurotransmitter dynamics in Plants and Animals.
Carbon quantum dots and their applications as a nanofertilizer, nano pest repellent/pest control and stress controller of plants.
Preparation of MOFs and their implementation in the drug delivery system.
Structure elucidation of novel antibiotics.

Achievements

Professor Asima Chatterjee Young Scientist Award- 2018
NESA Scientist of the year-2019, National Environment Science Academy
Professor Asima Chatterjee Young Scientist Award- 2020
CRS (Chiarantan Rasayan Sasthra) Bronze Medal Award- 2021
Prof D. K. Banerjee Memorial Lecture Award- 2022, IISc, Bangalore
Young Scientist Award- 2025, GCDEM, Singapore
Indo-Asian Richard P. Feynman Young Scientist Award 2025, International Multidisciplinary Research Forum (IMRF)

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IL-5

Dynamic Covalent Poly(disulfide)s and its Applications

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Abstract

Dynamic covalent poly(disulfide)s[1] is increasingly recognized as next-generation sustainable and intelligent materials due to their inherent dynamicity, recyclability, and stimuli-responsive behaviour. In this context, the development of a robust and generalizable strategy for synthesizing structurally diverse and functionally versatile poly(disulfide)s is of significant importance. In this work, we report a versatile and efficient cascade ring-opening polymerization (ROP) of 1,2 dithiolane ring[2] in combination with a post polymerization modification strategy to construct a library of functional poly(disulfide)s with broad structural diversity. The polymerization process is initiated by an amine, which activates a dormant thiolactone ring, generating a thiolate anion initiator. This nucleophile then triggers the ring-opening of a cyclic disulfide monomer, specifically a 1,2-dithiolane bearing a pentafluoro phenyl ester (PFP-ester), leading to polymer propagation. Remarkably, the entire polymerization proceeds at room temperature and under open-air conditions, highlighting the operational simplicity and mildness of the methodology.[3] The key innovation of this approach lies in the one-pot, in situ dual chain-end modification, followed by efficient post polymerization functionalization. The presence of PFP-esters along the polymer backbone allows for orthogonal pendant modification with alcohols and amines via organocatalyzed transesterification and amidation, respectively.[4] This sequence of transformations enables multi-functionalization of a single polymer chain, thereby creating highly tunable and application-ready materials. Notably, the mild polymerization and modification conditions preserve the integrity of the disulfide linkages, a critical factor for maintaining the dynamic covalent nature of the material. Unlike previous approaches, which rarely exploited post polymerization routes for structural diversification, this study establishes a new paradigm: a single, end-functionalized poly(disulfide) precursor can serve as a modular scaffold for generating a wide array of pendant ester- and amide-functionalized polymers, all derived through carefully orchestrated monomer design and reaction control. Overall, this work presents a powerful synthetic platform that enables rapid access to structurally and functionally diverse dynamic poly(disulfide)s through minimal synthetic steps. The simplicity, modularity, and efficiency of this strategy make it highly promising for the development of next-generation smart materials with applications in biomedicine, responsive coatings, recyclable systems, and more.

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Personal Profile

Dr. Mijanur Rahaman Molla received M. Sc. degree in Chemistry from the University of Calcutta, India in 2008 and subsequently joined Indian Association for the Cultivation of Science, Kolkata, India as a PhD student under the supervision of Dr. Suhrit Ghosh. He graduated in 2013. Then he moved to the University of Massachusetts, Amherst, USA where he completed two years of postdoctoral study on biologically relevant polymer assemblies in the group of Prof. Thayumanavan. He then joined as Alexander von Humboldt postdoctoral fellow in the group of Prof. Pavel Levkin at Karlsruhe Institute of Technology, Karlsruhe, Germany as a postdoctoral fellow. Since December, 2016 he has joined as Assistant Professor in the Department of Chemistry, University of Calcutta, Kolkata, India.

Fellowship and Awards

Elected Associates of West Bengal Academy of Science and Technology (June, 2023)
JMS-PAC Early Career Research Award from Taylor & Francis (March, 2023)
S. S. Bhatnagar Young Scientist Award, Indian Chemical Society, India (2020)
Early Carrier Research Award, DST-SERB, India (2019)
Alexander von Humboldt Postdoctoral Award, Germany (2016)
Sir P C Ray Research Award, University of Calcutta, India (2014)

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IL-6

Detection of biomolecules and hazardous chemicals by organic chemosensors, metalloreceptor and quantum dots

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Abstract

The development of efficient sensing systems for biomolecules and hazardous chemicals is of great importance for environmental protection, health monitoring, and industrial safety. This talk highlights recent advances in the design of organic chemosensors, metal-based receptors, and quantum-dot-based probes for selective and sensitive detection of diverse analytes. Acyl hydrazole-based organic compounds have been developed as versatile chemosensors owing to their strong binding ability and distinct optical responses. Rhodamine-based organic systems, exploiting the spirolactam ring-opening mechanism, offer excellent "turn-on" fluorescence for metal ion and analyte recognition. A zinc-based coordination complex has been designed for the effective sensing of picric acid and ammonia, addressing concerns related to explosive and toxic vapors. A cadmium-based metal–organic framework (MOF) has been explored for selective fluoride ion detection. Additionally, europium and zinc complexes have been employed for adenosine triphosphate (AMP) sensing, while carbon quantum dots have been utilised for the detection of biologically important molecules such as ascorbic acid and dopamine. Together, these systems demonstrate the versatility and practical potential of modern chemosensing platforms.

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Personal Profile

Dr. Tithi Maity obtained her Ph.D. in Chemistry from Vidyasagar University in 2007. She began her academic career at Hijli College and then Prabhat Kumar College, Contai, where she has been actively involved in teaching and research for 15 years. She currently serves as an Associate Professor in the Department of Chemistry, with more than 12 years of undergraduate and 7 years of postgraduate teaching experience. Her research interests span coordination chemistry, chemosensing, supramolecular chemistry, DNA/RNA/protein binding studies, synthetic ion transporter and the anticancer, antibacterial activity of metal complexes, along with polymer curing and toughening.

Dr. Maity has made significant contributions to chemical sciences through her extensive research output, having co-authored 85 publications in peer-reviewed international journals and edited 11 academic books. She is actively engaged in research mentorship and is currently supervising four Ph.D. scholars and two have already got PhD degree. She has completed and is leading several UGC, UGC-DAE, and Government of West Bengal–funded research projects. Her work has been published in leading journals such as ACS Applied Bio Materials, Analyst, ChemAsian, Crystal Growth and Design, and Dalton Trans. New Journal of Chemistry, Dyes and Pigments, and Journal of Photochemistry and Photobiology A.

Awards and Honors

Indian Chemical Society Research Excellence Award (2020); Outstanding Paper Award by the Department of Science and Technology & Biotechnology, Government of West Bengal (2019); Indo-Asian Research Excellence Award in Inorganic Chemistry (2022); Best Poster Award at the Indian Science Congress (2023).

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IL-7

Dithiocarbamate Mediated Synthesis of Useful Organic Molecules

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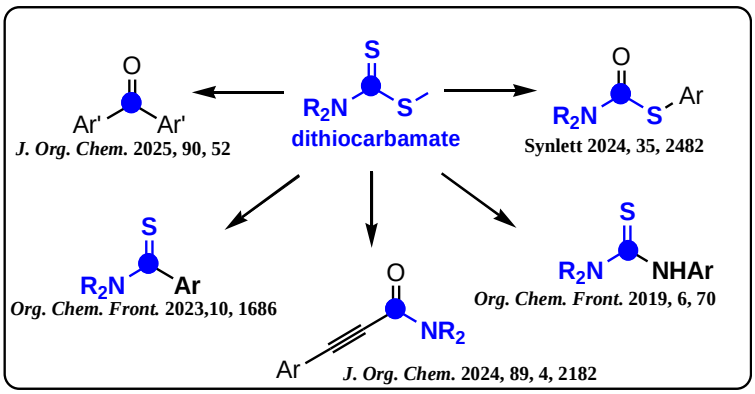
Abstract

Our research group is focused on exploring the use of dithiocarbamates as the synthetic precursors for various useful organic molecules. Dithiocarbamate dimers (thiuram disulfides) have been used by our group in the aminocarbonylation of terminal alkynes under Cu-catalyzed condition.[1] We have also employed the thiuram disulfide in Cu-catalyzed C-S cross coupling reaction to synthesize *S*-thiocarbamate compounds.[2] Dithiocarbamates have been used as carbonyl surrogates in the carbonylative homocoupling of arylboronic acids.[3]



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Personal Profile

Dr Amit Saha completed B.Sc. in Chemistry and M.Sc. with Organic Chemistry Specialization from Jadavpur University, Kolkata, India. He obtained PhD degree in 2011 from Indian Association for the Cultivation of Science (Jadavpur University), Kolkata, India. Then he moved to US-Environmental Protection Agency, Cincinnati, USA, for his postdoctoral research. He joined A. M. College, Jhalda, Purulia, West Bengal, as an assistant professor of chemistry in 2015. In 2017, he joined Department of Chemistry, Jadavpur University, Kolkata, India as an Assistant Professor of Organic Chemistry**.**

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IL-8

Shining Light on Cross-Dehydrogenative Synthesis of Functionalized Heterocycles

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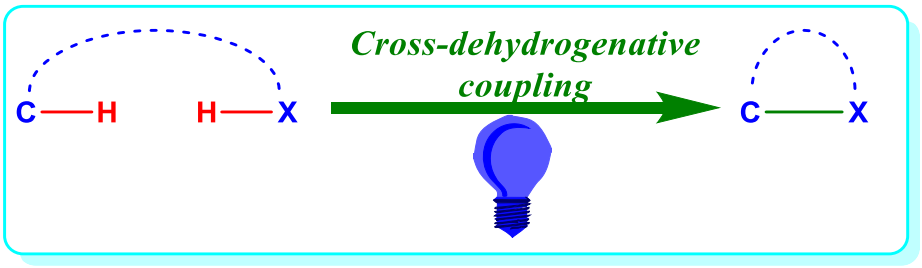
Abstract

Heterocycles are the core structure of the majority of the commercially available pharmaceuticals and agrochemicals. So, synthetic chemists are always interested in designing new methodologies for functionalized heterocycles. Different strategies have been employed over the years for the construction and functionalization of heterocycles. Among these, cross-dehydrogenative coupling (CDC) is one of the sustainable approaches.[1] No prefunctionalization of the reactants is required for executing cross-dehydrogenative coupling (CDC).[1] Consequently, it is a step-, time- and atom-efficient approach and preferable over the traditional cross-coupling reactions. Various catalytic approaches like transition-metal catalysis, electrocatalysis, iodine catalysis etc, have been extensively utilized for the synthesis of functionalized heterocycles through CDC. Recently, visible-light-mediated organic transformations have attracted the interest of chemists due to the use of renewable energy resources. So, designing a new methodology for the synthesis of functionalized heterocycles through cross-dehydrogenative coupling reactions using visible light photocatalysis will be an attractive one from the viewpoint of green chemistry.[2] We have successfully designed and developed methodologies for the synthesis and functionalization of heterocycles *via* organophotocatalyzed cross-dehydrogenative coupling (Scheme 1).[3-5] Some fascinating aspects observed during our efforts towards this light-promoted CDC will be presented.



Scheme 1: Visible-Light-Promoted Cross-Dehydrogenative Coupling.

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Choudhuri, T.; Paul, S.; Das, S.; Pathak, D. D.; Bagdi, A. K. *J. Org. Chem.* **2023**, *88*, 8992-9003.

Personal Profile

Dr. Avik Kumar Bagdi obtained his M.Sc. in 2009 from Visva-Bharati. He completed his Ph.D. in 2014 at the Department of Chemistry, Visva-Bharati, India under the supervision of Dr. Alakananda Hajra. He received the 2nd Prize of "2014 Eli Lilly & Company Asia Outstanding Thesis Award". In 2015, he was appointed as an Assistant Professor at the Triveni Devi Bhalotia College, Raniganj. In 2016, he went to OIST, Japan to carry out his Post-Doctoral Research with Prof. Fujie Tanaka. Since 2018, Dr. Bagdi is working as an Assistant Professor in the Department of Chemistry, University of Kalyani, India. His current research interest includes the employment of visible-light photocatalysis in the synthesis of functionalized heterocycles.

Awards:
CRS Bronze Medal Award 2025
Early Career Board Member of Research on Chemical Intermediates
2014 Eli Lilly & Company Asia Outstanding Thesis Award

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IL-9

Direct homo Michael type addition of deconjugated butenolides to donor-acceptor cyclopropane under catalytic activation

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Abstarct

Deconjugated butenolides such as *α*-angelica lactone has attracted extensive attention due to its easy accessibility and potential application in the construction of butenolides containing natural products and biologically active molecules.[1] Under appropriate condition these lactones exhibit nucleophilic reactivity at the α-, β-, or γ-positions, enabling a range of transformations includings Michael additions, Morita-Baylis-Hillman and Pd-catalyzed cross-coupling reaction etc. to access structurally diverse compounds.[2] Although, □-addition[2a] is commonly observed pathway, γ-addition[3] has also been reported under Lewis acid or transition metal catalysed condition. In contrast, reactivity originating from the β-position remains rare, despite its potential utility for accessing novel substitution patterns in butenolide-derived scaffolds. On the other hand, cyclopropanes are essential building blocks in organic chemistry due to their unique reactivity and strained structure. The incorporation of donor and acceptor group at vicinal position generates the "push-pull'' effect that has been synthetically exploited to access 1,3-functionalized compounds including annulated products.[4] During the reaction initial ring-opened products often undergoes annulations by suitably positioning of complimentary functionality. Taking advantage of this unique reactivity pattern, our research group has been engaged in developing methods under thermal, photolytic conditions to access various lactone or indole based scaffolds of medicinal importance.[5] My talk will encompass discussions on some of our recent efforts to develop organic transformations involving donor-acceptor cyclopropane (DAC) and deconjugated butenolides.

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Personal Profile

Dr. K. Ghosh obtained her Ph.D. in 2009 from IIT Kanpur, INDIA under the guidance of Professor M. K. Ghorai. After postdoctoral research with Professor Arun K Ghosh at Purdue University, USA (2010-2011), she joined Indian Association for the Cultivation of Science (IACS), Kolkata as a Research Associate (laboratory of Prof. Amitabha Sarkar). During this period she was deputed to University of Nottingham, UK (laboratory of Prof. Simon Woodward) as a visiting British Council Fellow. In 2012, Dr. Ghosh moved to Bangalore, India with a industrial position (team leader) at BMS Biocon R & D Centre (BBRC) at Biocon, Bangalore. In 2013, she joined as a Young Scientist (under DST Fast Track scheme) at IIT-Kharagpur. In November, 2013, she started her independent academic career at the Department of Chemistry, Presidency University, Kolkata, INDIA as an Assistant Professor.

Awards

2013: Young Scientist under Fast Track Project, SERB-DST, INDIA.
2010 – 2011: Postdoctoral fellowship at the Purdue University, USA
2005 – 2008: Senior Research Fellowship, Council of Scientific and Industrial Research, India
2002 – 2005 Junior Research Fellowship, Council of Scientific and Industrial Research, India

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IL-10

From Pharmacopoeial Compliance to Chemical Markers: Advancing Quality Control of Homoeopathic Medicines

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Abstract

Assurance of medicinal quality is a critical component of an effective healthcare system, and this is achieved through robust pharmacopoeial and regulatory standards. In India, the Homoeopathic Pharmacopoeia of India (HPI) functions as the statutory reference for the quality control of homoeopathic raw drugs and mother tinctures, specifying requirements for physicochemical parameters, contaminant limits, and standardized preparation methods. Complementing this framework, Bureau of Indian Standards (BIS) specifications provide harmonized quality benchmarks, particularly for analytical methodologies, permissible limits, and reproducibility, thereby strengthening regulatory consistency across laboratories and manufacturers.

Despite these guidelines, experimentally generated reference values for several quality parameters remain limited. Our work addresses this gap through systematic evaluation of raw materials and commercial homoeopathic tinctures using advanced analytical tools such as HPTLC and HPLC. Beyond routine standardization, the present study emphasizes the identification of chemically well-defined marker compounds through integrated experimental and computational approaches, aiming to enhance traceability, batch-to-batch consistency, and scientific robustness within the existing HPI–BIS regulatory framework.

Personal Profile

Dr. Bibaswan Biswas born in West Bengal, India in 1985 received his B.Sc. and M.Sc. in Chemistry from University of Calcutta. He did his Texas A&M University under the supervision of Dr. Daniel A. Singleton and received his PhD in 2015 with highest grades and endowed with F.A. Cotton Endowed Memorial Graduate Travel Award. After completion of his PhD, he joined as a post-doctoral fellow at Dr. M. P. Watson's group at University of Delaware, in 2015 under an National Institutes of Health (NIH) project. Since July 2017 he has been working as a Research Officer (Chemistry), CCRH. In CCRH his focus of research is advancement of Standardization of Homoeopathic Drugs. He is one of the Convenors and Principal Member of Bureau of Indian Standards (BIS) Homoeopathy Sectional Committee. He published several Pharmacopoeial Monographs and BIS Standards under his capacity.

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IL-11

Metal–Organic Framework–Based Composites for High-Performance Aqueous Symmetric Supercapacitor Applications

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Abstract

Metal–organic framework (MOF)–based composites have emerged as promising electrode materials for high-performance aqueous supercapacitors owing to their tunable porosity and rich electroactive sites. However, the intrinsically poor electrical conductivity of pristine MOFs limits their practical application. This talk presents recent strategies to overcome this challenge through the integration of MOFs with carbon nanomaterials and conducting polymers. UiO-66-NH_2–based composites were synthesized using facile solvothermal and in situ polymerization approaches, incorporating multi-walled carbon nanotubes (MWCNTs) and polyaniline (PANI) to enhance charge transport and electrochemical activity. Comprehensive structural and morphological analyses confirmed the successful formation of well-integrated hybrid architectures with high specific surface areas. The resulting composites exhibited excellent electrochemical performance in alkaline electrolytes, delivering high specific capacitance, enhanced energy and power densities, and good cycling stability. When assembled into aqueous symmetric supercapacitor devices, these materials demonstrated wide operating voltage windows and practical applicability, including the ability to power light-emitting diodes. Overall, the findings highlight the significant potential of MOF-based composite electrodes for advanced aqueous symmetric supercapacitor applications.

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4. Chattopadhyay et al. ACS Appl. Energy Mater. 2024, 7, 8683–8693

Personal Profile

Dr. Krishna Chattopadhyay is currently serving as a DST Women Scientist (WOS-A) in the Department of Chemistry, University of Calcutta. Prior to this, she worked as a SERB-National Post Doctoral Fellow at the Indian Association for the Cultivation of Science, Kolkata. She earned her PhD in Coordination Chemistry from the Indian Institute of Technology Kharagpur in 2017. Her research journey extends from the fundamentals of multinuclear inorganic complexes to the innovation-driven field of nanomaterials. Her current research focuses on the design, synthesis, and fabrication of advanced nano-MOFs aimed at developing novel materials for pollution control, antimicrobial activity, catalysis, and energy storage applications. She has co-authored more than twenty peer-reviewed international journal articles, seven book chapters with international publishers, and two undergraduate textbooks, and is currently editing an *Elsevier* book titled *"Organic, Inorganic, and Hybrid Nanomaterials: Synthesis, Properties, and Sustainable Applications."*

Awards:

DST-Women Scientists Scheme-A (WOS-A) Fellowship
SERB-National Post Doctoral Fellowship (N-PDF)

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IL-12

Supramolecular Organic Frameworks for Efficient Iodine Capture

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Abstract

The immobilization of radioactive iodine remains a key challenge in the context of nuclear energy utilization and environmental safety. In a series of studies reported in recently, we explored two complementary supramolecular design approaches for constructing crystalline organic materials capable of effective iodine capture. Our initial work focused on halogen-bonded organic frameworks (XOFs), in which highly directional halogen–halogen and halogen–acceptor interactions govern the self-assembly of stable crystalline architectures. These frameworks possess accessible internal voids and demonstrate efficient iodine uptake, highlighting halogen bonding as a powerful yet underutilized interaction for adsorbent design. More recently, we extended this concept to a dynamic covalent system by developing a chiral imine-based organic cage. Although intrinsically non-porous, the cage undergoes ordered crystallization driven by chiral recognition, resulting in the formation of continuous one-dimensional channels. This emergent porosity enables rapid adsorption of iodine from both gaseous and aqueous phases. Collectively, these studies illustrate how distinct supramolecular forces—halogen bonding and dynamic covalent assembly—can be strategically exploited to generate functional crystalline materials, offering versatile pathways toward advanced adsorbents for radioiodine containment and environmental remediation.

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Personal Profile

Dr. R. Natarajan grew up near Poompuhar in Tamil Nadu, India. He obtained his PhD from the Indian Institute of Technology Kanpur, under the guidance of Prof J N Moorthy, followed by postdoctoral research works with Prof Kimoon Kim at POSTECH (South Korea, 2005-06, 2011-12), Prof Frank Wuerthner at the University of Würzburg (Germany, 2006-07) and Prof Anthony Davis at the University of Bristol (UK) (2007-10). Subsequently, he joined CSIR–Indian Institute of Chemical Biology (CSIR-IICB), Kolkata, in 2013 as senior scientist, where he has been based since. His research activities include development of synthetic supramolecular receptors with clefts, macrocycles and cages, and porous materials with organic cocrystals and metal-organic frameworks

Awards

Alexander von Humboldt Fellowship
Ramanujan Fellowship

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IL-13

Discovery of New Cyclic Hypervalent Iodine Reagents & Its Application Towards Synthesis for Therapeutic Interest

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Abstract

Cyclic hypervalent iodine reagents have become indispensable tools in modern organic synthesis, functioning both as efficient oxidants1a and as versatile group-transfer reagents.1b-1d Their appeal arises from the distinctive reactivity patterns and finely tunable electronic properties enabled by the hypervalent iodine centre. We report herein a concise and operationally simple synthesis of a new class of uracil-containing cyclic hypervalent iodine reagents, designated Uracil-BX.1e The strategic incorporation of the uracil moiety facilitates umpolung functionalization of nucleophilic substrates, enabling C-5 sulfenylation,1e etherification,1f and amination1e under mild, metal-free conditions. The synthetic versatility of Uracil-BX is further demonstrated through the efficient construction of uracil-containing oxazolidinone derivatives using both solid and gaseous CO_2 surrogates, delivering moderate to excellent yields.1g Beyond synthetic applications, biophysical studies employing multispectroscopic techniques reveal that these reagents engage in pronounced interactions with VEGF G-quadruplex DNA, resulting in modulation of gene expression in cancer cells.1h The observed binding affinity and potential stabilization of G-quadruplex architectures underscore the promise of Uracil-BX as a functional scaffold at the interface of organic synthesis and chemical biology. Collectively, this work establishes a conceptually significant platform in hypervalent iodine chemistry that integrates reagent design, synthetic utility, and nucleic acid recognition.

Reference

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Personal Profile

Dr. Raj Kumar Nandi obtained his Ph.D. in 2014 under supervision of Prof. K. C. Majumdar. In 2014, he joined in the group of Prof. Okiko Miyata at Kobe Pharmaceutical University, Japan, as Postdoctoral assistant. In 2015 he moved to Dr. Guillaume Vincent group as a Marie Curie-IIF postdoctoral fellow at University Paris Saclay, France. In 2017 he joined in the laboratory of Prof. Jérôme Waser at the EPFL, Switzerland for his third postdoctoral venture. In 2019 he joined as an Assistant professor in department of Chemistry, DHWU, Sarisha. In March 2023, he moved Jadavpur University as Assistant Professor of Chemistry. His current research activities include the study of novel activation of Hypervalent iodine reagent and development of chemoselective and sustainable transformations towards the synthesis of interesting molecular architectures for therapeutic interest.

Awards

Best Oral presentation in ICCHD-2018
Marie Curie Fellowship, European unio, FP7 frame work, 2015
Prof. Asima Chatterjee endowment silver medal for securing 1st position in B.Sc. in Kalyani University.

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IL-14

Radical Generation, Philicity, and Reactivity (R-GPR) in the Synthesis of Pharmaceuticals

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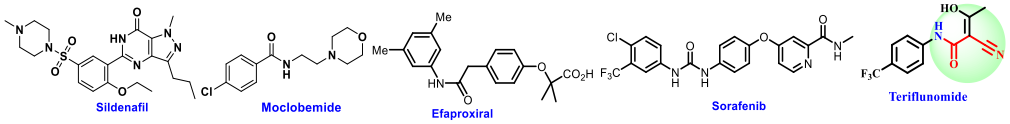
Abstract

Evolution of innovative, cost-effective green processes for generic Active Pharmaceutical Ingredient (API) synthesis in academia could help promote the production of generic APIs in industry. Our group has been involved in the development of radical reactions largely using an oxidant/reductant as an exclusive reagent to the green and sustainable synthesis of pharmaceuticals. Because of lack of understanding of the chemistry of several reactive radicals, we have demonstrated the convenient generation of these radicals, predicted of global electrophilicity by computational study and explored their subsequent reactivity with a polarity-matched coupling partner or via radical polar-crossover. Our on-going efforts on the synthesis of various APIs and Key Stating Materials (KSMs) involving various radicals including benzyl, arene, aroyl, arylglyoxyl and arylacetyl radical will be discussed. The underlying challenges during translation of a gram scale to scale up (>100 g) synthesis will also be covered.



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2. Laha, J. K.; Gulati, U.; Gupta, A.; Indurthy, H. K. Improved, gram-scale synthesis of sildenafil in water using arylacetic acid as the acyl source in the pyrazolo[4,3-d]pyrimidin7-one ring formation, New J. Chem. 2021, 25, 2643-2648.
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7. Gupta, A.; Bhatti, P.; Laha, J. K. "K2S2O8-Mediated Denitrogenative Formal Transformylation of Amines with Formylhydrazine in Water" Org. Lett. 2024, 26, 10013–10019.
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Personal Profile

Prof. Joydev K. Laha started his independent career as Assistant Professor at NIPER S.A.S. Nagar in July 2011. He was promoted to Associate Professor in 2016 and subsequently to Professor in July 2021. He has been serving as Head of the Pharmaceutical Technology department and associated state-of-the-art Technology Development Center (TDC) since February 2022. Prior to joining the NIPER, Dr. Laha was employed as a Postdoctoral Chemist (Staff) in the Laboratory for Drug Discovery in Neurodegeneration (LDDN) at HARVARD UNIVERSITY Medical School after acquiring postdoctoral research experiences in North Carolina State University and Mayo Clinic in the United States. Dr. Laha gained versatile research experiences including organic synthesis and medicinal chemistry research directed to structure-based drug discovery. Dr. Laha obtained a Ph.D. degree in organic chemistry from the National Chemical Laboratory at Pune. Prof. Laha's research interests in independent career include industrial organic synthesis, process research & development of pharmaceuticals, biocatalysis and diagonistic and therapeutic Tools. Prof. Laha's group has demonstrated translational applications (Ready-to-Transfer Technology) of a laboratory concept to prepare drugs under Production Linked Incentive (PLI) scheme and other top-selling marketed drugs. Over the past fourteen years in his independent career, he has mentored three Postdoctoral Fellows, fifteen PhDs and over hundred Master's students. He is author or co-author of ONE HUNDRED TEN papers published largely in ACS/RSC journals and has TWENTY Patents granted/filed to his credit. Prof. Laha's group has published abstract of papers over twenty. He has been serving referee to the ACS, RSC, Science Direct, and Wiley journals. He has delivered invited lectures/oral presentations extensively in India and abroad. Prof. Laha has established a strong collaboration nationally and internationally. He has been recipient of several awards including CRSI Bronze Medal 2023, PharmInnova award twice (2018 and 2024), NIPER Innovation award 2019, Award of Appreciation Technology Day 2018, etc. Among various other recognitions, he has been appointed as Editorial board member in Tetrahedron, Tetrahedron Letters, and Tetrahedron Green Chemistry journals. Prof. Laha has secured extramural research grants from Government funding agencies consistently.

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IL-15

Metal free organo-electrocatalyst for electrocatalytic hydrogen generation

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Abstract

As we move towards a net-zero emissions world, hydrogen continues to gain momentum as a critical energy enabler. Among the various methods of hydrogen production, electrochemical water splitting appears to be the most promising a. However, hydrogen production requires the use of efficient catalysts to reduce the large overpotential of the process. Noble metals act as excellent catalysts for hydrogen generation; however, their high cost and scarcity have limited their widespread use in renewable energy applications b. Therefore, the fabrication of earth-abundant electrocatalysts with high activity and durability for hydrogen generation has received significant attention. In recent years, metal-free organic molecules have emerged as effective electrocatalysts. Certain organic compounds can be easily synthesized from low-cost precursors. Furthermore, by altering the geometry and size of their constituent units, the direction of topological evolution and structural periodicity can be efficiently controlled. Organic electrocatalysts remain relatively underexplored, and only a few studies on organic electrocatalyst-based hydrogen generation have been reported to date. Among these, only metal-free porphyrins have been reported as efficient catalysts for electrocatalytic hydrogen generation from aqueous media c. Additionally, different perylene diimide–based compounds (PDI-1, PDI-2, and PDI-3) exhibit good electrocatalytic hydrogen generation activity, with low onset potentials and good stability under aerobic conditions. The delocalized π-electron density of the perylene units facilitates efficient electron transport, while the carbonyl sites promote hydrogen adsorption–desorption via keto–enol tautomerization. These two factors synergistically enhance the electrocatalytic performance. Therefore, well-designed organic compounds can demonstrate promising electrocatalytic hydrogen generation activity comparable to that of expensive noble metals. This opens new possibilities for replacing precious metals with alternative materials across a wide range of applications.

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Personal Profile

Dr. Poulami Hota obtained her Ph.D. in 2020 from Indian Association for the Cultivation of Science (IACS) under the guidance of Professor Shyamal K. Saha. After postdoctoral studies with Professor Dilip Kumar Maiti, at Calcutta University (2020-2023), she started her independent career as Assistant professor in Chemistry at Milli Al-Ameen College (For Girls), Kolkata. Her research interest includes designing metal free efficient electrocatalysts for electrocatalytic hydrogen generation.

Awards:

CSIR-JRF Fellowship
CSIR-SRF Fellowship
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IL-16

Analysis of Plant based Drugs and of Essential Oils from Indian and African sources: HPTLC, GC-MS, Anti-oxidant assay and In-silico approaches

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Abstract

It is well known that the use of traditional plant-based drugs has witnessed phenomenal growth in the last few decades. In our Institute, we are engaged in the analysis of plant-based drugs and essential oils with medicinal properties. We have carried out extensive studies on a number of Indian Medicinal plants, which are well-reputed in Ayurveda. We briefly present here our investigations on Hemidesmus indicus R. Br. roots (Anantamul), Ailanthes excelsa Roxb. (Mahanimba) stem bark and four Piper species. In addition to a number of known triterpenoids and coumarino-lignoids a new triterpenoid designated hemidesterpene (Δ12,13- dehydro-taraxesteryl acetate) has been isolated and characterised from H. indicus. A new compound Alru-1 was obtained from Ailanthes excelsa and was characterised as stigmasta-4,22-dien-3β-ol. Several plants of both Indian and Africa are used in respective ethnomedical practices. We report here our comparative studies on two plant species used in both India and Africa. These are Shigru leaves (Moringa oleifera Lamb.) and Cinnamomum zeylanicum Blume from India and Tanzania. Cinnamomum zeylanicum Blume (Lauraceae), is native to Sri Lanka and cultivated in India, Southeast Asia, and parts of Africa. Its stem bark is widely used in Ayurveda, Siddha in India and traditional medicine in Africa for treating digestive and respiratory ailments, rheumatism, and diabetes. Modern clinical studies have confirmed its antioxidant, anti-inflammatory, antimicrobial, anticancer, and antidiabetic effects. The phytochemical profile of C. zeylanicum varies markedly with genotype, soil, cultivation practices, and climate. We have carried out comparative studies comprising chromatographic profiling, volatile analysis, and antioxidant evaluation across regions in India and Africa. This study involves by comparing bark samples from India (Shillong and Kolkata) and Africa (Tanzania). Constituents identified include cinnamaldehyde, eugenol, coumarins, flavonoids, and other phenolics. HPTLC and GC-MS analyses revealed distinct chemical differences, including the exclusive presence of eugenol and higher cinnamaldehyde dimethyl acetal in the Tanzanian sample. Organoleptic and physicochemical properties also reflected regional influence. Antioxidant assays (DPPH and FRAP) showed superior activity in the Tanzanian variety, with the lowest IC50 value (22.05 µg/mL) and highest FRAP value (579 µM). These results emphasize the impact of geographical origin on the quality and therapeutic potential of C. zeylanicum, supporting the need for standardisation. Molecular docking further demonstrated strong binding of eugenol to diabetes-related targets (PTP1B, PPARγ, PPARδ, PPARα) and the Alzheimer's-linked enzyme BACE1, reinforcing its pharmacological relevance.

Personal Profile

After Post graduating in first class from Burdwan University, Manosi Das joined the CCRAS institute at Kolkata (then named Regional Research Institute in Ayurveda) in 2006 as a Research Assistant. She was promoted to Assistant Research Officer in 2011 and then Research officer (Scientist 1 grade). At present she is Research officer (Scientist 2 grade). She has served as Head of the Chemistry Division from 2017 to 2019, and 2020 to July 2025. Her main research interests are isolation of markers from medicinal plants and quality assessment of raw drugs and Ayurvedic formulation as per WHO/ API guidelines. She has published more than 53 papers and Abstracts in peer-reviewed journals and Conference proceedings. She has supervised eight projects related to quality assessment of raw drugs and Ayurvedic formulations as well as isolation of bioactive markers from medicinal plants. She has research collaborations with Jadavpur University and Calcutta University, in addition to other CCRAS Institutes. She has a number of presentations - both oral and poster in national and international conferences - including Indian Science Congress sessions, ICCHD2020, World Ayurvedic Congress, ICAR Conferences and International Conferences arranged by Society for Ethnopharmacology. As part of the CCRAS team of scientists, she is committed to research on plant derived drugs, and the development of drugs by linking the ancient medical science of Ayurveda with state-of-art spectroscopic, chromatographic and other instrumental techniques, with the extensive use of computational chemistry and clinical trials.

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IL-17

Photoswitchable Antibiotics to Combat Antibiotic Resistance

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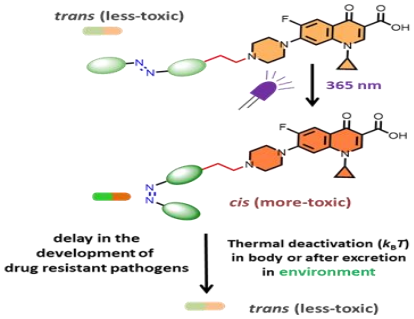
Abstract

The emergence and intensification of bacterial resistance towards antibiotics represent a significant global health threat in the twenty-first century.[1-2] Extensive and improper use of the life-saving antibiotics in healthcare, livestock husbandry, and agriculture is mostly responsible for this rapid aggravation of the resistance scenario.[3] The gradual accumulation of the active antibiotics in the environment results in the prolonged exposure of the drugs' toxicity to microorganisms, which creates selective pressure (life/death) to render them acquiring resistance through mutations and horizontal gene transfer.[4] The rise of antimicrobial resistant pathogens leads to increasingly compromised and failed treatments with conventional antibiotics. To overcome this issue for a prolong time, in addition to the discovery of new antibiotics or potency enhancement of the existing antibiotics, application and development of unconventional strategies that could restrict the exposure of drug toxicity to pathogens are indeed very essential. Photopharmacology constitutes one such approaches by the use of photoswitchable antibiotics, which permit control of drug action by the application of light.[5] In this lecture, the development of photoswitchable norfloxacin and ciprofloxacin for combating the growth of resistant pathogens will be discussed.[6]



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6.hunia, S., Jana, S. K., Sarkar, S., Das, A., Mandal, S., Samanta, S. Chem.-Eur. J. 2024, 30, e202303685.

Personal Profile

Dr. Subhas Samanta obtained his Ph.D. in 2010 from IIT Kanpur under the guidance of Professor J. N. Moorthy. After postdoctoral studies with Professor Andrew Woolley at Toronto University, Canada (2009-2013), and with Prof. Alexander Deiters at North Carolina State University, Raleigh, and at the University of Pittsburgh, Pennsylvania, USA (2013-2015), he started his independent career at the University of Calcutta, WB, in early 2016. He is now an assistant professor at the Stage III level. He was a member of the Canadian Society for Chemistry (CSC) from 2009 to 2013. He has 44 publications and has been serving as a reviewer of several international journals. He received a UGC start-up grant, a Core Research Grant from DST-SERB, and an ICMR grant.

Research Interests

Photoswitches and their potential applications in medicinal chemistry (photopharmacology), fluorescence sensing and imaging, and molecular solar-thermal energy storage systems

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IL-18

Stereoselective Synthesis of Olefin by Exploiting Vinyl Boronates and Amino Acids

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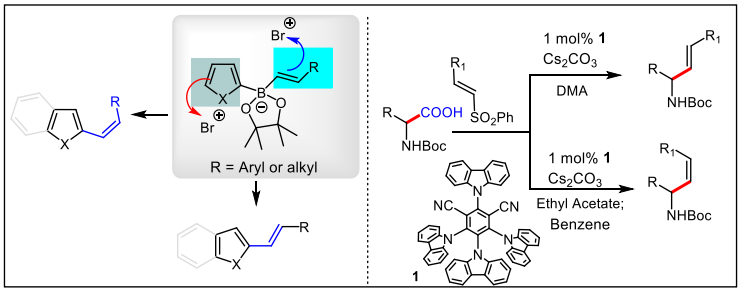
Abstract

Zweifel olefination is an attractive transition metal-free method for the stereoselective synthesis of olefins. Although several developments have been made in the Zweifel olefination and its extension to heterocyclic synthesis, the chemistry remains mostly reserved either between a pi-inactive and pi-active system or using similar olefins on both sides to control the stereoselectivity. The reactivity between two unsymmetrical olefins or between a heteroaryl and vinyl boronates is mostly unknown, which undermines its scope and impact on organic synthesis. We have developed a stereoselective 1,2-migration from a substituted vinyl and heteroaryl boronate complex, which has produced cis-or trans-vinyl heteroaryl, an important skeleton present in bioactive compounds and natural products.

Solvent plays an important role in the photophysical properties of donor-acceptor-based photocatalysts. Solvent-dependent access to E vs Z-allylic amines was achieved via decarboxylative vinylation of amino acids with vinyl sulfones. Detailed experimental studies have been conducted to understand the solvent role in the reactivity and stereoselectivity of the vinylation reactions.



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Personal Profile

Dr. Santanu Panda obtained his PhD on 2013 in organocatalysis and total synthesis of natural products under Prof. Antony Pearson, Case Western Reserve University, Cleveland, USA. After finishing his PhD, he moved to Dallas and joined Prof. Joseph Ready group as postdoc. During his postdoc, he was exposed to transition metal catalysed cross coupling and organoboron chemistry. On July 2018, he joined IIT Kharagpur as an assistant professor. His group is very much active in organoboron chemistry, total synthesis of natural product, and organophotoredox chemistry.

Awards & Honors :

2023 Merck Young Scientist award, Winer.
2022 CRS (Chirantan Rasayan Sanstha) Bronze Medal
2018 Ramanujan Fellowship from SERB
Best Poster Award at UTSW Biochemistry Retreat at Dallas Botanical Garden, Dallas On 2017.
Invited seminar to the annual UTSW Biochemistry department seminar series at UT Southwestern Medical Center, Dallas.
Graduate outstanding teaching assistant award 2013, Department of Chemistry, Case Western Reserve University, USA.
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IL-19

NHC-catalyzed Enolate and Homoenolate Michael Additions to Nitroalkenes Embedded in Benzo-fused Heterocycles

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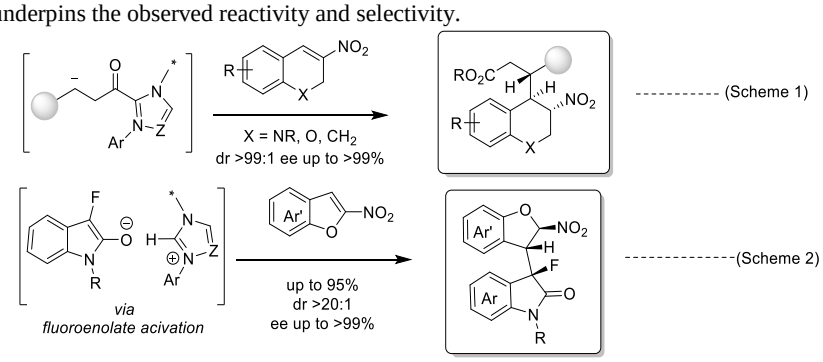
Abstract

Carba-nucleophiles with special emphasis with enolate and homoenolate chemistry has long served as a cornerstone in the development of carbon-carbon bond-forming strategies, offering powerful approaches for the rapid assembly of molecular complexity. Particularly, benzo-fused saturated N-/O-containing heterocycles and carbocycles are frequent motifs in biologically active molecules and drug candidates. In the realm of organocatalysis, N-heterocyclic carbenes (NHCs) has gained significant prominence, operating through direct covalent bond formation with a wide range of carbonyl substrates.[1] In contrast, novel asymmetric transformations via NHC catalysis leveraging its inherent Brønsted basicity through non-covalent activations, are less explored.[2] As part of our ongoing efforts in NHC-mediated asymmetric catalysis, we have developed a highly diastereo- and enantioselective homoenolate addition to C3-nitro-substituted chromenes, dihydroquinolines, and 1,2-dihydronaphthalenes.[3] This strategy delivers densely nitro-functionalized heterocycles and carbocycles in good yields with excellent stereocontrol (dr >20:1, up to >99% ee) (Scheme 1). Most recently, we have achieved a dual NHC/thiourea-catalyzed dearomative Michael addition of fluorooxindoles to nitrobenzofurans through a noncovalent activation mode.[4] The combination of a commercially available chiral NHC salt and a simple achiral thiourea catalyst enables efficient dearomatization, affording 2,3-dihydrobenzofuryl and fluorinated oxindole scaffolds with outstanding levels of stereoselectivity (dr >20:1, up to >99% ee) (Scheme 2). Mechanistic investigations, including key NMR studies, support a cooperative activation pathway that underpins the observed reactivity and selectivity.



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Personal Profile

Dr. Biswajit Maji was born in West Bengal, India. He studied Chemistry at the Vidyasagar University, Midnapore, West Bengal and received Ph. D. degree in the research group of Prof. Saumen Hajra at the Indian Institute of Technology, Kharagpur, India, in 2010. He next moved at Nanyang Technological University (NTU), Singapore for post-doctoral research with Prof. Liu Xue-Wei in the field of organocatalysis. In October, 2012, he returned as an Assistant Professor, Department of Chemistry, Indira Gandhi National Tribal University, Amarkantak, MP (A Central University). In 2013, He has been awarded DST-INSPIRE Faculty to start his independent research career. In 2024, he became Associate Professor. His research interests include asymmetric synthesis and catalysis with special emphasis on *N*-heterocyclic carbenes (NHCs) as covalent and non-covalent catalysis.

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IL-20

A High-Affinity "Synthavidin" Receptors for Squaraine Dyes

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Abstract

Strong-binding host–guest pairings in aqueous media have potential as "supramolecular glues" in biomedical techniques, complementing the widely−used (strept)avidin−biotin combination. We have previously found that squaraine dyes are bound very strongly by tetralactam macrocycles possessing anthracenyl units as cavity walls. Here we show that replacing the anthracenes with pentacyclic 5,7,12,14−tetrahydro−5,7,12,14−tetraoxapentacene (TOP) units generates receptors which bind squaraines with increased affinities (around $K_a = 10^{10}$ M^{-1}) and improved selectivities. Binding can be followed through changes to squaraine fluorescence and absorbance. The TOP units are easy to prepare and potentially variable, while the TOP−based receptor shows improved photostability, both in itself and in complex with squaraines. The results suggest that this system could prove valuable in the further development of practical "synthavidin" chemistry.

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Personal Profile

Dr. Soumen K. Samanta obtained his Ph.D. in 2013 from University of Siegen, Germany under the guidance of Professor Michael Schmittel. He did his postdoctoral studies with Professor Lyle Isaacs (2014-2018) at University of Maryland, USA and Prof. Anthony P. Davis (2019-2023) at University of Bristol, UK. Currently he is working as guest faculty at the department of Chemical Science at Biswa Bangla Biswabidyalay (University).

Awards and Accomplishment

9th rank in All India Joint Admission for MSc (JAM). DST INSPIRE FACULTY Award

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IL-22

A Versatile Condensation Polymerization Route to Functional Degradable Polymers

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Abstract

Our work describes a versatile step-growth polymerization route to functional aliphatic polyesters through an organo-catalyzed transesterification reaction between an activated pentafluorophenyl-diester of adipic acid (AA) and various structurally different diols (BB).[1] The use of an activated diester enables us to obtain a near quantitative reaction under mild conditions with no requirement of by-product (pentafluorophenol) removal, which remains a major drawback in the conventional polyester synthesis with non-activated diesters. Enzymatic degradation of the resultant polyesters has been demonstrated, which can be tuned by playing with the hydrophobicity of the polyester backbone. Following the same synthetic strategy, water dispersible amphiphilic, cationic polyesters with pendant naphthalene monoimide (NMI) derivatives were prepared by pre-quaternization of the fluorescent monomers with positively charged hydrophobic aromatic pendant. These amphiphilic polyesters produced fluorescent nanoparticles in water, which exhibited broad-spectrum antibiotic properties against both gram-positive and gram-negative bacteria by a membrane disruption mechanism, depending upon the nature of the cationic side chains.[2] These cationic polyesters also exhibited remarkably high cellular uptake by endocytosis and demonstrate mitochondrial targeting ability.[3] Further, the abovementioned methodology enabled us to design and prepare biotin-functionalized polyesters that showed selective uptake and targeted release of anticancer drug doxorubicin in cancer cells.[4] Additional incorporation of disulfide bonds within the polyester scaffold allowed targeted drug release in the presence of endogenous glutathione.[5] Furthermore, immobilization of a photosensitizer in the biotinylated polyester enabled synergistic combination of cancer targeted drug delivery with photodynamic therapy.[6] Finally, we demonstrated that the synthetic approach goes beyond polyesters and can be used for preparing structurally diverse polythioesters.[7] This presentation will showcase multiple aspects of our newly established synthetic methodology for functional degradable polymers and their biomedical applications.

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Personal Profile

Dr. Anindita Das is an Associate Professor at the Indian Association for the Cultivation of Science (IACS). She works in the interdisciplinary area of polymer sciences and supramolecular chemistry. She received her Ph.D. degree in 2014 from IACS under the supervision of Professor Suhrit Ghosh. Thereafter, she worked as an Alexander von Humboldt Postdoctoral Fellow with Professor Patrick Theato at the University of Hamburg, Germany (2014–2016) and subsequently, with Professor E. W. Meijer at the Eindhoven University of Technology, The Netherlands (2016–2017). She started her independent research career at the IACS in 2017. Her research interests include supramolecular polymerization of functional π-systems and macromolecules by directional non-covalent interactions, crystallization-driven macromolecular assemblies, and functional degradable polymers.

Awards:

Early Career Advisory Board Member of all Wiley in-house Polymer journals, including the *Macromolecular* family, *Journal of Polymer Science*, and *Journal of Applied Polymer Science* (since January 2026)
***Small* Young Innovator Award** (2025) presented by Wiley
Associate of the West Bengal Academy of Science & Technology (WAST) (2024)
Kabita Maiti Memorial Award (2024) from Professor Sukumar Maiti Polymer Award Foundation for the contribution in the field of Polymer Science
ACES-CRSI Early Career Award (2024) conferred jointly by the Chemical Research Society of India (CRSI) and the Asian Chemical Editorial Society (ACES)
Member of the **Editorial Advisory Board** of ***ACS Polymer Au*** *(*since 2024*)*
Member of the **Editorial Advisory Board** of ***RSC Applied Polymers*** (since 2024)
SERB Women Excellence Research Grant (2024)
Associate Fellow of the Indian National Science Academy (INSA) (since 2023)
Associate of the Indian Academy of Sciences (IASc) (since 2022)
DAE-BRNS Young Scientist Research Award (2022)
Author's Profile Published in ***Angew. Chem. Int. Ed.*** (2022)
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IL-23

Supercapacitors Based on Carbon Nanofibers of Bacterial Cellulose Decorated with Polydopamine

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Abstract

Cellulose is a renewable organic material offered by the nature in abundance and it has been widely used in paper, cloth and food industries as well as in many other forms, which has transformed different aspects of our daily lives. Bacterial cellulose (BC) is a polysaccharide, like plant cellulose, with a β-1,4-glycosidic linkage (Molecular formula: $(C_6H_{10}O_5)_n$) having several advantages that makes it a desirable candidate in energy research.[1] In contrast to traditional cellulose fibers, bacterial cellulose nanofibers (BCNF) exhibit more attractive microstructure and unique properties. It consists of 3D-ultrafine nanosized network structure of fibers having 10 to 100 nm diameter which leads to a higher specific surface area and porosity. Additionally, it has high-purity, excellent mechanical properties and ease of surface functionalization by virtue of the hydroxyl groups present on its surface. Thus, BCNFs have been utilized as raw materials to play diverse roles in energy storage devices and flexible electronics.1 Porous bacterial cellulose allows the passage of electrolyte through its structure which is important to enhance the capacitance as well as the charge storage ability of the supercapacitors. Additionally, it is biocompatible and eco-friendly which makes it an attractive substitute of conventional materials employed in energy storage devices.[2] In this talk, an effective approach to bioengineer the BCNF surface via polydopamine (PDA) coating will be discussed with an emphasis on the effect of concentration variation of the coating material to achieve the desired electrochemical properties of the resulting carbonized samples. The BCNF surface are uniformly coated with PDA which introduce nitrogen heteroatom in the carbon precursor contributing additional pseudocapacitance in a metal free approach.[3]

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Personal Profile

Dr. Mahasweta Nandi obtained her Ph.D. in 2008 from the Indian Association for the Cultivation of Science. After that she joined as an Assistant Professor at the Integrated Science Education and Research Centre, Visva-Bharati, Santiniketan in 2009. Thereafter she carried out her postdoctoral studies at Osaka University, Japan (2010-2012) with a GCOE fellowship followed by JSPS. After returning from Japan, she started her independent research career at Visva-Bharati and has been an Associate Professor there since 2021. Presently she has around 100 publications with a total citation of nearly 4000 and h index of 33.

Awards:

Japan Society for the Promotion of Science (JSPS) Fellowship (2011)

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IL-24

Hydrogenated Diamond-Like Carbon as a Robust Carbon Nanomaterial for Advanced Energy Storage

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Abstract

The growing demand for high-performance and durable energy storage systems has accelerated the search for advanced carbon-based nanomaterials with tunable electrical and structural properties. In this work, hydrogenated diamond-like carbon (HDLC) is explored as a functional nanomaterial for energy storage applications. HDLC combines the mechanical robustness of diamond-like sp^3 carbon with the electrical transport pathways of sp^2 carbon, while hydrogen incorporation plays a decisive role in tailoring conductivity, surface chemistry, and defect density. Controlled hydrogenation enables modulation of charge transport behavior, surface energy, and electrochemical stability, making HDLC highly suitable for electrode architectures.The material demonstrates excellent chemical inertness, strong adhesion, and resistance to structural degradation under electrochemical cycling. These characteristics support its application in lithium-ion batteries, supercapacitors, and hybrid energy storage systems, where stable electrode–electrolyte interfaces and long cycle life are critical. Enhanced surface area and improved charge transfer kinetics further contribute to its electrochemical performance. The findings highlight HDLC as a promising platform for next-generation energy storage devices, offering a balance between conductivity, durability, and structural integrity. The study establishes HDLC as a viable carbon nanomaterial capable of addressing key performance limitations in contemporary energy storage technologies.

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Personal Profile

Dr. Hari Shankar Biswas is Assistant Professor in Chemistry Surendranath College, Kolkata. Dr. Biswas is with a multifaceted academic background and a strong dedication to research and education. He embarked on his academic journey by obtaining his B.Sc. degree in Chemistry Honours from R.K.M.V.C. College in 2005, followed by his M.Sc. degree from Presidency College, Kolkata, in 2008. Dr. Biswas further pursued his scholarly pursuits by earning a Ph.D. in Material Science from the Saha Institute of Nuclear Physics, University of Calcutta, in 2015. His professional experience spans various roles, including a stint as a School teacher at Keshub Academy, Kolkata, from 2008 to 2010, before transitioning into academia as an Assistant Professor at Surendranath College. Dr. Biswas specializes in the research domain of Carbon thin Film, Graphene, and Graphene Oxide-based nano Composites, focusing on their synthesis, characterization, and application across Environmental, Biological, and Technological fields. Dr. Biswas's scholarly contributions are significant, with authorship of 22 book chapters and over 35 papers published in esteemed International Journals. He is actively involved in academic societies, holding life membership in the Indian Science Congress Association and the Indian Chemical Society, along with an affiliated membership with the Royal Society of Chemistry. In addition to his research and academic endeavors, Dr. Biswas plays a vital role in the dissemination of scientific knowledge as a series book Editor (14 books edited) and reviewer for reputable international publishers and journals. He serves as an Editorial board member for the American Journal of Chemical Engineering, Reseapro Journal, Lincoln University College, etc., and is affiliated with Rotary International. Dr. Biswas's editorial contributions extend to editing various books, including titles such as “Emerging Concepts in Chemical and Biological Science” and “Modern Approaches in Chemical and Biological Sciences,” among others. Through his comprehensive involvement in research, education, and editorial responsibilities, Dr. Hari Shankar Biswas continues to make valuable contributions to the field of Chemistry, fostering advancements and innovations for the betterment of society.

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IL-25

Unfolding a Greener Methodology for the Synthesis of Novel Heterocycles using a Biocatalyst in Aqueous Medium

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Abstract

Synthesis of heterocycles has been an attractive topic in the fields of chemistry, pharmacology, and medicine because of their various biological activities. Most of the medicines contain heterocyclic molecules as the main components because of their binding affinity, solubility, permeability, and many other factors. However, their conventional preparation procedures have several disadvantages, including the use of harmful chemicals and solvents, harsh reaction conditions, the use of expensive chemicals and metal catalysts, multi-step reactions, and the release of toxic chemicals, providing low yields of products. So, these call for alternate methodologies, which are eco-friendly and follow greener approaches without the use or removal of harmful, toxic chemicals, as well as multicomponent reactions. The use of biocatalysts is a good replacement, as they are inexpensive, biodegradable, and do not require harsh reaction conditions or harmful solvents. A one-pot, three-component reaction procedure for the synthesis of valuable imidazole N-oxide1,2,3,4 derivatives, a bioactive compound and an important starting material for the preparation of more complex organic compounds containing imidazole scaffolds, using biocatalyst bovine serum albumin (BSA) with the application of the incubator shaker in the solvent of water has been developed. The aromatic aldehydes, when combined with aromatic or aliphatic amines, were found to be efficient in this procedure, yielding good to high amounts of the desired products. The catalytic promiscuity of the catalyst BSA is evident towards aromatic aldehydes, aliphatic/aromatic amines, and monoximes across a broad range. This methodology offers numerous advantages in various aspects, such as excellent yields, an environmentally friendly, greener approach, the absence of hazardous solvents, the use of aqueous solvent, a straightforward work-up procedure, recyclability of the BSA catalyst, and many others. Furthermore, the gram-scale reaction was also successfully achieved using this methodology.

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4 M. Hossain*, J S Al-Otaibi, R Thomas, Y S Mary, I Habib, S Armakovi´, S J Armakovi´, C V Alsenoy, Journal of Molecular Liquids. 439 (2025) 128771.

Personal Profile

Dr. Mossaraf Hossain is an Assistant Professor at the UGC-MMTTC (HRDC) at the University of North Bengal, India. Dr. Hossain is also associated with the chemistry department at the University of North. He received his Bachelor's degree (B.Sc. Honours in Chemistry) from Calcutta University and M.Sc. from West Bengal State University with an organic specialisation. He stood first in order of merit of the M.Sc examination, and he was awarded a medal in recognition of his academic excellence. Then, he joined as an Assistant Professor in a substantive post in the department of chemistry at Ananda Chandra College, Jalpaiguri. After a few days, he became an Assistant Professor at the UGC-MMTTC (HRDC), University of North Bengal. He is working on synthetic organic chemistry based on a greener approach and their biological applications. He has been a reviewer of several reputed international journals of the American Chemical Society, Wiley, Elsevier publications, etc. During his PhD, he singly filed a patent on anti-cancer activity containing no side effects, and it was granted by Govt. of India in 2022. Dr Hossain has published so many novel works in very reputable international journals. Dr. Hossain has received a few research projects from various funding agencies. Presently, four full-time research scholar are continuing their research work under the supervision of Dr. Hossain. Dr. Hossain has delivered so many lectures in various National & International Seminar/Conference/workshop, faculty development programmes, Short Term Courses, Refresher Courses, and NEP Orientation & Sensitization programmes conducted by many UGC-MMTTC (HRDC) and also delivered popular lectures at various colleges & university levels.

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IL-26

Application of edible coating on different types of fruits and vegetables and assesing their cytotoxic effects

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Abstract

The effort of applying nanotechnology in food preservatives by prolonging the shelf life of fruits and vegetables is the focus of this article. Herein the investigation demonstrates the first report on the use of novel edible coating of chitosan-acetylated gallic acid nanoparticles for food preservation with prolonged shelf life, maintaining good nutritional integrity in comparison to pristine chitosan and chitosan-gallic acid nanoparticles. This is achieved by creating a hydrophilic and lipophilic protection wall that offers antimicrobial and antioxidant properties, as well as by developing a self-cleaning technique to increase shelf life. Along with several advantages of chitosan, the two main shortcomings are associated with its low mechanical strength and weak water solubility. These shortcomings were eliminated by incorporation of gallic acid in its acetylated form. It is well known that if normal gallic acid is used, due to presence of three highly hydrophilic hydroxyl groups, the edible coating faces a high solubility problem, which is ticklish for commercialization. In order to solve this problem, the novel modification on the three hydroxyl groups of gallic acid into acyl groups (to install π-π stacking, hydrogen bonding and dipole gluing interactions) was done under grafted state with chitosan, which can form H-bonding with water molecules. Hence, detoured the insolubility and complete solubility problem of chitosan and gallic acid-based edible coatings with modification of chitosan with acetylated group that provides inter-medial water solubility. The synthesized nanoparticles were characterized using NMR, FT-IR, DLS, PXRD, SEM and UV-Vis spectroscopy. The synergistic impact of the edible coating of chitosan-acetylated gallic acid nanoparticles was investigated on fruits and vegetables. After that, weight loss, pH, TSS (Total soluble solids), and the nutritional content were recorded on a daily basis for 12 days. The efficiency of the edible coating was further extended towards the cytotoxic activities in vitro. The findings showed the edible coating of chitosan-acetylated gallic acid nanoparticles, provide a superior impact over chitosan-gallic acid nanoparticles and pristine chitosan. The effect of cytotoxic activity documenting that structural modification in Chitosan such as, O-acetylation, can alter the biological activity. This might be due to altered solubility and cellular uptake after modifications, but might not bypass the resistant mechanisms developed in drug-treated OSCC cohorts. All of these findings point to the effectiveness of our unique nanoparticles in preserving and improving the quality of post-harvest fruits and vegetables. Furthermore, our analysis clearly points to the approaches promising potential, which could attract a lot of interest in commercial postharvest applications aimed at extending the shelf life and general storage stability of fruits and vegetables while preserving their nutritional value.

Personal Profile

Dr. Antara Roy is currently working as a Assistant Professor at Adamas University, Kolkata. She is Food and Nutrition Scientist with over **8 years of research experience** in **food nanotechnology, smart food preservation, edible coatings, and functional foods**. She holds a **Ph.D. in Food Nanotechnology from the University of Calcutta (2025)** and has strong expertise in **food chemistry, food microbiology, biochemistry, and antibacterial nanomaterials** for extending the shelf life and nutritional quality of fruits and vegetables. She has designed and executed multidisciplinary research projects, is proficient in advanced analytical techniques including **UV–Vis, FTIR, NMR, XRD, DLS, SEM, and chromatography**, and has experience in **in vivo preclinical studies**. Dr. Roy has authored and co-authored 25**+ published and communicated research articles** in reputed international journals and books (ACS, Wiley, De Gruyter, RSC) and actively collaborates with internationally recognized scientists. A **NET-qualified (JRF & Assistant Professor)** researcher, she is an **award-winning presenter** at national and international conferences, a **Top-10 ranker** at undergraduate and postgraduate levels, and a **Top 50 Influential Femmes (2024)** awardee. She also serves as an academic educator and invited speaker, contributing to research, teaching, and scientific outreach in food, nutrition, and health sciences.

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IL-27

Organometallic Chemistry in Meatal-Organic Framework: Application in Photoelectrochemical Water Splitting

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Abstract

The photoelectrochemical water oxidation requires an efficient photoanode to absorb light in the visible region.[1] The use of $BiVO_4$ as the photoanode for water oxidation has been widely explored in the last decade. Although the bandgap and band positions of $BiVO_4$ are suitable for water oxidation, the high charge recombination rate compared to the surface redox reaction(s) makes the process challenging.[2] In this context, the cocatalyst plays an important role in charge separation and transport, and the minimization of charge recombination.[3] Further, the cocatalyst offers the active sites for the substrate and intermediate adsorption. In this talk, the utilization of different metal-organic frameworks (MOFs) as efficient cocatalysts will be described based on the principles of organometallic chemistry.[4-5] The control over the ligand environment around the metal center and the variation in the π-acidity of the ligand will be discussed for the efficient design of the cocatalyst.[2,5] Further, the cocatalytic activities of different MOFs loaded on the surface of the $BiVO_4$ photoanode will be demonstrated for the photocatalytic oxygen evolution reaction (Figure 1).[6] The impact of the spin state (high spin, intermediate spin, and low spin) of the metal ions on the cocatalytic activity and hence on the photoelectrochemical water oxidation activity will be discussed.[7] The reason of the higher photoelectrochemical activity of the intermediate spin state Co(III) over the high spin and low spin states will be uncovered.

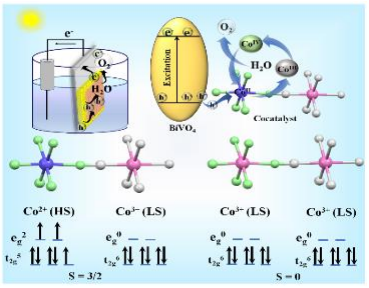

Figure 1. Spin-state-modulated photoelectrochemical water oxidation with MOF-loaded $BiVO_4$ photoanode.

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Personal Profile

Dr. Arindam Indra is an Associate Professor in the Department of Chemistry, IIT (BHU), Varanasi, India. He pursued his Ph.D. from IIT Bombay (Mumbai, India) on solid-supported catalysts for industrially important organic transformation reactions. After Ph.D, he joined Technische Universität Berlin (Germany) as a postdoctoral fellow and worked in the field of bioinspired energy conversion. Then he joined BasCat and worked in the field of solid-supported catalysis. He moved to Hanyang University (Seoul, Republic of Korea) as an Assistant Research Professor and developed self-supported catalyst systems for electrochemical water splitting. Currently, his group at IIT (BHU) works in the area of metal-organic framework-derived catalysts focusing on electrochemical and photocatalytic energy conversion processes.

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IL-28

Bandgap Engineered Conjugated Porous Organic Polymers in Photocatalysis

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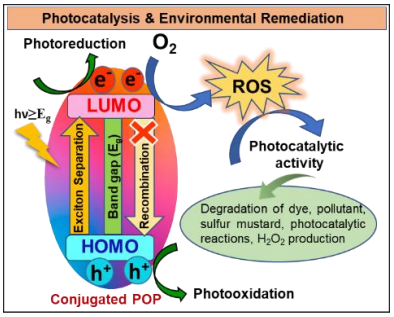
Abstract

Donor-acceptor (D-A) based porous organic polymers (POPs) have emerged as promising materials in photocatalysis due to their tunable electronic structures, bandgap, high surface areas, and efficient charge separation capabilities. These polymers leverage the strong intermolecular interactions between donor and acceptor units to facilitate charge transfer, thereby enhancing light absorption and catalytic efficiency. By incorporating diverse functional groups, one can tailor their bandgap and optimize redox properties for various photocatalytic applications, including hydrogen evolution, CO_2 reduction, and organic transformations. Additionally, photocatalytic degradation of toxic micropollutants offers several advantages over adsorptive removal, including the conversion of these pollutants into non-toxic or value-added byproducts. Conjugated porous organic polymers are photoactive, and upon exposure to light, they generate electrons and holes, as well as various reactive oxygen species. These reactive oxygen species can perform various organic transformations, as well as catalytic photo-reduction and oxidation reactions. Due to the excellent exciton dissociation, bandgap-engineered porous polymers can facilitate the photoreduction of oxygen, generating hydrogen peroxide with or without the use of sacrificial agents. Notably, for the first time, we demonstrated that BINOL-based POPs can photosynthesize significant amounts of H2O2 and degrade various micropollutants. The excellent exciton dissociation can also result in simultaneous photoredox removal of uranium(VI) by e- and ciprofloxacin by h+ using a triazine-based CMP



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Personal Profile

Dr. Suman Kalyan Samanta was born in West Bengal, India, in 1983. He received his B.Sc. (2004) and M.Sc. (2006) in Chemistry from the University of Calcutta. He obtained his Ph.D. in 2011 from the Indian Institute of Science under the tutelage of Prof. Santanu Bhattacharya. In 2013, he joined Prof. Ullrich Scherf's group at Bergische Universität Wuppertal, Germany, as an Alexander von Humboldt fellow for his postdoctoral studies on conjugated polymers and the synthesis of polymer networks. He completed his second postdoc in the group of Prof. Joon Hak Oh at the Pohang University of Science and Technology (POSTECH), South Korea, in optoelectronic device applications of organic materials (small molecules and conjugated polymers) for field-effect transistors, organic solar cells, and light-emitting diodes. His research interests include design, synthesis, and characterization of chromophoric functional organic molecules, conjugated polymers, porous polymer networks, supramolecular chemistry, and optoelectronic device applications. He has co-authored more than 53 peer-reviewed international journals. He has received prestigious awards, including the Gold medal in MSc, Best Thesis Award (The Guha Research Medal) in Ph.D., Alexander von Humboldt Fellowship (Germany) in postdoc, CRS Bronze Medal 2025, and Faculty Excellence Award 2025, IIT Kharagpur.

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IL-29

Design of Hydrophobic–Hydrophilic copolymer Coated γ-Fe_2O_3 Nano-carriers for Biocompatible and Targeted Chemotherapy Applications

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Abstract

The threat of cancer is increasing globally, along with the growing number of cancer patients. Cancer is the second worldwide cause of mortality. This trend is largely due to the lack of effective early detection techniques and limitations in current therapeutic strategies. The high doses of drugs used in chemotherapy lead to severe adverse side effects and damage healthy cells because of poor targeting specificity toward cancerous cells. Inhibition of cancer cell growth can be achieved through appropriate treatment at the early stages of the disease. Therefore, the development of suitable targeted drug carriers is pivotal important for cancer therapy. For this application, nanoparticles must possess a combination of high magnetic saturation, biocompatibility, and functional surface interactions. In addition to being non-toxic and biocompatible, iron oxide nanoparticles should prevent the opsonization process and remain stable within the reticuloendothelial system. This study focuses on the synthesis of stable, biocompatible magnetic drug delivery vehicles based on polylactic acid (PLA)–polyethylene glycol (PEG) copolymer–functionalized superparamagnetic γ-Fe_2O_3 nanoparticles for targeted anticancer drug delivery in biological systems. The inner core of the copolymer is formed by the hydrophobic PLA polymer, which binds to the surface of γ-Fe_2O_3 nanoparticles, while the hydrophilic PEG polymer forms the outer layer, enabling the attachment of the anticancer drug doxorubicin through hydrogen bonding. The outer PEG layer reduces particle aggregation and enhances stability in biological fluids. Cytotoxicity tests were performed using normal cell lines through MTT assays on uncoated, copolymer-coated and drug-conjugated copolymer-coated γ-Fe_2O_3 nanoparticles. The results revealed that uncoated, copolymer-coated and drug-conjugated copolymer-coated γ-Fe_2O_3 nanoparticles exhibit good biocompatibility with healthy cells, supporting their potential application as magnetic nanocarriers for chemotherapy.

Personal Profile

Professor Subhasis Rana obtained his Ph.D. in 2004 at Indian Institute of Technology, Kharagpur in the area of nanostructured materials and he has two foreign postdoctoral experiences at the University of Louisiana at Lafayette, USA (2003 – 2006) and Stockholm University, Arrhenius Laboratory, Sweden (2007-2008). Following his postdoctoral work, he served as a Visiting Scientist at the Indira Gandhi Centre for Atomic Research (DAE), Kalpakkam; the Central Glass & Ceramic Research Institute (CSIR), Kolkata; and the Variable Energy Cyclotron Centre (DAE), Kolkata, India. Prof. Rana is currently an Associate Professor at the University of Engineering and Management, Newtown, Kolkata. His research interests focus on the synthesis of advanced nanomaterials for biomedical and energy-related applications. His notable research contributions are diabetes detection from breath, removable magnetic photocatalyst, targeted drug delivery, formation of superlattices of iron oxide nanocrystals and 2-Dimensional nanomaterials such as Graphene and Mxene.

Prof. Rana has published more than 40 research articles in highly reputed, peer-reviewed journals and has received over 2,600 research citations. He holds US, European, Japanese, and Korean patents for his innovative work on diabetes detection through breath analysis using a nanostructured gas sensor.

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IL-30

Redox Active Azo-aromatics From Thermal/Photochemical Reactions to Molecular Memristor Devices

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Abstract

Redox-active, noninnocent ligands (NILs) provide a powerful platform for generating and stabilizing metalloradicals, enabling controlled modulation of reactivity and selectivity in chemical transformations. Among NILs, azo-aromatic ligands with low-lying □* orbitals (LUMOs) are particularly effective in accessing ligand-centered radical manifolds. We report a Zn–azo complex that selectively generates ligand-centered radicals in the presence of Zn dust or ^{t}BuOK, displaying high efficiency in dehydrogenative coupling reactions and enabling the synthesis of diverse N-heterocycles via radical–radical coupling pathways. In addition, our Cu-azo complexes enable a photoinduced ligand-to-substrate single-electron transfer (SET) process, facilitating atom transfer radical addition (ATRA) reactions and providing access to thioester derivatives while bypassing energy-intensive metal-centered two-electron pathways through synergistic metal–ligand cooperation. Extending this dual activation strategy, nitrene radical intermediates are generated at room temperature using Zn/^{t}BuOK, enabling efficient N–N and N–S bond formation as well as C–H functionalization reactions. Beyond synthetic applications, ongoing efforts are devoted to exploring the potential of NIL-based systems in memristor device architectures. Collectively, these findings highlight the versatility of noninnocent ligands in metalloradical chemistry and establish a general platform for radical-mediated transformations under mild conditions.

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Personal Profile

Dr. Nanda D. Paul obtained his Ph.D. in 2012 from IACS, Kolkata. He worked as a post-doctoral fellow at the Van't Hoff Institute for Molecular Sciences, University of Amsterdam, Netherlands (2012-2013) with Professor Bas de Bruin. He started his independent career as an Assistant Professor at the Department of Chemistry, IIEST, Shibpur, in January 2014. Presently, he holds the position of Associate Professor, and Associate Dean (Research) at the same institute.

Awards

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IL-31

Multifunctional Metal-Organic Gels Based on Terpyridine-Metal Coordination for Sensing and Soft Materials Applications

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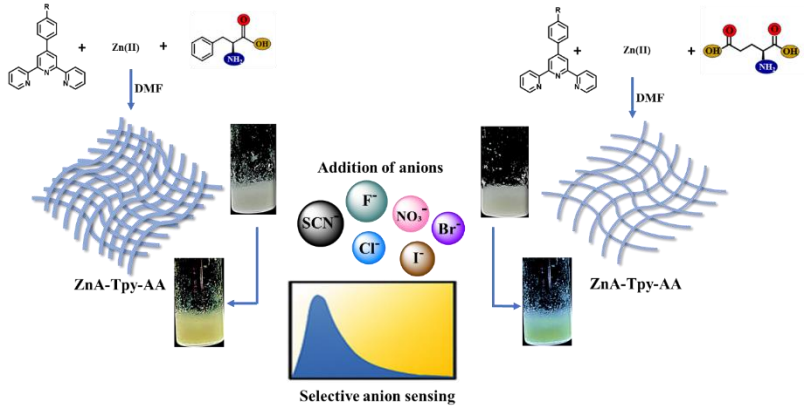
Abstract

Various metal-organic gels (MOGs) were prepared through coordination of substituted terpyridine derivatives with different divalent transition metal ions in the presence of chosen amino acids as auxiliary ligands. The amino acids participate in secondary coordination and hydrogen-bonding interactions, resulting in distinct three-dimensional supramolecular networks. Structural, spectroscopic, and rheological analyses confirm gel formation and reveal that the nature of the amino acid modulates network density, mechanical strength, and stability. The gels exhibit intrinsic photoluminescence that responds to selected anions, enabling qualitative sensing behaviour. Optical bandgap estimation from UV-visible absorption measurements indicates moderate bandgaps, consistent with semiconducting characteristics. Owing to their tunable network architecture and multifunctional properties, such metal-organic gels hold promise for a range of applications, including chemical sensing, antibacterial materials, semiconducting soft matter, self-healing systems, and injectable gel-based platforms.



Personal Profile

Dr. Rajarshi Sarkar currently posted as Associate Professor at Department of Chemistry, School of Advanced Sciences, VIT-AP University, Amaravati, Andhra Pradesh.

Professional Experiences

08/2024 – present Associate Professor, VIT-AP UNIVERSITY, Andhra Pradesh, India.
06/2022 – 07/2024 Assistant Professor, VIT-AP UNIVERSITY, Andhra Pradesh, India.
07/2017 - 05/2022 Assistant Professor, NMIMS-deemed-to-be University, Madhya Pradesh, India.
01/2017 - 07/2017 National Post Doctoral Researcher, Jadavpur University, West Bengal, India.
11/2015 - 12/2016 R&D Chemist, United Engineering Enterprises, West Bengal, India.

Education

Bachelor of Science (B.Sc.) - Chemistry, 2005, University of Calcutta (1st class, 61%)
Master of Science (M.Sc.) - Chemistry, 2007, University of Calcutta (1st class, 64%)
Ph.D. - Inorganic Chemistry, 2015, The University of Akron, USA, awarded on 22.12.2015, from Department of Chemistry, The University of Akron, USA.
Advisor - Dr. George R. Newkome
Dissertation Title - "Design and Synthesis of Heteroleptic and Heterometallic Metallo-Supramolecular Terpyridine Architectures"

Awards and Fellowship

1. National Postdoctoral Fellowship in 2017 for post-doctoral research from SERB, Project No. PDF/2016/002584
2. Best Teaching Assistant award from The University of Akron, USA. 2011

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IL-32

2-Alkynylanilines as Privileged Synthons for Regioselective Synthesis of N-Heterocyclic Frameworks

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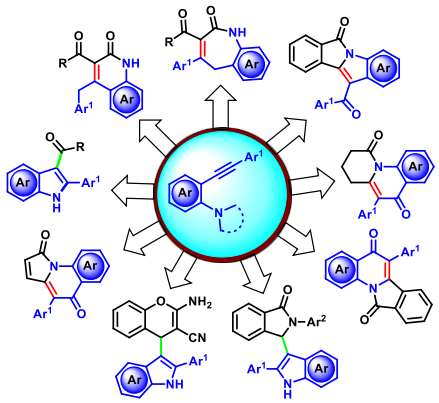
Abstract

2-Alkynylanilines have emerged as privileged synthons for the regioselective synthesis of structurally diverse N-heterocyclic frameworksa,[b.] Their versatile reactivity enables both metal-catalyzed and metal-free annulation strategies to access azepinones, quinolinones, indoles, isoindolo-, pyrido-, dihydro-quinolinedione, indolo-indolone, and indolo-chromene motifs. We demonstrate a catalyst-directed divergent annulation approach in which Lewis acidsc, Brønsted acidsd, and Ag(I) catalystse mediate selective C–C and C–N bond formations through efficient carboamination cascades. $ZnCl_2$ promotes 5- and 7-membered ring closures, whereas I_2 enables 6-membered annulations via C–H activation and 1,3-hydride shift pathways. This unified method offers atom-economical, regioselective access to valuable N-fused heterocycles.



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Personal Profile

Dr. Sk Ajarul is an emerging researcher in organic synthesis and catalysis. He earned his Ph.D. from the University of Calcutta in 2021 under the supervision of Prof. Dilip Kumar Maiti, where he developed a strong foundation in synthetic methodologies and reaction design. After that he joined the Government General Degree College, Salboni, Paschim Medinipur, as an Assistant Professor. Dr. Ajarul completed his Bachelor's and Master's degrees at Vidyasagar University. His current research focuses on sustainable synthetic methodologies, particularly metal-catalysed C–H activation and cascade annulation reactions using Lewis acid catalysts, aiming to advance greener approaches to heterocycle construction.

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IL-33

From Mechanism to Molecules: Ligand-Free Nickel Catalysis in Cascade Reactions

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Abstract

Nickel-catalyzed hydroarylation reactions represent a powerful strategy for the synthesis of bioactive heterocyclic compounds. Seven- and eight-membered heterocycles are of longstanding interest in pharmaceuticals, and their incorporation with tetra-substituted alkenes significantly broadens structural and functional diversity. Conventional methods such as the Wittig, Julia-Kocienski, Horner-Wadsworth-Emmons, and McMurry reactions provide access to such motifs but often suffer from narrow scope and low regioselectivity.1a-c In recent years, the carbometalation of alkynes used as a versatile strategy for stereospecific synthesis of tetra-substituted alkenes.[1d-e] Recently, we developed ligand-free, nickel-catalyzed one-pot cyclocarbonickelation-arylation cascade enabling efficient and regioselective access to bioactive heterocycles like dibenzoxepine, dibenzoxathiepine, dibenzothiazepine, indolin-2-one, pyrrolo[3,2-b]pyridin-2-one, and pyrano[3,2-e]indole-2,7-dione frameworks in good to high yields.1f These methods exhibit broad functional group tolerance, including electron-rich, electron-poor, heteroaryls, as well as terminal alkynes, and are also effective under microwave irradiation. Detailed DFT studies support a Ni(I)/Ni(III) pathway involving oxidative addition, migratory insertion, and reductive elimination, consistent with the observed regio- and stereoselectivity. Targeted compounds were evaluated further for biological relevance and reveal selective binding to the H-telo G-quadruplex (GQ) DNA motif over other GQ structures and duplex DNA. This work demonstrates a nickel-catalyzed cascade strategy for accessing diverse medium-ring heterocycles bearing tetra-substituted alkene and introduces their potential as promising GQ-DNA binders, thus connecting synthetic innovation with nucleic acid-targeted applications.

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Personal Profile

Dr. Tapas Ghosh obtained his Ph.D. in 2013 from University of Kalyani, West Bengal, India under the guidance of Professor K. C. Majumdar. After postdoctoral studies with Prof. Levent Artok at Izmir Institute of Technology, Turkey (2014), Prof. Okiko Miyata, Kobe Pharmaceutical University, Japan (214-2015) and as Alexander von Humboldt Fellow with Prof. M. Lehmann at University of Würzburg, Germany (2015-2017) he started his independent career as an assistant professor in the Department of Chemistry at Sree Chaitanya College, Habra. Dr. Ghosh then moved to Maulana Abul Kalam Azad University of Technology (MAKAUT), West Bengal as an assistant professor in the Department of Applied Chemistry in 2018. Since August 2022 he is working as an assistant professor in the Department of Chemistry, Jadavpur University, Kolkata, India.

His current research interest includes the development of new synthetic methodologies to design and synthesis of small drug molecules along with the development of advanced functional materials. His research group is also engaged in photoredox- nickel dual catalysis and gold catalyzed organic transformations.

Awards

1. Alexander von Humboldt Postdoctoral Fellowship, Alexander von Humboldt Foundation, Germany. (2014)
2. Marie-Skłodowska-Curie Actions Postdoctoral Fellowship (H2020-MSCA-IF-2014).
3. TÜBITAK Postdoctoral Fellowship, Turkey. (2014)
4. BELSPO Postdoctoral Fellowship, Govt. of Belgium. (2015)
5. SERB-TARE Fellowship, SERB, India (2023)
6. Alexander von Humboldt Renewed Research Stay Fellowship, Alexander von Humboldt Foundation, Germany (2025)

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IL-34

Light Sensitive Chiral Supramolecular Superhelix

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Abstract

Cyclodextrin (CD) based supramolecular chemistry is an emerging field in modern chemical research because of greater complexity than the individual ones and these supramolecules pose huge potential to be applicable as molecular devices, sensors, artificial ion channels, on-off scaffolds, etc. Parallelly, development and control of supramolecular stimuli responsive chiral assembly from achiral functional organic materials presents a great challenge, to provide systems that can increase our understanding of some life processes, and afford potential applications in aforementioned areas. Design of achiral small molecules for generating CD-based self-assembled chiral stimuli responsive hierarchy is, therefore, a vital demand in present-day supramolecular research. In view of these, my aim is to design and synthesize new small organic functional molecules that could generate chiral hierarchical morphology with CDs and study of their external stimuli responsive optical activities as well as chiral behavior. The superstructures would have considerable practical value in chiroptics, templates and chiral sensing.

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Personal Profile

Dr. Amitava Mandal obtained his Ph.D. in organic chemistry in 2012 from University of North Bengal, India under the guidance Prof. Dr. Pranab Ghosh. After post-doctoral studies (2014) with Prof. Dr. Kimmon Kim at the Institute of Basic Sciences (IBS) in POSTECH, Pohang, South Korea, Dr. Mandal started his independent career at the Department of Chemistry, Raiganj University, West Bengal, India. He is also the recipient of Dr. D. S. Kothari Post Doctoral fellowship (2015). He is the visiting professor at the Department of Chemistry, University of Gour Banga, West Bengal, India.

Research Area:

Supramolecular Chemistry
Organic Synthesis
Medicinal Chemistry

Publications: Dr. Mandal has more than 50 research publications in various International journals of repute. He has three Indian patents in his credit.

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IL-35

An organocatalytic approach for the first total synthesis of proposed structure of pandangolide 1

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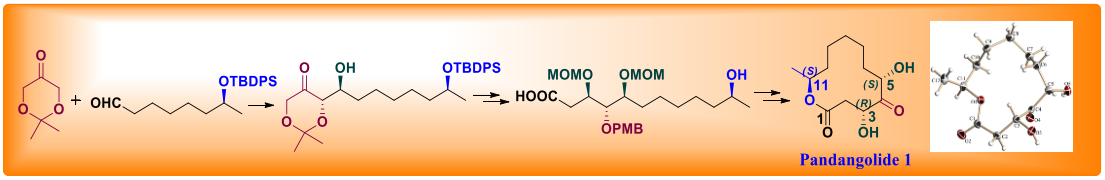
Abstract

The first total synthesis of proposed structure1 of Pandangolide 1 is reported. The required stereochemistry at C-3 and C-5 was introduced by using organocatalytic aldol reaction2 followed by stereoselective keto reduction and the construction of the key 12-membered core was achieved via MNBA-mediated Shiina lactonization3 method. Although the structure of the final product was confirmed by X-ray crystallography but both optical rotation and NMR data of the synthesized Pandangolide 1 are inconsistent with the proposed structure.



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Personal profile

Dr. Krishanu Show obtained his Ph.D. in title of “Enantioselective Synthesis of Hydroxylated Pyrans, Pyrrolidine alkaloid and Lactones using Asymmetric Dihydroxylation, Hydrolytic Kinetic Resolution and Organocatalytic Aldol Reaction." under the guidance of Prof. Pradeep Kumar in CSIR-National Chemical Laboratory, Pune in 2016. After postdoctoral studies with Professor Dilip Kumar Maiti on ‘’Efficient protecting group directed catalytic fluorination to unactivated β-methylene C(sp3)–H bond of aliphatic amine derivatives: easy access to drug analogues’’ at University of Calcutta (2016-2019),he joined as an assistant professor at Department of Chemistry of Malda College in 2021.
Guest Professorships at Scottish Church College, Kolkata (2019-2021) and St. Xavier’s College Kolkata (2019-2020)

Fellowship and Awards

Best Poster Award in the International Conference “Nature Inspired Initiatives in Chemical Trends-2016 (NIICT-2016)” in Organic Chemistry held at CSIR-Indian Institute of Chemical Technology (IICT), Hyderabad in 19-20th September, 2016.
2009-2014: Junior Research Fellowship (JRF) and Senior Research Fellowship (SRF) awarded by University Grants Commission (UGC), India.
2002-2005: Foundation for Excellence Scholarship by FFE India Trust, Bengaluru.
2000-2002: National Scholarship by Government of West Bengal.

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IL-36

Transition Metal-Catalyzed Synthesis of Bioactive *N*-heterocyclic Compounds under Microwave-Assisted Conditions

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Abstract

Indole nucleus is a ubiquitous structure found in naturally occurring alkaloids, synthetic therapeutic agents and agrochemicals.[1] Indoles possessing an aromatic substituent on the ring nitrogen are called N-arylindoles, which are key intermediates in drug discovery for preparing CNS-active drugs, anti-proliferative, anticancer, anti-diabetic, anti-hypertensive, and HIV-1 integrase inhibition agents.[2,3] Wide range of bioactivities makes N-arylindole derivatives important drug candidates in clinical trials.[1-4] Consequently, synthesis of N-arylindoles has received great interest in the past few decades, and among them trendition metal-catalyzed construction of the N-arylated pyrrole ring from aniline derivatives at the final step, has emerged as a potent tool for accessing a variety of functionalized N-arylindoles. In continuation to our interest in the synthesis of bioactive heterocyclic compounds,[5] we have developed an efficient method for selective synthesis of diverse N-arylindoles in good to excellent yields relying on carbopalladation-cyclization reactions[6] of 2-halo-N-arylanilines with alkynes under microwave-assisted conditions.[7] Compared to conventional heating, microwave assistance significantly reduces the reaction time under phosphine ligand-free conditions and rules out the competing intramolecular C–H arylation generating carbazole as the side product in presence of a chloride additive in dry DMF. Reactions exhibit moderate to good C2/C3 regioselectivity with unsymmetrical internal alkynes favoring N-arylindoles with substituent bearing electron rich Csp atom of the alkyne at C2 position. Utilization of microwave as an efficient green energy source enabled rapid access to a variety of N-arylindoles under mild conditions.[7]

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Personal Profile

Dr. Safiul Alam did his M. Sc. in Chemistry from University of Calcutta. He obtained his Ph.D. in 2006 from University of Kalyani, under the guidance of Professor K. C. Majumdar. He did his doctoral research works on the synthesis of indole-annulated heterocyclic compounds. Dr. Alam did post-doctoral research with Professor Duen-Ren Hou in National Central University, Taiwan (2007-2008) and then with Professor Hamid Dhimane in Paris Descartes University, France (2009-2010). There he worked on the synthesis of small organic molecules having anti-diabetic and anti-cancer activities, respectively. After postdoctoral studies he engaged as Senior Research Scientists in Jubilant Chemsys Ltd., Noida and TCG Lifesciences Ltd., Kolkata (2010-2012).

In October 2012, Dr. Alam joined Aliah University as an Assistant Professor in Chemistry and started his independent research. At present he is an Associate Professor there. He has published a book and many research papers in reputed international journals. Currently, his research group is working on transition metal-catalyzed cross coupling reactions under green conditions utilizing alternative energy sources and environmentally benign reaction media towards the synthesis of heterocyclic compounds having bioactive potential.

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IL-37

Renaissance of phthalocyanine: Exploring its functional frontiers

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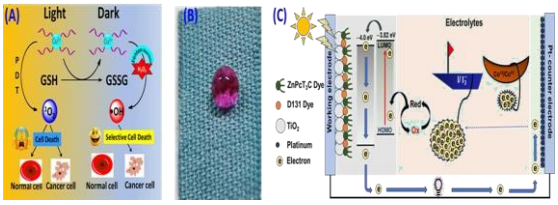
Abstract

Metallo phthalocyanines (MPc), a type of NIRI dye, have been widely used as a photosensitizer for photodynamic therapy. The MPc dyes show strong absorption wavelengths (λ_{max}> 660 nm), high extinction coefficients (ε_{max} > 105 L mol-1 cm-1). Different central metal and facile chemical modification at peripheral, and non-peripheral positions results in tunable photophysical and photochemical properties in MPcs. MPcs have been one of the promising candidates for cancer treatment displaying several advantages over chemotherapy. A symmetrically tegylated copper phthalocyanine $CuPcT_4$ substituted with four tetraethylene glycols was synthesized. Remarkably, the $CuPcT_4$ catalyzed GSH oxidation reaction to make GSSG, and subsequently produced hydroxyl radical (•OH) following Fenton-like process. MTT assay suggested $CuPcT_4$ effectively destroy cancer cell (A549, MCF-7) with cell viability 30% and it showed minimal effect on normal cell (3T3) with cell viability (85%) (A). Notably, symmetrical tegylated zinc phthalocyanine ZnPcT4 was synthesized and applied on cotton textile. The photodynamic property of the dye ZnPcT4 afforded antibacterial, self-cleaning fabric. In addition, presence of ZnPcT4 dye turned hydrophilic cotton a to a hydrophobic surface without compromising air breathability (B). Moreover, an unsymmetrical ZnPcT3C was used a photosensitizer for DSSC application with η = 6.27% power conversion efficiency. Synthesis, characterization, photophysical, electrochemical properties, DFT studies and their application in cancer therapy, functional textile and dye sensitized solar cell will be discussed.



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Personal Profile

Dr Nabanita Sadhukhan is an assistant professor at the Department of Speciality Chemicals Technology, Institute of Chemical Technology (ICT), Mumbai. She obtained her M.Sc. in Inorganic Chemistry from Kalyani University, West Bengal, in 2002, and her Ph.D. from the Indian Institute of Technology Kanpur in 2009. After completing postdoctoral research and a spell of assistant professor (research) position for four years at Tohoku University, Japan, she joined the faculty of ICT Mumbai in 2016. Her research work on lotus effect mimicking to create self-cleaning cotton has received a recognition from the Ministry of Textile, Government of India and highlighted at the Global Textile Expo in 2025 at New Delhi.

Awards:

- Young Scientist start-up Grant, SERB-YSS 2014,
- Top 20-Research Award by Germany Chemical Society (GDCh) in 2014
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IL-39

Nonplanar Bowl-Shaped Heterocycles: Synthetic Challenges, Dynamic Curvature, and Functional Materials

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Abstract

Nonplanar bowl-shaped π-conjugated heterocycles constitute a distinctive class of organic architectures that connect planar aromatic systems with fullerene-like curvature, giving rise to electronic, structural, and dynamic properties that are inaccessible in conventional molecules.a Progress in this field has been driven by advances in synthetic strategies that overcome intrinsic challenges associated with ring strain, reduced symmetry, and limited scalability. Heteroatom-embedded buckybowls and carbazole-based cyclo-oligomers, including [n]cyclo-1,8-carbazolylenes (n = 3, 4, 6), exemplify how controlled curvature enables the formation of bowl-, flake-, and double-decked ring frameworks with distorted C_1/C_2 symmetry and unusual trivalent tridentate coordination toward heteroatoms such as B, P, and Si. These structural features induce pronounced modulation of electronic structures, manifested as significant red-shifts in optical absorption and emission.b A hallmark of nonplanar bowl-shaped systems is their dynamic curvature behavior. Hydrazine-embedded heterobuckybowls undergo reversible, oxidation-state-dependent interconversion among curved, twisted, and planar geometries through multi-electron redox processes coupled to N–N bond cleavage and reformation. This dynamic response results in complex bowl inversion profiles, including triple-well potential energy surfaces, and enables acid/base-regulated electron transfer disproportionation.c, d, e Beyond fundamental molecular design, bowl-shaped heterocycles have demonstrated functional relevance in energy- and bio-oriented applications. Hydrazine-containing carbazole, acridine, and phenothiazine derivatives function as cathode-active materials in high-voltage organic batteries, exhibiting stable redox plateaus and rapid charge–discharge characteristics.f In parallel, the curvature, redox tunability, fluorescence, and Lewis acidity of nonplanar π-systems point toward emerging opportunities in biomedical contexts, including molecular imaging, redox regulation, and drug-delivery-assisted cancer therapy.g These attributes establish nonplanar heterocycles as versatile molecular platforms for advancing functional materials and bioresponsive molecular engineering.

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Personal Profile

Dr. Palash Pandit is an Assistant Professor of Chemistry at Saheed Nurul Islam Mahavidyalaya (SNIM), affiliated with West Bengal State University, India. He obtained his Ph.D. in Chemistry in 2011 from the University of Calcutta under the supervision of Professor Dilip Kumar Maiti. Following his doctorate, he pursued postdoctoral research at National Cheng Kung University, Taiwan (2011-2012), The University of Tokyo, Japan (2012-2013) with Professor T. Sasaki, and the Institute of Molecular Science, Japan (2013-2015) with Professors H. Sakurai and S. Higashibayashi. Prior to joining SNIM, he worked as a Senior Research Scientist at TCG Life Science Pvt. Ltd., Kolkata (2016-2020). His research interests include organic, inorganic, and nanomaterial synthesis, catalysis, green chemistry, and cancer biology, emphasizing interdisciplinary strategies for health, sustainability, and advanced materials

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IL-40

Synthesis, characterization and antibacterial activity of nontoxic Cu-Ag-TiO2 nanocomposite

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Abstract

The extensive use and adverse side effects of standard antibiotics have imposed challenges for therapeutic treatment. Multi-drug resistant (MDR) pathogens need much higher concentrations of antimicrobial drugs, which kill the beneficial microflora of the human body. In these contexts, the development of novel drugs is urgently needed. Antibiotics, including metronidazole, sulfamethoxazole, erythromycin, trimethoprim, penicillin, and, azithromycin have become the most widely used medications in recent years to treat a variety of illnesses in aquaculture, contemporary husbandry, and people. The use of these antibiotics may show several side effects like liver damage, hearing loss, serious or life-threatening allergic reactions, abnormal heartbeats, and diarrhea linked to clostridium deficiency. Using a variety of inorganic and natural materials, scientists have recently been attempting to develop new antimicrobial, antifungal, or antibacterial compounds. Nanoparticles (NPs) are an effective way to deliver various antibiotics due to their small size (1–100 nm) and high surface–to–volume ratio. When exposed to visible light, certain benign metal oxides can produce reactive oxygen species (ROS). When it comes to photocatalytic coating, these kinds of harmless metal oxides might be employed as a photocatalytic agent. These ROSs have strong antibacterial properties and can efficiently eliminate microorganisms. In the present work, a simple and easy mechanical alloying method is used to develop the Cu-Ag-TiO2 nanocomposite, which is then effectively used as an antibacterial agent to stop Gram-positive bacteria from growing. By examining its XRD patterns, FTIR spectra, FESEM, and TEM images, the nanocomposite's structure and microstructure are described. The Cu-Ag-TiO2 nanocomposite has better antibacterial activity than both the TiO2-Ag nanocomposite and the conventional pristine antibiotic LineZodil 600, according to the agar cup diffusion method and minimum inhibitory concentration (MIC) analysis. This reveals an enhanced activity of the nanocomposite after the conjugation of Cu. Thus, we propose a new simple, cost-effective, and facile route to synthesize a novel biocompatible nanocomposite with significant antibacterial activity.

Personal Profile

Dr. Moupiya Ghosh obtained her Ph.D. in 2022 from The University of Burdwan under the guidance of Prof. Swapan Kumar Pradhan. She worked as a postdoctoral fellow under the mentorship of Professor Jaydeep Basu at IISC Bangalore. She also worked as an Assistant Professor at the Department of Physics, Amity University, Kolkata, and at Brainware University, Kolkata. Her research expertise includes nanomedicine, nanotechnology, drug delivery, structural and microstructural characterizations, synthesis of different nanoconjugates, development of different antibacterial, antifungal and antidiabetic agents, cancer therapeutics and wastewater treatment. Her research is focused on the development of different drug conjugated nanomaterials for the treatment of common and epidemic diseases with minimum side effects and higher efficacy. She has published more than 35 SCI, SCOPUS Indexed articles in several reputed international journals. She has received several International, National and State Awards in the field of research. Presently, she is working as an Associate Professor in the Department of Basic Science and Humanities, IEM, UEM, Kolkata.

Awards:

University Gold Medalist (1st class first in M.Sc); 2019;
Outstanding Paper Award in 27th West Bengal State Science and Technology Congress, 2020;
International Best Research Award (SF), 2020;
ISSN International Best Researcher Award, 2022;
Record Owner Young Scientist Award, 2023;
Membership by World Research Council.
INTERNATIONAL Best Researcher Award (International Science, Technology & Research Awards Congress 2024. ISTRA);
Member of the American Chamber of Research;
Research Excellence Award (INSC), 2024;
Empowering Woman Award (ICST 2024)
Best Researcher Award from Knowledge Research Academy (2026)

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Sponsor Lecture-1

ICCHD Special Collection and Today's Publication Landscape

Dr. Subhabrata Mukhopadhyay
Deputy Editor, Wiley

Abstract

This talk will feature Wiley as a publishing house and its variety of journals. I'll briefly highlight a thematic collection named 'ICCHD' (spread across Chemistry – An Asian Journal, ChemNanoMat, and Asian Journal of Organic Chemistry) and the journals participating in the special collection. I'll also talk about the workflow involved in the special collection. Additionally, I'll talk about artificial intelligence-based generative language learning models and their probable use in manuscript writing briefly.

Personal Profile

Dr. Subhabrata is working with the Wiley global team from India as a deputy editor. His primary focus is on the journals Chemistry - An Asian Journal, ChemNanoMat, and ChemPlusChem. Additionally, he assists in developing new editorial policies and projects. Subhabrata has a strong background in materials chemistry, with a PhD from the University of Hyderabad (2020). Before joining Wiley, Subhabrata was working at the Research Institute of Sweden (RISE), as a scientist. He also has postdoctoral experience at Ben Gurion University in Israel (2020-2022) and Uppsala University in Sweden (2022-2023).

Dr. Subhabrata Mukhopadhyay
Deputy Editor, Wiley

Sponsor Lecture-2

Dr. Dipankar Malakar, Sciex

Oral Presentations

OP-1

Synthesis of metal-polymer nanocomposites for ammonia free hydrogen generation using nitrogen-based hydrides

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Abstract

In recent years, there has been a growing demand for renewable energy resources for a sustainable economy since the use of non-renewable resources has led to a significant increase in greenhouse gases and posed detrimental effects on the environment.[1a] Hydrogen has attracted considerable attention as a universally accepted green energy since it has high energy density.[1b] The ammonia borane is mostly used nitrogen-based hydrides because of its high hydrogen density (19.6 wt.%), relatively high stability under ambient conditions, and the ability to release hydrogen through thermal or hydrolytic decomposition.[1c] Despite significant use of noble metal catalyst (Pd/ Pt), their high cost and lower natural abundances limit promising applications.[1d] To circumvent this issue, the use of transition metal-alloy nanoparticles is encouraged because of their significant catalytic activities with the higher number of active sites.[1e] Importantly, polymer-supported metal nanoparticle alloys are expected to be useful for catalytic hydrogen generation because of their ability to combine the high surface area and high catalytic activity of nanoparticles with the improved stability, processability, and reusability of the catalysts. In this work, three aliphatic polymers and metal-polymer nanocomposites using FeCu nanoalloy have been synthesized and characterized using gel permeation chromatography (GPC), spectroscopic, microscopic, and thermal techniques. The as-synthesized polymer nanocomposites exhibited significant catalytic efficiency for hydrogen generation by hydrolysis of ammonia borane. We meticulously investigated the effect of varying catalyst and ammonia borane concentrations at different temperatures on H_2 evolution rates using the gas chromatography (GC) technique. The rate-determining stage of hydrolysis reactions was determined by kinetic isotope effect experiment. The turn-over number (TON) and turn-over frequency (TOF) of H_2 production were for quantifying the efficiency. The reusability studies were performed in order to determine the retention of catalytic activities after five consecutive cycles.

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OP-2

Metalloredox Dysregulation Under Adrenergic Stress Leading to Cardiac Damage and Cell Death: Attenuation by Melatonin

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Abstract

Excessive adrenergic stimulation is a well-recognized trigger of acute myocardial injury, contributing to cardiac dysfunction and sudden death under conditions of severe physiological or psychological stress [a]. However, the chemical mechanisms linking adrenaline overload to cardiotoxicity remain insufficiently defined [b]. In this study, we investigated adrenaline-induced cardiac injury, focusing on metal-driven oxidative chemistry and evaluated the protective potential of melatonin as a redox-active small molecule. Adrenaline exposure promoted aberrant copper accumulation in cardiac tissue, resulting in metallotoxic stress and amplification of reactive oxygen species (ROS) via copper-mediated Fenton and Fenton-like reactions. This redox imbalance was reflected by increased myocardial superoxide levels, elevated serum hydrogen peroxide, enhanced conversion of xanthine dehydrogenase to the pro-oxidant xanthine oxidase (XO/XDH shift), increased lipid peroxidation, and depletion of reduced glutathione (GSH). Collectively, these changes indicate the establishment of a self-propagating redox cycle in which adrenaline-triggered tissue copper accumulation catalyzes immense oxidative damage of cellular macromolecules. This oxidative burden culminated in cardiomyocyte apoptosis, as evidenced by an increased Bax/Bcl-2 ratio, cytochrome-c release, and p53 upregulation. Melatonin treatment significantly attenuated copper accumulation, suppressed ROS generation, normalized XO/XDH balance, reduced lipid peroxidation, and restored intracellular GSH levels, thereby disrupting copper-dependent redox cycling and limiting oxidative injury. These redox-protective effects translated into marked suppression of apoptotic signaling and preservation of myocardial integrity. Overall, this study identifies copper-driven oxidative chemistry as a central mediator of adrenaline-induced cardiotoxicity and highlights melatonin as a metal-modulating, redox-active scaffold with therapeutic potential in stress-associated cardiac injury.

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OP-3

Catalytic Reductive Alkylation of Pyridine-Fused *N*-Heteroarenes Using Alkyl Formates as Transfer Hydroalkylation Reagents

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Abstract

Metal-catalyzed hydroalkylation reactions were found widespread applications in the organic synthesis as it induces both reduction (hydro) and functionalization (alkylation) of unsaturated bonds such as C=C or C=N in an atom-economical manner.[1] 1 Given the ready accessibility of hydrocarbon substrates, these transformations have attracted significant attention. However, the intrinsic difficulty of activating strong C–H alkyl bonds has limited the substrate scope to a few activated systems, including 1,3 dicarbonyl derivatives, and alkyl amines possessing reactive C–H bonds. To overcome the challenges associated with selective C–H activation, transfer hydroalkylation strategies have emerged as efficient alternatives. In these systems, bifunctional reagents deliver both a hydrogen atom and an alkyl group tethered by a molecular linker that can be transferred across unsaturated bonds.[2]. Despite the various organic linkers, such as homoallyl alcohols, benzothiazoles, and Hantzsch esters, gaseous linker-based strategies offer higher atom economy and facile byproduct removal.[3] In the literature, hydrazones, carboxylic acids, and alkyl formates have been employed as gaseous linker-derived transfer hydroalkylation reagents. Among these, alkyl formates (HCO_2R) have emerged as practical and sustainable reagents due to their facile synthesis from alcohols and formic acid.[4] Nevertheless, multi-site functionalization of unsaturated coupling partners using alkyl formates as transfer hydroalkylating reagents remain in its infancy largely due to issue of control their reactivity and selectivity.Here, we have developed Ru-catalyzed reductive alkylation of *N*-heteroarenes to obtain saturated azacycles using alkyl formates as bifunctional reagents.[5] This versatile protocol enables the late-stage functionalization and deuteration of substituted quinolines. Mechanistic investigations emphasize the crucial role of LiI in cleaving the C–O σ-bond of formate motif. Notably, this environmentally benign strategy offers several advantages, including high conversion efficiency, atom economy in the synthesis of valuable *N*-heterocyclic products, while utilizing the readily available starting materials, such as, *N*-heteroarenes and alkyl formats, without requiring flammable hydrogen gas.

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OP-4

Pd-Catalysed [3+2] cycloaddition of Spirovinylcyclopropyl Oxindoles with coumarins: A Synthetic Route to spirochromene-1,3′-indoline scaffolds

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Abstract

Spirocyclic oxindoles constitute a privileged class of molecular architectures due to their rigid topology and significant prevalence in natural products and bioactive compounds.[a] The development of efficient strategies for constructing such frameworks remains an important goal in synthetic chemistry. In this context, spirovinylcyclopropyl (SVCP) oxindoles have emerged as valuable building blocks because of their ability to undergo transition-metal-mediated C–C bond activation.[b] We have developed a $Pd_2(dba)_3$/Xantphos-catalyzed [3+2] cycloaddition[c,d] between SVCP oxindoles and coumarins,[e] enabling direct access to spirochromene-1,3′-indoline derivatives under mild conditions. The transformation proceeds via selective cleavage of the cyclopropane ring followed by cycloaddition with coumarin electrophiles, delivering products in up to 91% yield and excellent diastereoselectivity (>20:1 dr). Broad substrate tolerance was observed, accommodating electron-rich and electron-deficient substituents on both reaction partners. Mechanistic studies support a Pd(0)/Pd(II) catalytic cycle involving oxidative addition into the C–C bond of the cyclopropane. The method is scalable, operationally simple, and compatible with post-cycloaddition functionalizations, highlighting the synthetic versatility of the approach. This strategy provides a concise and efficient route to spirooxindole frameworks of significant structural and pharmacological relevance.

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OP-5

Non-Isocyanate Polyurethanes for Humidity Sensing and Hydroplasticization Monitoring via Harnessing Clusteroluminescence

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Abstract

This work introduces non-isocyanate polyurethane (NIPU) films of the polyhydroxyurethane (PHU) type, rich in pendent vicinal diol groups, as versatile materials for both humidity sensing and monitoring matrix hydroplasticization. Notably, these films exhibit intrinsic clusteroluminescence, removing any need for external fluorophores. Their nonconventional emission arises from dense hydrogen-bonding networks and electron-rich heteroatomic sub-luminophores. The optical properties of the PHU films show a strong, predictable sensitivity to ambient humidity. Increasing relative humidity produces a linear decrease in fluorescence intensity and lifetime, a behavior attributed to water-induced disruption of the hydrogen-bonding interactions that drive clusteroluminescence. Beyond humidity detection, this fluorescence response also provides direct insight into the hydroplasticization of the NIPU matrix. A clear linear relationship between relative fluorescence intensity and the material's glass transition temperature (T_g) was established, enabling the first demonstration that nonconventional fluorescence can serve as a reliable probe for humidity-dependent T_g variations. Overall, these findings highlight the dual functionality of PHU-based NIPU films and position them as simple, fluorophore-free optical platforms capable of real-time humidity sensing and quantitative monitoring of softening phenomena in NIPU materials.

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OP-6

Secreted Secondary Metabolites from Marine Bacterial Source: Diversity, Abundance, and Functional Significance.

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Abstract

The polar extract derived from the culture supernatant or cell extracts of marine bacteria revealed a diverse range of secreted secondary metabolites, including cyclic peptides, alkaloids, polyketides, and terpenoids[1]. Many of the detected compounds such as, callyspongidipeptide A, Maculosin, cyclo(leucylleucine), somalimycin, and N, N-diacetyltryptamine, Prodigiosin[2] are recognized extracellular molecules actively secreted through specialized bacterial mechanisms. Their presence and relative abundance in the supernatant or cell extract indicate functional roles in microbial ecology, including antimicrobial activity, chemical communication, competition, and enzyme regulation. Cyclic peptides and diketopiperazines are among the most abundant and versatile metabolites, while polyketides and terpenoids contribute additional biologically relevant properties. This metabolite profile underscores marine bacterial secretomes as a promising source of bioactive compounds, providing a foundation for further bioprospecting and biosynthetic[3] exploration. Analytical approaches such as metabolite class distribution, molecular networking based on structural similarities, and functional bioactivity correlation can effectively illustrate the diversity and significance of these secreted metabolites.

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OP-7

Efficient Synthesis of Cyclohepta[*b*]indoles and Cyclohepta[*b*]indole-Indoline Conjugates via RCM, Hydrogenation, and Acid-Catalyzed Ring Expansion

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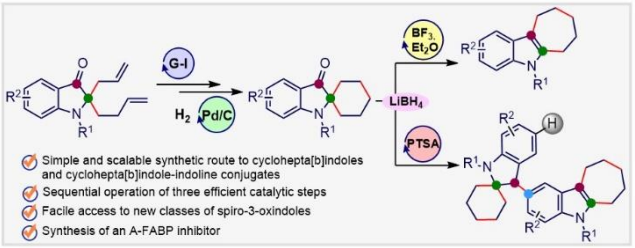
Abstract

Cyclohepta[*b*]indoles, prevalent in natural products and pharmaceuticals, are conventionally accessed via metal or Lewis acid-mediated cycloadditions with prefunctionalized substrates. Our study introduces an innovative sequential catalytic assembly for synthesizing cyclohepta[b]indoles from readily available isatin derivatives. The process involves three catalytic sequences: ring-closing metathesis, catalytic hydrogenation, and acid-catalyzed ring expansion. The RCM of 2,2-dialkene-3-oxindoles, formed by butenyl Grignard addition to 3-allyl-3-hydroxy-2-oxindoles, yields versatile spirocyclohexene-3-oxindole derivatives. These derivatives undergo further transformations, including dibromination, dihydroxylation, epoxidation, Wacker oxidation at the double bond. Hydrogenation of spirocyclohexene-3-oxindole yields spirocyclohexane-3-oxindoles. Their subsequent acid-catalyzed ring expansion/aromatization, dependent on the acid catalyst, results in either cyclohepta[b]indoles or cyclohepta[b]indole-indoline conjugates, adding a unique synthetic dimension. The utility of this methodology is exemplified through the synthesis of an A-FABP inhibitor, showcasing its potential in pharmaceutical applications..[a]



Scheme1: Synthesis of cyclohepta[b]indoles and cyclohepta[b]indole-indoline conjugates

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OP-8

Terephthyl-linked acyl hydrazone-based k^+/Cl^- ion pair symporter: synthesis, mechanistic insights, and in vitro cytotoxicity evaluation

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Abstract

Cellular membranes rely on the precise transport of vital ions to regulate various physiological processes. Developing synthetic ion transporters offers a promising solution to overcome the dysfunction of natural transport phenomena. Moreover, this innovative approach may also unlock new avenues for cancer treatment, providing a groundbreaking opportunity to tackle this devastating disease. Hence, in this present work, we have synthesized a series of acyl hydrazone-based ion pair symporters **L_a – L_c**. The 1H NMR titration study confirms the binding with of K^+ and Cl^- to the sympoters. The ion transport experiments across the lipid bilayer membrane (both EYPC-LUVs⊃HPTS and EYPC-LUVs⊃Lucigenin) demonstrate that Lc exhibits the highest transport activity among the other congeners. From the Hill analysis, the EC_{50} value (7.26 μM), and the Hill coefficient value (n=2) indicate the formation of a noncovalent dimer of the Lc as an active structure responsible for the ion transport activity. The detailed transport study unveils that Lc transports K^+Cl^- ion pair via symport mechanism. The SCXRD analysis reveals the linear and planner geometry of the transporters. Whereas the DFT calculation study discloses the fact that during the ion-pair binding, the transporter molecule forms a self-assembled helical structure with a dimer formation. Ultimately, the anticancer activity of **L_c** is confirmed, demonstrating its efficacy in killing cancer cells. Notably, Lc induced cancer cell death through the apoptosis pathway, highlighting its potential as a targeted therapeutic agent.

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OP-9

Moisture-Tolerant Ni(II) Catalysis Unlocking *gem*-Diamidation and Amidoindolization Cascades from Benzimidates

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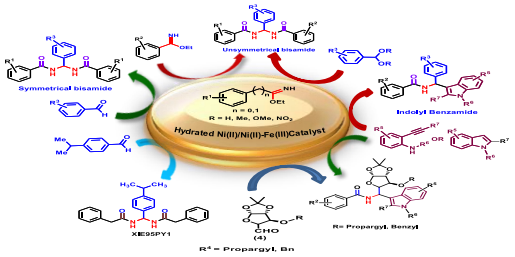
Abstract

We report a new advancement in benzimidate chemistry enabled by moisture-insensitive Ni(II)/Ni(II)–Fe(III) combo catalysis, which promotes a simultaneous two–three bond-forming gem-diamidation and amidoindolization cascade reaction. This strategy allows the efficient construction of both symmetrical and unsymmetrical gem-(arylmethylene)amides and indolo(arylmethylene)amides from incipient benzimidate synthons. Notable features of this methodology include operational simplicity, mild reaction conditions, and excellent robustness. The protocol is broadly applicable to the synthesis of diverse molecular architectures, including novel compounds, labile sugar-derived chiral molecules, and pharmaceutically relevant frameworks, consistently delivering high yields under uniform reaction conditions. This approach holds significant potential for the streamlined synthesis of complex organic molecules, with promising implications for drug discovery and materials science.



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OP-10

Eco-Benign Bronsted acid catalyzed Annulation Strategy to Construct 4-Amino/Thioquinoline Frameworks as Promising Anticancer Therapy Candidate

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Abstract

Proficiently modern sustainable organic chemistry emphasizes atom economy, reduced waste, and safer, energy-efficient synthesis. Organocatalyzed, especially Brønsted acid-catalyzed annulations provide eco-benign access to bioactive heterocycles.[1] Quinoline, a versatile pharmacophore with broad therapeutic potential, remains highly valuable despite solubility challenges in functionalized derivatives. A sustainable strategy for constructing highly functionalized quinoline scaffolds is essential for anticancer drug discovery, where development often spans 15 years and exceeds a billion USD.[2] Modern computer-aided methods, particularly molecular docking can now accelerate target validation. While 2-alkynylanilines have enabled diverse metal-catalyzed annulations to access pharmaceutically important heterocycles including indoles, bisindoles, and various quinolines; but eco-friendly organocatalytic approaches remain extremely scarce.[3] Existing methods involve Brønsted or Lewis acids and metal catalysis (e.g., Ag, Cu, Pd/Cu), yet few address mild, green synthesis of 4-arylamino/thioquinolines.[4] To fill this gap, we developed an atom-economical, Brønsted acid-catalyzed one-pot heteroannulation of 2-alkynylanilines using conventional or microwave heating. This domino process forms C–C, C=C, C=N, and C–N/C–S bonds via nucleophile-triggered cyclization with 2-alkynylanilines, thiophenols or heteroarylthiols, delivering densely substituted 1,2,4-quinoline scaffolds including drug congeners without metals. Docking studies further evaluated the synthesized quinolines as promising anticancer candidates based on protein–ligand binding energies.Furthermore, the reaction mechanism has been substantiated through control experiments, literature precedence, and HRMS-supported kinetic analysis, collectively providing strong evidence for the proposed catalytic pathway.

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OP-11

Organoselenocyanate-conjugated GSTP1 Inhibitor as a Novel Anticancer Agent

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Abstract

Cancer has become a major global health concern due to its limited clinical management by treatment-related toxicities and therapeutic resistance.[1] In the recent past, significant research attention have been driven towards repurposing of enzyme inhibitors in the treatment of different organ-specific cancers. In this regard, conjugation of organoselenium moiety to various drugs or enzyme inhibitors has been proven to be one of the promising approaches towards the treatment of breast cancer with multimodal beneficial effects to overcome the limitations of conventional therapies.[2] Herein, we have conjugated organoselenocyanate unit to an well-known GSTP1 inhibitor, NBDHEX, to enhance its anticancer efficacy. A series of organoselenocyanate-NBDHEX hybrids were synthesized and evaluated for their preliminary anticancer activity in different organ-specific cancer cells (MCF-7, MDA-MB-231, HeLa, IMR-32, HepG2, PC-3) as well as non-cancerous cells (L132). Interestingly, organoselenocyanate-NBDHEX conjugate, **NHSe-2** was found to exhibit an enhanced and selective anticancer activity compared to the parent inhibitor NBDHEX towards MCF-7 cells, while retaining the GSTP1 inhibitory property of NBDHEX (Figure 1). Moreover, the organoselenocyanate conjugate (**NHSe-2**) was found to show the most selective cytotoxicity towards MCF-7 cells among other organoselenium analogues. Therefore, **NHSe-2** was chosen for further biological studies against MCF-7 cells and found to exhibit pronounced anticancer activity with S phase arrest of cells and late phase apoptosis in MCF-7 cells. Most importantly, **NHSe-2** inferred ROS-mediated degradation of HDAC4, NF-κB and c-Myc, resulting in potent anti-proliferation and eventually leading to apoptosis of MCF-7 cells. The key outcomes of the study would be helpful towards the development of anticancer agent with its multimodal activity in the realm of cancer research.

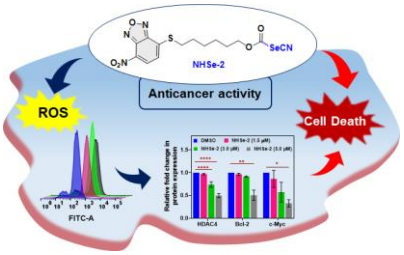

Figure 1. Schematic representation for the anticancer activity of novel organoselenocyanate-NBDHEX conjugate (**NHSe-2**) in MCF-7 cells.

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OP-12

Arsenic Contamination in Kolkata: The Role of Agricultural Product Transport from Endemic Areas

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Abstract

Human exposure to arsenic primarily occurs through the consumption of contaminated drinking water and arsenic-laden food, particularly in arsenic-endemic regions such as the Bengal Delta. The transport and distribution of crops and vegetables cultivated using arsenic-contaminated groundwater and soil from endemic areas to non-endemic regions pose a significant dietary risk to populations otherwise consuming arsenic-free drinking water. In this study, food materials were collected from 30 households with arsenic-free drinking water sources and from nine major markets in Kolkata city. Dietary habits were assessed, and arsenic exposure was evaluated through a market basket survey (n = 93) and a household survey (n = 139) for human health risk analysis.All analyzed food samples contained detectable levels of arsenic, ranging from 24 to 324 µg/kg, reflecting their origin from arsenic-affected regions. The estimated daily intake of inorganic arsenic (iAs) from rice grains and vegetables was 76 µg for adults and 41.4 µg for children (Biswas et al 2019). Inorganic arsenic species, predominantly arsenite and arsenate, constituted approximately 88% of the total arsenic content in vegetables. Furthermore, inadequate intake of essential nutrients among the studied population may exacerbate arsenic toxicity over prolonged exposure periods. An independent cancer risk assessment conducted on the same population revealed that the primary carcinogenic risk is associated with the consumption of arsenic-contaminated rice grains and cereals (Swain et al 2021). These findings highlight the significant role of dietary arsenic exposure in non-endemic regions and underscore the need for comprehensive food safety monitoring and nutritional interventions.

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OP-13

. Diverse Ring Opening and Annulation Catalyses of Isoxazole To Construct Valuable Functionalized Pyrroles, Pyridines, and Nicotinamides

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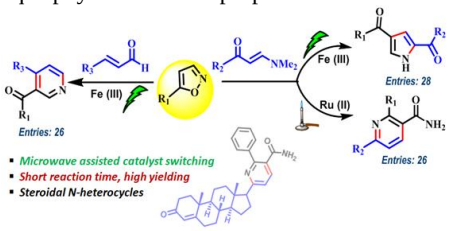
Abstract

Isoxazoles are privileged scaffolds in organic synthesis due to their ability to undergo ring-opening reactions, which generate reactive intermediates that can be strategically manipulated to form diverse heterocyclic systems. One particularly promising strategy within this domain is the microwave-assisted, transition metal-catalyzed ring-opening annulation of isoxazoles, a class of five-membered heterocycles known for their synthetic versatility.This study introduces microwave-assisted, Fe(III)-catalyzed ring-opening annulations of isoxazoles, enabling the rapid and selective synthesis of 1,4-diacyl pyrroles and substituted pyridines. By leveraging microwave irradiation and transition metal catalysis, this approach enhances the reaction efficiency, reduces reaction times, and promotes high regioselectivity under mild conditions. Under thermal conditions, the Ru(II) catalyst led to the synthesis of nicotinamide derivatives. These heterocyclic products are pivotal in pharmaceutical, agrochemical, and materials science applications due to their unique physicochemical properties.



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OP-14

Unlocking Enhanced Reactivity of Hexafluoroisopropanol: A Sustainable Atom Economical Approach to Selective Cascade di-π Functionalization of Allenamides

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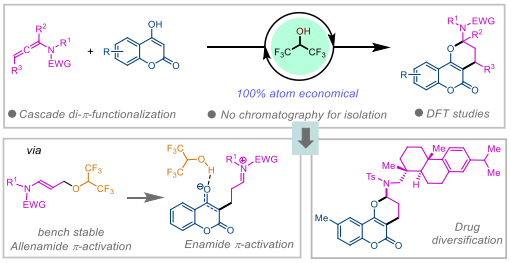
Abstract

Hexafluoroisopropanol (HFIP) mediated di-π activation of allenamide allows metal-free regioselective intermolecular interception of 4-hydroxy coumarin, establishing a general cascade C – C and C – O bond formation process for accessing novel pyranocoumarins. This method exhibits a broad substrate scope, and the feasibility of late-stage functionalization underscores the practicality of this approach. Most significantly, this method is made more resilient and sustainable by a novel precipitation technique that prevents the use of column chromatography for product isolation. This protocol would specify an appropriate means to reach this fascinating chemical space, yet it remains limited due to the regioselective 1,2- and 2,3-functionalization arising from the difficulty associated with the selective functionalization of allenamide and in-situ generated enamide π-bond. The underlying mechanism was unveiled by a combination of control, isotopic labelling experiments as well as computational investigations, which showcased the critical role of HFIP as a superior mediator for proton-transfer events as well as the pivotal role of the hydrogen bonding interaction with the substrates and intermediates.[1]



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OP-15

Sulfenylation of bioactive maleimides, acrylates and cyclohexenones under ambient organophotocatalysis

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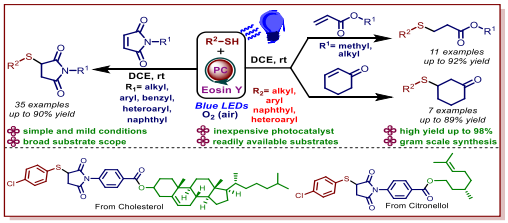
Abstract

C–H sulfenylation has traditionally relied on sulfonylhydrazides and sulfonyl chlorides, yet the direct use of thiols as sulfenyl donors offers distinct advantages. Integrating visible-light photocatalysis into cross-dehydrogenative coupling provides a sustainable approach, utilizing renewable energy while minimizing waste[1]. The synthetic relevance of thiolated maleimides is underscored by their antibacterial and antitumor activities[2], as well as their widespread application in polymer and peptide modification as stable linkers for bioconjugation. Succinimides and maleimides are privileged scaffolds in organic synthesis, abundant in natural products and drug candidates, and serve as precursors to bioactive pyrrolidines and γ-lactams[3]. Despite their electrophilic nature, conventional functionalization often suffers from polymerization or hydrolysis, limiting scope. Herein, we report a visible-light-induced sulfenylation of maleimides, acrylates, and cyclohexenones using eosin Y and thiols under ambient aerobic conditions. This metal-free protocol is operationally simple, cost-effective, and broadly tolerant of functional groups. To our knowledge, this represents the first example of organophotoredox-catalyzed, visible-light-mediated thiolation of these scaffolds, expanding synthetic access to sulfur-containing motifs relevant in medicinal chemistry and natural product synthesis.



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.OP-16

Sustainable Visible-Light-Induced Organophotoredox Synthesis of Diverse Sulfone Architectures from Unsaturated Frameworks Using DABSO as an SO_2 Surrogat

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Abstract

An efficient and sustainable visible-light-mediated organophotoredox protocol has been established for the construction of β-keto sulfones, α-sulfones, and vinyl sulfones under mild reaction conditions. This multicomponent sulfonylation approach is operationally straightforward, environmentally benign, and free from hazardous reagents, enabling the selective synthesis of structurally diverse and biologically relevant sulfone derivatives. The methodology exhibits broad substrate scope and delivers good to excellent yields through the coupling of alkenes or alkynes with DABCO(SO_2)$_2$ and aryl diazonium salts, employing mesityl acridinium perchlorate as an effective photocatalyst. Mechanistic insights are proposed on the basis of fluorescence quenching studies and systematically designed control experiments

Organosulfones are privileged moieties regarding the medicinal utility for human beings to influence the drug metabolism and the rate of biotransformations as well as splendid treasurous organic transformations.[1] A wide range of clinically approved pharmaceuticals and agrochemicals comprise sulfone skeleton as their active part,[2] like Antagonist of bacterial quorum sensing (A),[3] 11 b-HSD[1] inhibitors (B),[4] Biculutamide (C) as an antiandrogen,[5] Eletriptan (D) as the migraine relieving drug,[6] LpxC inhibitor (E),[7] Pyroxasulfone (F) as a prime herbicide,[8] Cafenstrole (G) as a herbicide,[9] Letaxaban (H) as an effective drug on thromboembolism and acute coronary syndrome,[10] Oxycarboxin (I) as a popular fungicide,[11] Apremilast (J) as psoriasis,[12] and Human carboxylestesrase 1 inhibitor (K)[13].

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OP-17

Cu/Ag Synergistic Catalysis for Regioselective Synthesis of 3-Amido and 3-Indolyl Phthalides

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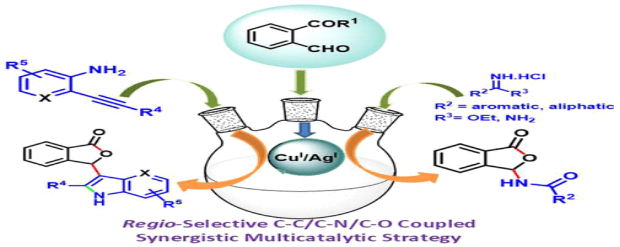
Abstract

To address the increasing demands for selectivity and sustainability in modern synthesis, integrated multicatalytic strategies such as synergistic dual catalysis, regioselective cyclization, and combo catalysis have emerged as powerful tools for accessing complex, highly functionalized, and valuable molecules. In this study, we first report a unique, straightforward, and practicable domino Cu/Ag Synergistic-cooperative cyclization catalysis for the efficient derivatization of variably functionalized 3-amido phthalides and 3-indolyl phthalides in good to excellent yields through regioselective C−C/C−N/C−O bond formation. These pharmaceutically relevant and important scaffolds are widely recognized for their diverse therapeutic potential, ranging from cardiovascular to Alzheimer′s disease applications. The developed protocol utilizes readily producible, inexpensive precursors and proceeds under robust, moisture-insensitive, and step-economic conditions, avoiding expensive catalytic systems, harsh reaction conditions, or hazardous chemicals. Plausible mechanistic insights are proposed and supported by literature surveys, control experiments, and DFT computations for this easily practicable protocol. Furthermore, the scale-up to gram-scale production with good yields and postmodifications of the core 3- substituted phthalide products demonstrates the practical potency and versatility of this synergistic multicatalytic strategy.



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OP-18

Cu(I)-Catalyzed C(sp^3)-H Functionalization of Amino Acids with Benzimidate and ROS to Synthesize Triazines

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Abstract

An easily accessible Cu(I)-catalyzed regioselective oxidative C-N/C-O cross-coupling organic transformation has been disclosed for the syntheses of variably functionalized triazines through the involvement of C(sp^3)-H bond functionalization. A noteworthy advancement is the oxidative functionalization of C(sp^3)−H bonds which has gained significant attention for its efficiency in installing new C−N bonds. However, C(sp^3)−H bond functionalization is commonly performed through an intramolecular approach. Reactive oxygen species (ROS) act as the *in situ* generated crucial intermediates in organic synthesis with an influential role in various oxidation, radical, cross-coupling, and aromatic substitution reactions, targeted heterocycle synthesis, photocatalysis under mild conditions through a greener protocol due to their highly reactive nature for selective oxidation, bond cleavage and radical-mediated transformations of functional groups with minimized use of hazardous chemicals. Recent studies have focused on the generation and effective use of ROS for their potential in targeted and sustainable chemical synthesis, particularly for applications in pharmaceuticals and materials science. It facilitates the formation of 2-3 new bonds through the cross-coupling strategy involving benzimidates, amino acids, and *in situ* generated reactive oxygen species (ROS) from the aerial O_2 as the sole oxidant. The key utilities of the new reactions are demonstrated by its operational simplicity, regioselectivity, robustness, and broad substrate scope.

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OP-19

Detection of physiologically relevant cation Al(III) and Fe(III) by a newly synthesized azo-embedded Rhodamine-B-based Schiff base chemosensor

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Abstract

The design, synthesis, and characterization of a novel Schiff base chemosensor, **HL**, derived from the condensation reaction between Rhodamine B-hydrazide and 4-[(E)-(3-ethoxy-5-formyl-4-hydroxyphenyl) diazenyl] benzoic acid. Spectroscopic methods, including Fourier transform infrared (FTIR), ultraviolet-visible (UV-vis), mass and nuclear magnetic resonance (NMR) spectrometry, confirm the structure of **HL**. HL selectively detects Al(III) and Fe(III) ions in a MeOH–water solution, exhibiting enhanced fluorescence and a noticeable colour shift. The sensing mechanism involves a structural change, including spirolactam ring opening, which significantly increases the emission intensity. Binding tests revealed a 1 : 1 stoichiometric ratio between **HL** and the target metal ions.

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OP-20

Coumarin-Tetrasubstituted Pyrroles: Design, Synthesis, and Anti-Leishmanial Activity

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Abstract

Leishmaniasis is a major neglected tropical disease worldwide. Ongoing challenges in leishmaniasis treatment, including drug toxicity, resistance, prolonged therapy, and high costs, continue to limit the effectiveness of existing drugs and emphasize the necessity for the development of new antileishmanial chemical entities.[1,2] Herein, a diverse library of Fe (III)-catalyzed coumarin-tethered tetrasubstituted pyrroles was synthesized *via* a one-pot multicomponent reaction involving a coumarin-derived β-ketoester, substituted aromatic amines, and aldehydes. These mild, green conditions enabled broad substrate scope and high yields while upholding atom economy. The resulting C3-C2'-linked coumarin-pyrrole hybrids (CTPs) exhibited potent antileishmanial activity against *Leishmania donovani* promastigotes (IC_{50}: 28–36 μM), with negligible cytotoxicity to mammalian splenocytes. SAR analysis revealed that phenyl- and methyl-substituted pyrroles displayed inferior potency, highlighting the pivotal role of the coumarin moiety. A battery of studies on **5a** confirmed that the potent activity and selectivity of these tetrasubstituted pyrroles are due to the induction of ROS generation and nitrite accumulation in host macrophages.

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OP-21

A pyrazole-Based transmembrane chloride anion transporter exhibiting anti-Cancer Activity Cells and Induces Apoptosis

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Abstract

The rise of antibiotic resistance is indeed a critical global health challenge, and the development of artificial transmembrane ion transporters[a] presents an innovative avenue for addressing this issue. Herein, we have reported synthesis and identification of pyrazole-carbohydrazide based derivatives as chloride (Cl-) ion transporters is particularly noteworthy. By mimicking natural symporters, these synthetic transporters[b] not only facilitate the movement of essential ions across cell membranes but also have the potential to enhance cellular functions in the presence of antibiotic-resistant bacteria[c]. The synthesized transporters are confirmed by ^{1}H-NMR, ^{13}C-NMR and HRMS respectively. The transporters compound may be most effective transporter highlights its promise in therapeutic applications, particularly for combating infections[4]. The use of NMR spectral titration to confirm the binding of anions to the pyrazole-carbohydrazide derivatives adds credibility to findings and underscores the importance of understanding the molecular interactions involved. This research could pave the way for new treatments that improve ion transport and exhibit antibacterial properties, ultimately contributing to better public health outcomes. Further studies could explore the mechanisms of action and optimize these compounds for clinical use, potentially offering a much-needed alternative to traditional antibiotics.

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OP-22

Ring expansion and fused cyclization catalysis to construct indoloquinazolinones with functionalization

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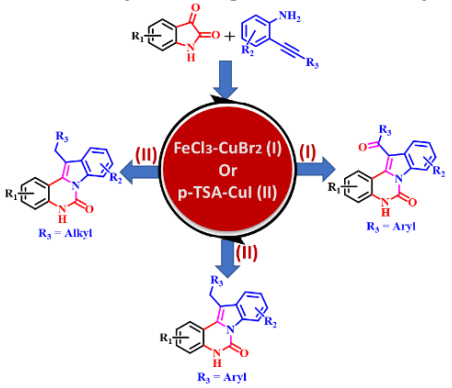
Abstract

In this study, a straightforward, moisture insensitive, and regioselective FeIII–CuII/p-TSA–CuI catalyzed reaction is achieved from readily available isatin and 2-alkynylaniline to furnish diverse 12-benzoyl/benzyl/alkyl indolo[1,2-c]quinazolin-6(5H)-ones. This catalytic method includes C–C cleavage, multi bond forming ring expansion, fused-ring construction, broad substrate scope, gramscale producibility, and high atom economy.



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Poster Presentation:

PP-1

p-TSA•H2O Catalyzed synthesis of novel functionalized dihydro furocoumarins *via* a pseudo-three-component reaction

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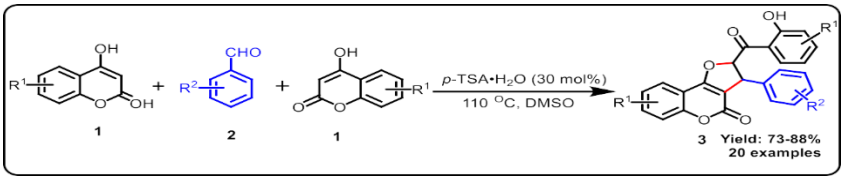
Abstract

A simple and efficient method has been developed to accomplish substituted dihydrofuro[3,2-c]chromenone derivatives(**3**) by reacting 4-hydroxycoumarins (**1**) with aromatic aldehydes (**2**) using 30 mol% *p*-TSA·H2O *via* a pseudo-three-component reaction. The reaction proceeds through the formation of a Knoevenagel intermediate from 4-hydroxycoumarin and aromatic aldehyde, which reacts instantly with another molecule of 4-hydroxycoumarin by Michael-type reaction, followed by cyclisation, ring-opening and decarboxylation to afford the dihydrofuro[3,2-c]chromenone derivatives.[1,2] In addition, the use of *p*-toluenesulfonic acid (*p*-TSA•H2O) makes this protocol cost-effective, non-toxic, and eco-friendly tool for various multi-component reactions, generating important heterocyclic scaffolds. This reaction is easy to handle, has a broad substrate scope, is metal-free, and offers high atom economy, high regioselectivity, good to excellent yields, and does not require inert atmospheric reaction of products, as well as their mechanism, will be disclosed. conditions, eliminating the need for co-catalysts or additives. Among the synthesised compounds, some derivatives are biologically active and exhibit antiproliferative activity. In this presentation, the formation



Scheme 1. Synthesis of dihydrofuro[3,2-*c]*chromenone derivatives

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J. Org. Chem., **2022**, *87*, 4777–4787.

PP-2

Greener and Selective Methodology for the Synthesis of Novel 2-Cyanoimidazole Derivatives and their *in-vitro*, *in-silico* and Herbicidal activity

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Abstract

Imidazole N-oxide functionalisation has gained popularity as a research topic because it can be used to synthesise a wide range of physiologically active molecules. Imidazoles and their N-oxide derivatives are among the most important classes of compounds in synthetic and medicinal chemistry. Functionalised imidazoles are essential scaffolding in many physiologically active compounds. Imidazole compounds, for instance, have anti-cancer[1], anti-microbial[2,3], anti-inflammatory[4], antiviral[5], and numerous other bioactivities. We describe a one-step approach that uses trimethylsilyl cyanide (TMSCN) to synthesise 2-cyanoimidazole derivatives without the need for a solvent or catalyst. The process is carried out in a sealed tube at a moderate temperature for quick conversion. Based on their IC50 values against A549 lung cancer and MCF-7 breast cancer cell lines, the cytotoxicity of all synthesised cyanated compounds was assessed. Additionally, an *in-silico* analysis of the produced chemicals was assessed. Also, the herbicidal activity of the synthesized samples was assessed in both laboratory and greenhouse conditions against *Echinochloa crus-galli* and *Digitaria sanguinalis*.

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PP-3

Recent Advances and Future Perspectives of Schiff Base Assembly Induced Emission Luminogens

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Abstract

Fluorescence based sensing has become an advanced analytical technique for detecting target analytes by monitoring changes in emission intensity or wavelength, facilitating both quantitative and qualitative identification. This method is precious for its exceptional sensitivity, quick response time, and outstanding selectivity. Nevertheless, many conventional fluorophores experience a significant loss of emission intensity when present at high concentrations or in aggregated and solid-state forms. Aggregation-induced emission (AIE) effectively resolves this challenge by promoting stronger fluorescence in the aggregated state, enabling wider sensor applications.Due to their simple and economical synthesis, low toxicity, and highly flexible structural design, Schiff base functionalized probes have become highly convincing among the array of fluorogenic systems. The occurrence of tunable electron donating and electron withdrawing groups facilitates Schiff base derivatives to reveal strong fluorescence behavior through intramolecular charge transfer (ICT) within a delocalized π-electron framework. These aspects make them extremely compliant for selective sensing applications.Schiff bases, also known as imines or azomethines, comprising the characteristic functional group $R_1R_2C{=}NR$ and were first detected by German chemist Hugo Schiff in 1864. Incorporation of heteroatoms into the R_1, R_2, and R substituent framework renders Schiff bases capable of acting as strong polydentate ligands for transition metal complexes. Synthesis of Schiff bases typically encompasses the reaction of amines with carbonyl compounds under suitable conditions and function as vital intermediates in many organic and pharmaceutical molecules. These compounds easily coordinate with metal ions such as Al^{3+}, Cu^{2+}, Zn^{2+}, Ni^{2+}, and Co^{2+}, forming stable complexes through the lone pair on the nitrogen atom of the Schiff base or azomethine group. Complexation commonly involves ligand to metal charge transfer (LMCT), driven by electron donation from the nitrogen nonbonding orbital to vacant metal orbitals. Consequently, fluorescent sensors incorporating Schiff base frameworks are widely applied in environmental monitoring, biological analysis, and clinical diagnostic fields.

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PP-4

Visible Light-Promoted Multicomponent Photocyclization: Synthesis of Polycyclic Fused Amino-Thiazoles and Amino-Selenazoles

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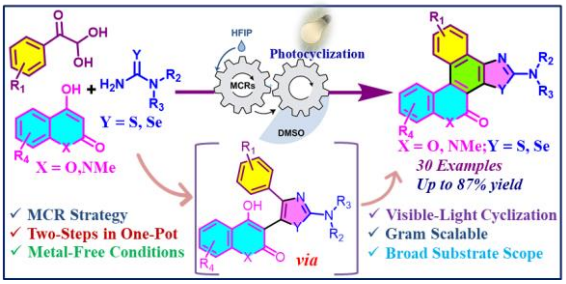
Abstract

Here, we present for the first time a one-pot synthesis of 2-amino-4H-dibenzo[3,4:5,6]isochromeno[7,8-d]thiazol-4-one and 2-amino-5-methylbenzo[k]thiazolo[5,4-i]phenanthridin-4(5H)-one derivative using a two-step process involving arylglyoxal, 4-hydroxycoumarin/4-hydroxy-1-methyl-2(1H)-quinolone and thiourea. The reaction proceeds via a two-step process: the initial step involves the formation of two C–C bonds, one C–N bond, and one C–S bond, yielding aminothiazole in 1,1,1,3,3,3-hexafluoroisopropanol (HFIP) medium within two hours. The second step involves white LED-promoted photocyclization in DMSO. Replacing thiourea by selenourea provided the corresponding selenazoles. This method aligns with green chemistry principles due to its ambient temperature reaction, atom economic multicomponent approach, mild reaction conditions, and utilization of visible light.[1,2]



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PP-5

Exploring the Greener and Sustainable Approach towards the Synthesis of Novel Imidazole *N*-Oxides in H_2O-EtOH medium

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Abstract

The importance of heterocyclic compounds has attracted researchers because of their various applications in industrial, biological, medicinal, and pharmacological fields. Among them, derivatives of imidazole are one of the well-known significant compounds. Imidazole *N*-oxides are important intermediates from which various compounds containing imidazole scaffolds can be synthesized[1]. Besides that, imidazole *N*-oxides are also biologically active molecules showing various properties like anthelmintic, antimicrobial, antihypertensivity, antiprotozoal, and so on[2-4]. Several procedures have been reported regarding the synthesis of imidazole *N*-oxides. However, these procedures have many drawbacks, such as harmful solvents or catalysts, harsh reaction conditions, high temperature, multi-step reactions, and low yields of products. In today's world, pollution as well as the release of industrial waste are big problems, and for that reason, there have been continuous efforts to replace these conventional, harmful methods with greener methodologies. Here, we are discussing a greener and sustainable approach for the synthesis of imidazole *N*-oxides in water-ethanol medium.

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PP-6

Rational Design of ICT-based Ratiometric Fluorescent Probe for Real-Time Detection of Esterase Enzyme in Living Cells

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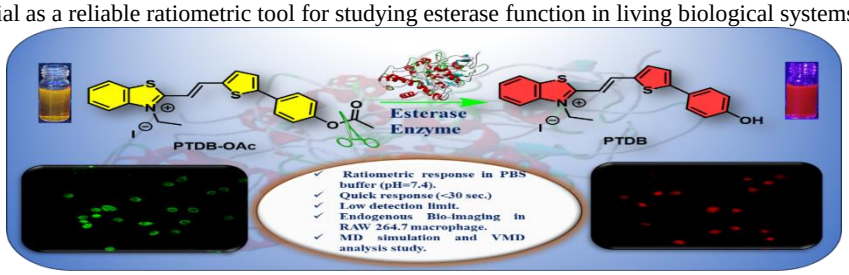
Abstract

Erases are a major class of mammalian hydrolase enzymes involved in diverse biological processes, and their dysregulation is implicated in several metabolic disorders. Activatable in situ fluorescence techniques offer high-resolution spatiotemporal analysis, enabling precise investigation of their biological roles. Considering this, we have designed and synthesized a ratiometric fluorescence probe, PTDB-OAc, based on an intramolecular charge transfer (ICT) for the esterase enzyme activity detection. The mechanism was supported by ESI-MS, ^{1}H-NMR spectra, DFT, VMD analysis and MD simulation studies. Owing to its excellent ratiometric response (<30 s), low detection limit (5.17×10-4 U/mL), and excellent selectivity, the probe effectively monitored time-dependent esterase activity in RAW 264.7 macrophage cells, enabling real-time imaging of endogenous esterase variations and demonstrating its strong potential as a reliable ratiometric tool for studying esterase function in living biological systems.



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PP-7

ESIPT-Based Ratiometric Fluorescent Probe for Rapid Dopamine Detection in Plant and Human Biofluids

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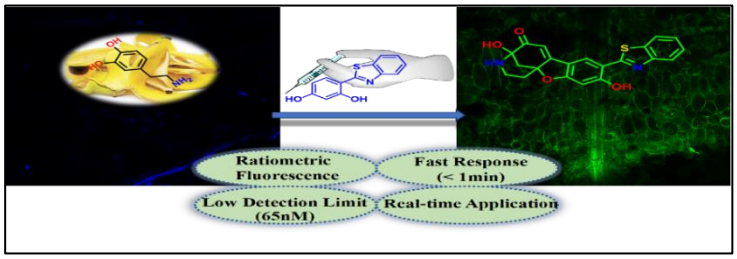
Abstract

Dopamine (DA) plays a pivotal role in maintaining neurological function, and its abnormal levels are closely associated with various mental and neurodegenerative disorders. To address the need for a reliable detection strategy, we report a novel ESIPT-based ratiometric fluorogenic probe capable of ultrasensitive and selective DA quantification. The probe demonstrates exceptional sensitivity, achieving a detection limit of 65 nM, and forms a highly stabilized DA-adduct with an excited-state lifetime of 2.54 ns. Owing to its rapid ratiometric response (<1 min), strong selectivity, and high analytical performance, the method was further applied to real sample analysis. Successful quantification of dopamine in banana peel, human urine, and blood serum confirms the probe's practical applicability and robustness. This work presents a simple, efficient, and highly sensitive fluorescence-based platform for real-time detection of dopamine in complex biological and natural matrices.



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PP-8

Design, Synthesis and Biological Evaluation of Novel Coumarin Derivatives as Antimicrobial Agents

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Abstract

Microbial infections represent a growing global health challenge, responsible for severe morbidity and mortality, particularly in vulnerable and immunocompromised patient populations.[1a,b] Though, many antimicrobial drugs are available in market, their usage is severely compromised by a range of drawbacks ranging from limited efficacy, toxicity to the hosts, non-optimal pharmacokinetics and development of resistance in pathogens.[1c] To expand the chemotype of antimicrobial drugs, we envisaged to develop some antimicrobial coumarin compounds. In this context, a series of coumarin derivatives was designed and synthesised and subjected to detailed *in vitro* screening using the minimum inhibitory concentration (MIC) assay to assess the antimicrobial efficacy of the compounds. The results revealed that some of the derivatives exhibited broad-spectrum antimicrobial activity, with MIC values ranging from 6.25 to 25 µg/mL. Among the tested compounds, one compound emerged as the most promising candidate and was subsequently evaluated *in vivo* using a murine dermal candidiasis model to determine its therapeutic relevance. The study revealed some interesting results which will be highlighted in poster. To complement the experimental findings, molecular docking studies were performed to explore the potential interactions with target proteins and provide mechanistic insight, moreove drug-likeness and pharmacokinetic profiles of the synthesized derivatives were also examined using SwissADME online program.[1d]

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PP-9

Rh(II)-catalyzed synthesis of furo[2,3-b]indoles from 3-diazooxindoles and electron rich arylacetylenes

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Abstract

We report a Rh(II)-catalyzed synthesis of aromatic furo[2,3-b]indole derivatives via cyclopropenation of 3-diazooxindoles with arylacetylenes, followed by in situ rearrangement. A unique aspect of this transformation involves activation of the typically inert C-2 oxygen atom of diazooxindole. Using isatin as the starting material, this approach enables efficient access to novel furoindole frameworks under mild conditions, offering a valuable route for constructing pharmaceutically relevant heterocycles.[a] The reaction showcases good functional group tolerance and scalability, highlighting its synthetic utility. Currently, biological evaluation and structure activity relationship (SAR) studies of the synthesized compounds are ongoing in our laboratory to further assess their therapeutic potential.

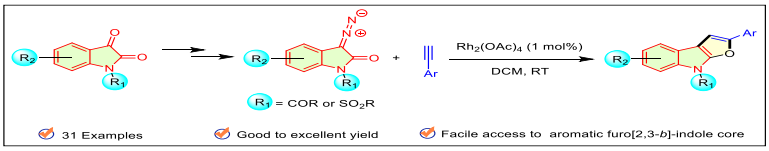

Figure 1. Rh(II)-catalyzed construction of furo[2,3-b]indole framework from isatin derived diazooxindoles and arylacetylenes

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S. Maiti, C. P. Roy, S. R. Kabir, J. Dash, *Chem. Commun.*, 2025, *61*, 18649–18652

PP-10

Side Chain Engineered NDI-Based Functional Materials for Organic Electronics

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Abstract

Imide-based organic materials have gained considerable attention owing to their structural versatility and tunable optoelectronic properties. In this study, a series of novel naphthalene diimide (NDI) derivatives were rationally designed and synthesized through targeted molecular engineering at both the imide and aromatic core positions. The imide-functionalized NDIs containing flexible alkyl chains were further diversified by introducing various amine and aryl substituents via amination and Suzuki–Miyaura cross-coupling reactions. The strategic incorporation of electron-donating and electron-withdrawing substituents into the electron-deficient NDI core enabled precise modulation of their optical and electronic characteristics. Spectroscopic and electrochemical analyses revealed distinct absorption features and tunable energy levels, which were further supported by density functional theory (DFT) calculations. The semiconducting behavior of these materials was confirmed through Schottky diode device fabrication, exhibiting clear structure–property correlations. Complementary AFM and XRR studies highlighted morphology-dependent charge-transport properties, emphasizing the role of molecular architecture in governing device performance. Overall, this work demonstrates that systematic core and imide modification of NDIs is an effective approach for tailoring optoelectronic functionality, offering significant potential for the development of next-generation organic electronic materials.

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PP-11

Electro-carbo-cyclization of alkyne-, alkene-, and nitrile-tethered *α*-halocarbonyls

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Abstract

The electroreductive formation of heterocyclic cores from acyclic precursors is a topic of growing interest in organic chemistry, yet few methods exist. Notably, there's currently no approach that allows a tertiary carbon-centered radical to directly undergo intramolecular C(sp^3)-C(sp) carbo-cyclization with alkyne, alkene, or nitrile substrates. We present a method where the electrochemical dehalogenative intramolecular radical carbo-cyclization of alkyne-tethered α-halocarbonyls produces 3,4-dihydroquinolin-2-ones with good yields. This process employs zinc as a sacrificial anode in an undivided cell under constant current density at room temperature and requires no electron mediator or transition metal catalyst. Using CD_3CN instead of CH_3CN enables the synthesis of 3,4-dihydroquinolin-2-ones with high deuterium incorporation at the C4 and benzylic positions. Furthermore, replacing the alkyne with a nitrile group facilitates a similar intramolecular C(sp^3)-C(sp) carbo-cyclization to generate quinoline-2,4-diones. A control experiment using H_2O^{18} confirms the oxygen source at the C4 position. This chemical reductant-free strategy is not only sustainable and efficient but also compatible with various functional groups.

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PP-12

Silylarylation of Alkenes *via meta*-Selective C-H Activation of Arenes Under Ruthenium/Iron Cooperative Catalysis

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Abstract

Organosilicons are privileged skeletons in the domains of pharmaceutical chemistry, organic synthesis, and materials science. Hence, investigating catalytic techniques for the synthesis of organosilicon compounds has received a lot of emphasis. Carbosilylation of alkenes is an efficient technique to introduce silicon-containing diverse molecular architectures into the chemical space. However, organohalide and pseudohalide are prerequisites for most of the existing carbosilylation protocols. On the flip side, the utilisation of C−H activation has been sowing the seeds for the successful development of intricate molecular scaffolds. In this regard, the synthetic accessibility of complexed organosilicon derivatives by the carbosilylation of alkenes through the catalytic meta-C−H activation approach have remained intangible. Herein, we present a three-component strategy of arylsilylation of olefins with (het)arenes and silanes by integrating the iron-catalyzed silyl radical generation, coupled to intrinsic reactivity of silyl radical with an alkene, to the ruthenium-catalyzed meta-C−H functionalization of (het)arene, leading to the targeted cross-coupled carbosilylated product.

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PP-13

A TEMPO−N_3 Complex Enables the Electrochemical C−H Azidation of *N*−Heterocycles through the Cleavage of Alkoxyamines

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Abstract

A TEMPO−N_3 charge-transfer complex enables the electrochemical C-H azidation of various *N*−heterocycles. The $TEMPO^+$ ion, generated from TEMPO, assists in producing N_3^- by forming a TEMPO−N_3 complex with N_3^-. The formation of this complex is supported by UV vis absorption spectra, cyclic voltammetry studies, and ESI HRMS studies. The reaction likely proceeds by forming a highly labile azidooxygenation adduct, which undergoes oxidative alkoxyamine mesolytic cleavage. Subsequent deprotonation of the resulting carbocation exclusively produces the azidation product. It is important to note that substituted olefins generally yield azidooxygenation or diazidation as the final product. Our study demonstrates that *N*-heterocycles deliver a selective monoazidation product, possibly due to steric reasons. ESI HRMS studies provide evidence for forming azidooxygenation and alkoxyamine radical cation adducts. The regio- and chemoselectivity of this azidation reaction using the TEMPO−N_3 complex have been discussed.

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PP-14

Antimicrobial and DNA Gyrase inhibitory activity of novel 3-amidocoumarins

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Abstract

The escalating emergence of pathogenic bacteria resistant to antimicrobial drugs poses a critical threat to global public health. Multidrug resistance significantly elevates morbidity, mortality and health care costs, particularly concerning in the context of hospital acquired infections.[1,2] Consequently, the development of novel antibacterial agents with unique chemical structures and mechanisms of action is imperative to circumvent established resistance pathways.[3] This work addresses the urgent need for novel antibacterial agents by exploring the design and synthesis of amido-coumarins as potential DNA gyrase inhibitors. The antibacterial activity of synthesized compounds was evaluated against a panel of bacterial strains using serial dilution method. Some of the compounds showed significant antibacterial effects at very low Minimum inhibitory concentration (MIC). Molecular docking studies against DNA gyrase demonstrated strong binding affinities of most promising compounds with docking scores superior to standard drug ciprofloxacin. Detailed analysis of binding interactions highlighted key amino acid residues involved in stabilizing the ligand-protein complexes, providing insights into their mode of action. Furthermore, to assess the therapeutic potential of the compounds, a comprehensive in silico analysis of their ADMET properties was performed using SwissADME web tool,[4] which revealed that the targeted molecules possess favorable physiochemical profiles satisfying the crucial prerequisites for progression as safe antibacterial candidates.

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PP-15

External photocatalyst-free photocycloaddition between triplet vinylnitrenes with 1,3-biradical character and activated olefins under 420 nm LEDs

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Abstract

The photocycloaddition between vinyl azides and olefins typically occurs through a 2*H*-azirine, which is formed from triplet vinylnitrine after decaying by intersystem crossing. Herein, we report triplet vinylnitrenes with 1,3-biradical character can directly take part in photocycloaddition reactions with olefins to produce single diastereomers of the corresponding 1-pyrrolines. We used 420 nm LEDs in acetonitrile solvent for this reaction, and the excited state of the substrate olefin sensitized vinyl azide via energy transfer, removing the need for an external photocatalyst or sensitizer. This reaction can also also be carried out under sunlight. Additionally, we developed a one-pot method to convert to pyrroles directly through this photocycloaddition and oxidation sequences. The proposed mechanism is supported by density functional theory (DFT) calculations and control experiments. This external photocatalyst or sensitizer-free strategy not only offers sustainability and efficiency with excellent functional group compatibility but also introduces previously unknown photocycloaddition reactions using the 1,3-biradical character of the vinylnitrenes with olefins.

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PP-16

Visible-light-mediated carboxylation of alkene with CO_2 through reductive radical polar crossover

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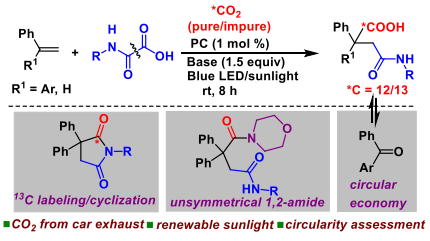
Abstract

An organophotoredox-catalyzed, transition-metal-free three-component alkene difunctionalization involving a carbamoyl radical and carbon dioxide has been developed under visible or solar light irradiation. Notably, this protocol enables the construction of an all-carbon quaternary center at the α-position, bearing a versatile carboxylic acid functionality that can be readily transformed into the corresponding amide to afford unsymmetrical vicinal diamides. In addition to 1,1-diaryl styrenes, the carboxylation process is effective for the more challenging simple vinyl arenes, a substrate class that has remained comparatively underexplored. The resulting difunctionalized products can be further cyclized to access medicinally privileged 3,3-disubstituted N-alkylsuccinamide scaffolds. Moreover, the reaction is compatible with ^{13}C-labeling for drug-metabolism studies by employing $^{13}CO_2$ in place of naturally abundant $^{12}CO_2$, despite the high cost associated with CO_2 purification. From both process and practical perspectives, we demonstrated that these three-component reactions can be efficiently conducted using impure CO_2 sources, such as soda water and automobile exhaust. Furthermore, the metal-free, base-mediated decarboxylative oxygenation of the resulting products enabled the formation of parent benzophenones through sequential carbon–carbon bond cleavage. Collectively, these findings establish a circular chemical economy, wherein benzophenone derivatives are regenerated via a carboxylation–decarboxylation sequence, highlighting the potential of this emerging strategy for sustainable development in strategically important sectors.



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PP-17

Discovery of 4H-chromene derivatives as anti-metastatic cancer agents targeting JNK in Sribble knockdown induced epithelial cancer model

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Abstract

On exploration of chromene-based molecules for health-oriented applications [1a], we report the first *in vivo* and *in silico* evaluation of ten 4H-chromene derivatives as prospective anti-metastatic agents acting through c-Jun N-terminal kinase (JNK) modulation [1b]. Synthesis of functionalized 4H-chromenes has been performed by Knøvenagel reaction between aromatic aldehydes and ethylacetoacetate to yield corresponding alkylidene acetoacetate, further their reaction with substituted phenols via acid catalyzed Michael addition has been carried out [1c]. In a *Drosophila* metastatic cancer model, five compounds displayed notable activity, with one showed the strongest response by rescuing 27% of metastatic cancer-induced pupal lethality while the standard drug sorafenib showed no rescue. Biological analysis further demonstrated that the hit compound significantly downregulated JNK and the metastasis-promoting enzyme matrix metalloproteinase-1 (MMP1) in *Scribble* knockdown cancer tissues [1d]. Computational docking supported these findings, revealing strong binding affinities of all derivatives toward *Drosophila* JNK (PDB ID: 5AWM) [1e]. Comparative docking of hit compound in both *Drosophila* and human JNK structures (PDB IDs: 1UKH and 3E7O) indicated a high degree of homology, with similar amino acid residues participating in ligand interactions. SwissADME profiling confirmed favourable pharmacokinetic and drug-like properties across the series. Overall, the research results highlight the chromene scaffold as a promising platform for developing anti-metastatic agents targeting epithelial cancers, reinforcing the role of chemistry in advancing human health and development.

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PP-18

Non-Aromatic Synthetic, Semisynthetic, and Zr(IV)-/ Zn(II)-/ Ni(II)-Coordinated Opto-Electronic Polymer Materials: Ultra-High Conductivity and Voltammetric/ Impedimetric/ Luminometric Glucose Sensing

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Abstract

Exploration of purely aliphatic supramolecular macromolecules exhibiting high conductivity, light emission efficiency, and redox activity should improve the quality and efficacy of opto-electronic devices. In this work, four synthetic electrochemically active aliphatic fluorescent polymers (EAFPs), four semi-synthetic electrochemically active fluorescent inclusion polymers (EAFIPs), and subsequently, three metal ion-coordinated semi-synthetic inclusion polymers (M(II/IV)-MCSIP, M = Zr(IV)/Ni(II)/Zn(II)) were strategically designed and sequentially synthesized.[a–f] Here, conductivity of EAFPs was noted within 355.6-137.7 mS cm^{-1}, comparable to those of aromatic polymers. During synthesis of EAFPs, EAFIPs, Zr(IV)-MCSIP, Ni(II)-MCSIP, and Zn(II)-MCSIP, cyclic *N*-(5-methacryloyl-1,5-oxazocan-2-ylidene)-N-methylmethanaminium (MOYMMA) ions originated in situ.[a–f] The presence of MOYMMA in EAFPs, EAFIPs, Zr(IV)-MCSIP, Ni(II)-MCSIP, and Zn(II)-MCIs was confirmed from nuclear magnetic resonance and Fourier transform infrared spectroscopies. The optical and electrochemical properties in EAFP3/ EAFIP3 (optimal composition), Zr(IV)-MCSIP, Ni(II)-MCSIP, and Zn(II)-MCSIP generated through spontaneous charge transfer from oxyanionic centre of $–C(–O^{–})=N^{+}(CH_3)_3$ functionality in *N*,*N*-dimethylacrylamide to electro-deficient >C=O centre in MOYMMA. The UV-vis/ fluorescence spectroscopy confirmed 333.71 and 242.44% increment of charge transfer efficacies in EAFIP3 and Ni(II)-MCSIP, respectively. The highest conductivity and oxidation power of Zn(II)-MCSIP and Zr(IV)-MCSIP, respectively, were evaluated by cyclic voltammetric and electrical impedance spectroscopic analyses of M(II/ IV)-MCSIP fabricated glassy carbon electrode (GCE). Hence, Zr(IV)-MCSIP, Ni(II)-MCSIP, and Zn(II)-MCSIP were suitable for cyclic voltammetric, fluorometric, and impedimetric glucose sensors owing to the high open circuit potential of Zr(IV)-MCSIP, 242.44% enhanced CT in Ni(II)-MCSIP, and strong conductivity of Zn(II)-MCSIP, respectively. Here, appreciable efficiencies of multi-method glucose sensing using Zr(IV)-MCSIP-, Ni(II)-MCSIP-, and Zn(II)-MCSIP-modified GCEs were confirmed through high stability, selectivity, reproducibility, sensitivity, and low LODs.[a–f]

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PP-19

Cooperative Catalysis Employed with Highly Efficient Bimetallic Platinum(II) NHC Complexes Towards Aerobic Oxidation of Alcohol

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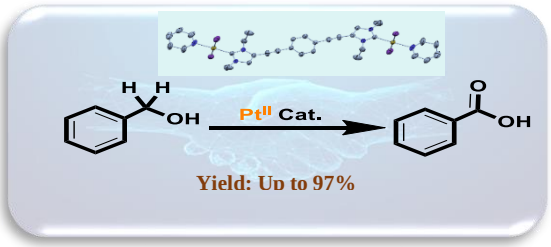
Abstract

Cooperative catalysis in multimetallic complexes results catalytic benefits over their mononuclear counterparts. However, such type of catalysis utilizing multimetallic Pt^{II} NHC (N-heterocyclic carbene) complexes is very limited. Here the synthesis of bimetallic Pt^{II} NHC complexes utilizing a central acetylene-bridged bis-NHC ligand platform and as the first bimetallic Pt^{II} NHC complexes to initiate the oxidation of primary alcohols to acid under aerobic conditions. Bimetallic catalyst with PPh_3 as ancillary ligand resulted excellent yield of the acid with a very low catalyst loading. Furthermore, the bimetallic NHC complexes surpass the catalytic outcomes of the corresponding mononuclear which might be due to the duel action of the metal centers. The donor strengths of both mono- and bis-NHC ligands have been compared with the help of ^{13}C and ^{31}P chemical shift values.



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PP-20

Influence of Ligand's Electronic Effect vs Temperature on Solvent FreeCatalyticCO2 Fixation andNoncovalent Interactions in MolecularArchitecture of Zn-Complexes

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Abstract

A series of mononuclear bis-ligated Zn(II) octahedral complexes $[Zn(L^{Mes})_2]$ (**Zn**^{Mes}), $[Zn(L^{OMe})_2]$ (**Zn**^{OMe}), $[Zn(L^{CF3})_2]$ (**Zn**^{CF3}), and $[Zn(L^{Cl})_2]$ (**Zn**^{Cl}) have been synthesized using tridentate N/N/N donors, maleonitrile tethered, half-reduced Schiff base ligands, ((2-(benzylamino)-3-((E)-(pyridin-2-ylmethylene)amino)maleonitrile) derivatives, **HL**^{Mes}, **HL**^{OMe}, **HL**^{CF3} and **HL**^{Cl}). All the compounds were well characterized by spectroscopy and structurally. The noncovalent interactions present in the lattice of Zn-complexes were studied in detail to explain the origin of molecular architecture using Hirshfeld surface (HS) analysis. The catalytic activity for the coupling of CO2 with epoxides under mild and solvent free condition was demonstrated. The variable electronic effect of ligands due to different substitution at the ligand's backbone was correlated with the variation in catalytic yield. The reverse electronic effect of the ligand due to the rise of temperature in the yield of catalysis was mechanistically explained in terms of the way to the formation of the active catalyst.

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PP-21

Cole–Cole and Nyquist Analysis of Graphene Oxide Impedance Data

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Abstract

Graphene oxide (GO) is a two-dimensional carbon-based material that has gained considerable interest due to its tunable electrical and dielectric properties, which arise from the presence of oxygen-containing functional groups and structural disorder[1]. These features make graphene oxide a promising material for applications in sensors, energy storage devices, and electronic components. In the present work, a detailed investigation of the impedance behavior of graphene oxide is carried out using impedance spectroscopy, with particular emphasis on Cole–Cole and Nyquist analyses to understand its dielectric relaxation and charge transport mechanisms.Impedance measurements were performed over a broad frequency range at room temperature. The obtained complex impedance data were analyzed using Nyquist plots (imaginary impedance versus real impedance) to identify different electrical contributions within the material. The Nyquist plots exhibit depressed semicircular arcs, indicating the presence of grain and grain boundary effects as well as non-ideal electrical behavior[2]. The absence of perfect semicircles suggests a distribution of relaxation times rather than a single relaxation process, which is commonly observed in structurally disordered materials such as graphene oxide. Further insight into the relaxation dynamics was obtained through Cole–Cole analysis.The Cole–Cole plots show clear deviations from ideal Debye relaxation, confirming the non-Debye nature of dielectric relaxation in graphene oxide. This behavior is attributed to interfacial polarization, space charge effects, and the heterogeneous distribution of oxygen functional groups within the GO structure. The frequency-dependent dielectric constant and dielectric loss values support the presence of multiple polarization mechanisms, including dipolar and interfacial polarization, especially at low frequencies.To quantitatively interpret the impedance response, an equivalent electrical circuit model consisting of resistive and capacitive elements was employed[3]. The model provides a good fit to the experimental data and allows the extraction of important electrical parameters such as bulk resistance, grain boundary resistance, and capacitance values. These parameters help in understanding the conduction pathways and polarization effects in graphene oxide..

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PP-22

Influence of the Ligand's Electronic Effect on iClick Reaction of Ni(II)–Azido Complexes with Alkynes: Synthesis, Structure, Characterization, and Kinetic Studies

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Abstract

The synthesis and characterization of two new square planer Ni(II)-azido complexes [Ni(N3)(L)]−1 of **1-N3** and **2-N3** using electronically varied N/S/O donor tridentate ligands (where $\mathbf{H_2L^{OMe}}$: (*E*)-2-(((2-mercaptophenyl)imino)methyl)-6-methoxyphenol), $\mathbf{H_2L^{tBu}}$: (*E*)-2,4-di-*tert*-butyl-6-(((2-mercaptophenyl)imino)methyl)phenol) were reported. Azido moiety in Ni–azido complexes was found as more dipolar than free azide ion. Six number of [3+2] cycloaddition coupling product of **1-N3**/**2-N3** and three different alkynes were isolated and well characterized as [Ni(triazolate)(L)]−1 (**$1^{/tBu}$-T)** complexes. In triazolate complexes originated from terminal alkyne, the triazolate ligand was coordinated via the **N1-T** atom whose (**$1\text{-}T^2$)** crystal structure was presented. The triazolato products of symmetrical and unsymmetrical nonterminal alkynes were isolated as **N2-T** mode of binding. The conversion of **N1-T/N3-T** to **N2-T** as well as the stability in a particular mode of binding was proposed as thermal control of their equilibrium based on the variable temperature 19F NMR studies on **$1\text{-}T^3$/$2\text{-}T^3$**. The detail kinetic studies resulted that the reaction with methyl propiolate follows zero-order rate law, whereas other two alkynes showed first-order rate. Mostly, the electron-poor ethyl-4,4,4-trifluorobut- 2-ynoate always react faster than dimethyl but-2-ynedioate and Ni(II)-azido complex with $\mathbf{L^{tBu}}$ ligated always react with a particular alkyne in a faster rate than the same of $\mathbf{L^{OMe}}$.

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PP-23

Zn(II) selective recognition using a new coumarin-pyridyl based chemosensor and strategic formation of a mononuclear Zn(II) complex for efficient detection of nitro-aromatics in 100% aqueous medium: Application in live cell imaging

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Abstract

Zn^{2+} concentration is critical for the well-being of human health which prompts efficient management of Zn^{2+} present in real-time samples and fluorescent chemosensors serve a significant function in the selective identification of Zn^{2+}. Facile detection of nitroaromatic explosives also holds immense importance for enhancing the safety of humankind. Taking these into account, we have designed and constructed a new coumarin-pyridyl based tridentate probe, **HCoupic** that selectively senses Zn^{2+} by fluorescence enhancement at λ_{max}=438 nm surpassing all other competing metal ions in acetonitrile-HEPES buffer medium in nanomolar range. Furthermore, the strategically synthesized penta-coordinated **Zn^{2+}-HCoupic** (1:1) ensemble **(ZCMI)** offers selective and sensitive detection of picric acid and 2,4-Dinitrophenol from 100% aqueous solution with very low detection limit and high Stern-Volmer constant. To pinpoint the interactions present within the generated systems various spectroscopic analyses have been performed. Single crystal structures of all three compounds **HCoupic, ZCMI** and **ZCMI-Picric acid** ensemble **(ZCWP)** along with the DFT studies set the seal on the PET-CHEF-ESIPT based sensing mechanism for the **HCoupic** and Zn^{2+} and PET based phenomenon for the **ZCMI** and PA. This study also illustrates the potential applicability of **HCoupic** in sensing Zn^{2+} in plant cells (chickpeas) and MDAMB-231 human cancer cell lines.

PP-24

Exploration of noise effect on the Tsallis Entropy and Corresponding Magnetocaloric Effect in *GaAs* Quantum Dot under the Aegis of Noise-Anharmonicity Interplay

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Abstract

Quantum dots (QDs) and other low-dimensional semiconductor nanostructures have witnessed tremendous technological applications, particularly when they contain dopants with ample focus on their *nonlinear optical (NLO)* properties. Researches related to thermodynamic properties of low dimensional nanostructures merit significance in view of the immense potential of these systems in various technological applications, through the elucidation of the nuances of their electronic and optical properties. Such elucidation also helps realize the nonequilibrium processes. Boltzmann, Gibbs, and Einstein initiated the attempts to build up the subject of statistical mechanics from the first principle. The Boltzmann-Gibbs (BG) statistical mechanics turned out to be a fascinating physical theory because of its ability to provide a satisfactory description of many experimental systems at equilibrium. However, there are several physical systems where, application of BG statistical mechanics yields an unsatisfactory and anomalous picture.[1a] The system consists of various complex interactions need to be studied using some alternative statistical formalism. Tsallis made an attempt to overcome the limitations of the BG statistics. Tsallis conjectured a generalized version of BG entropy known as Tsallis entropy.[1b] This entropy comes out to be immensely useful for complex systems comprising diverse interactions and nonstandard distributions. It is *non-extensive* and can prevail over many shortcomings of conventional BG statistical thermodynamics.[1c] In consequence, several studies can be found that involve Tsallis entropy in low-dimensional nanosystems. When a magnetic substance is subjected to a change in magnetic field (ΔB), it displays a characteristic response which can be directly correlated with the entropy change (ΔS). This characteristic response is known as the *magnetocaloric effect (MCE)*. MCE assumes unquestionable importance for manufacturing devices pertaining to magnetic refrigeration for achieving ultralow temperatures.[1d] We have considered a *GaAs* QD subject to Gaussian white noise and anharmonicity. The inherent QD confinement incorporates lateral parabolic potential that causes spatial arrest of the movement of the electron to the x–y plane and a perpendicular magnetic field. Added to this, the confinement also comprises of noise and anharmonicity. The impact of noise comes out to be different depending on its mode of ingression (*additive/multiplicative*). In contrast, the impact of anharmonicity depends on its parity (*odd/ even*). We have found that the Tsallis entropy increase with an increase in temperature, whereas MCE falls as temperature rises. At a given temperature, under odd anharmonicity, an increase in the anharmonicity constant leads to an enhancement of Tsallis entropy and depression of MCE. Exactly the reverse trend is observed under even anharmonicity. At a given temperature, and both under odd and even anharmonic potentials, the applied additive noise happens to lower the Tsallis entropy and raise MCE, with respect to the noise-free state. Exactly the reverse trend, however, has been observed in the presence of applied multiplicative noise.[1e]

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PP-25

Visible-Light-Promoted Access to Fused Aza-Heterocyclic Frameworks

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Abstract

The development of innovative and sustainable synthetic methodologies is crucial to address the increasing demand for environmentally benign practices in all domains of organic chemistry.[1a] In this regard, harnessing visible light as the sole energy input is particularly attractive.[1b] Diazo compounds, being highly versatile reagents with notable reactivity and ready accessibility[1c], are well-suited for photochemical activation, which offers a promising, eco-friendly[1d] alternative to traditional transition-metal catalyzed processes.[1e] In this perspective, we report generalized photochemical pathways for the synthesis of benzene fused 1,4- and 1,3-diazines from 1,4- and 1,5-aza bis-nucleophiles and various diazo compounds, employing water as the sole and distinct solvent under aerobic presence. This protocols involve the direct photoinduced generation of carbenes from diazo compounds averting the need of any photocatalyst which then opts [4+2] or [5+1]-annulation pathway and offers distinct products. The detailed insights into the reaction pathways are investigated through several control experiments and DFT studies. Strategically it is also possible to construct 5-membered aza-heterocyclic core applying the same photochemical approach. Finally, the late-stage modifications of quinoxalinone and quinoxaline scaffold applying the photoinduced C-H activation technique generates the structurally diverse spiroindene compounds including steroid embedded polyaza heterocycle.

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PP-26

A Solvent- and Catalyst-Free Amination Strategy on Modified Nucleosides and One-Pot Access to Benzimidazopurine and Benzimidazole Nucleosides

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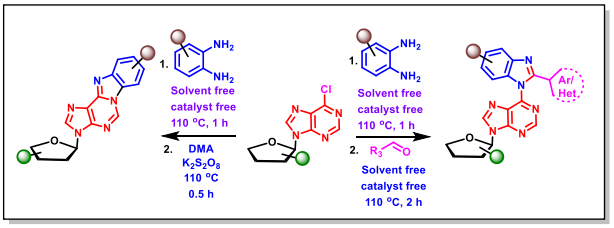
Abstract

We report a sustainable and efficient strategy for the synthesis of bio-inspired 6-substituted aminopurine nucleoside analogues through catalyst-free and solvent-free amination reactions. Unprotected 6-chloro purine nucleosides undergo direct amination with a broad range of amine derivatives, furnishing the corresponding unprotected 6-aminopurine nucleosides in good to excellent yields. This environmentally benign protocol eliminates the need for transition-metal catalysts, and organic solvents, offering a highly practical and atom-economical approach. Building on this methodology, we developed a one-pot synthesis of purine fused polycyclic nucleosides and benzimidazole nucleosides using potassium persulfate ($K_2S_2O_8$) as a green oxidant. The transformation proceeds *via* a transition metal-free oxidative cyclization involving intramolecular C-N bond formation. In the case of purine fused polycyclic nucleosides, the reaction follows an oxidative deamination pathway, where the nucleophilic purinyl nitrogen and the departing amino group cooperatively facilitate cyclization under mild conditions, with DMA serving as a C1 source. This sustainable, atom-economical, and operationally simple approach demonstrates excellent functional group tolerance and delivers high yields across a diverse substrate scope. The methodology provides an environmentally friendly platform for the rapid synthesis of structurally complex nucleoside analogues with potential biological relevance.



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PP-27

Pyrene based Schiff base colorimetric chemosensor for recognition of Hg^{2+} ion

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Abstract

A novel Isonicotino-hydrazide based chemosensor INPC was successfully designed and synthesized which shows spectral response towards mercury ion (Hg^{2+}) with a sharp colour change from colourless to mustard yellow which provided the opportunity for detection of Hg^{2+} ion in the naked eyes. Selectivity studies stated that the chemosensor INPC was specific to the Hg^{2+} ion detection among other metal ions. The UV-vis absorption spectrum of chemosensor INPC was investigated with 20 μM Hg^{2+} ion in acetonitrile solution which revealed a bathochromic shift of maximum absorbance (λ_{max}) value to 447 nm from a strong band maximum absorbance peak (λ_{max}) of 373 nm associated to chemosensor INPC only. Here we report surprisingly low LOD of 2.16 μM. The value of binding constant for complexation of metal ion with receptor INPC calculated out to be 1.23×10^4 M^{-1}. The linearity of the Benesi-Hildebrand plot indicated 1:1 stoichiometry of metal- ligand complex which is further confirmed by the Job's plot method and a maximum was observed at 0.5 mole fraction of ligand INPC which reconfirms 1:1 stoichiometry of ligand metal (INPC- Hg^{2+}) complex.

PP-28

Rh(III)-Catalyzed Cascade Regioselective C–H Activation/Spiroannulation: Access to DiverselyFunctionalized Heterocyclic Scaffolds

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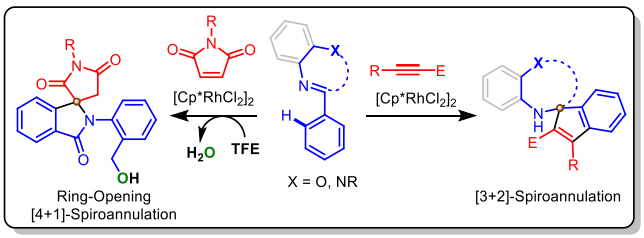
Abstract

A scalable one-pot Cp*Rh(III)-catalyzed [m+n]-spiroannulationshave been developed for the efficient synthesis of potentially biologically relevant γ-spiro lactams and spiro-indenes using cyclic imine as directing group employing ynones/ynoates and activated olefinsas reaction partners under mild and operationally simple conditions. The process exhibits a broad substrate scope, a wide range of functional group tolerance, affording a regioselective synthesis of a diverse range of γ-spiro lactams and **substituted** indenamines and in excellent yields. This protocol offers a practical and versatile approach to spirocycles. Thorough mechanistic studies have been executed to support the plausible mechanism.



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PP-29

α-Functionalization of Ethers with Acridanes and Amines *via* Metal-Free Direct C(sp^3)-H Radical-Radical Cross-Dehydrogenative Coupling

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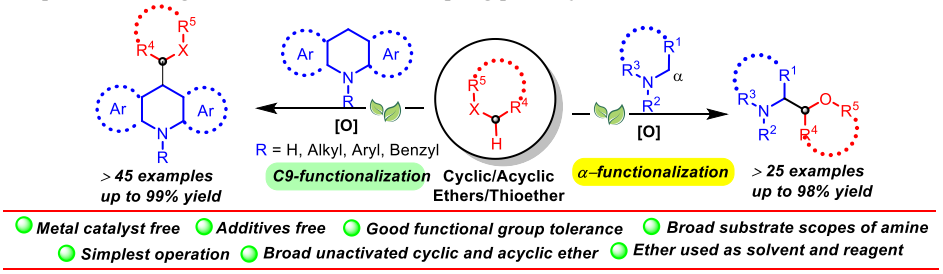
Abstract

An efficient, direct, radical-radical cross-dehydrogenative coupling (CDC) of relatively unactivated C(sp^3)–H bond of ethers with the C(sp^3)-H bond of acridanes and amines has been developed enabling the construction of C9-etherified acridanes and *α*-etherified amines in moderate to excellent yields using tert-butyl hydroperoxide (TBHP) as the sole oxidant. This sustainable methodology circumvents the need for external metal catalysts or additives, providing a cost-effective and operationally simple protocol for C9-acridanes and *α*-C(sp^3)-H functionalization of cyclic and acyclic amines with a broad range of unactivated cyclic/acyclic ethers. A detailed mechanistic study, including characterisation of the intermediate by single x-ray crystallography analysis and isotope-labelling experiments, provides strong evidence for a radical coupling pathway.



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PP-30

Co(II)-Catalyzed [4+2] Annulation with Maleimides: Efficient Access to Fused Maleimide–Imidazole Architectures

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Abstract

A novel cobalt(II)-catalyzed sequential C(*sp*^{2})–H and N(*sp*$^{3-2}$)–H activation has been developed for an efficient [4+2] annulation of imidazole derivatives with maleimides, enabling streamlined access to complex fused pyrrolo-isoquinolinedione architectures. The true merit of this approach lies in its exceptional functional group tolerance, facilitating access to biologically relevant fused heterocyclic frameworks while seamlessly accommodating diverse post-synthetic modifications, such as chemoselective reductions and oxidative transformations. Notably, a phenanthraimidazole-embedded derivative (**6j**) exhibits a pronounced fluorescence “turn-off” response toward Fe^{2+} ions, displaying high sensitivity and selectivity. Comprehensive mechanistic studies, corroborated by control experiments provide detailed insight into the underlying reaction pathway and catalyst behavior.

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PP-31

Stereoslective synthesis of *cis*-Styrenyl-1,2-bis dithiocarbamate by dithiocarbamylation of alkynyl bromide

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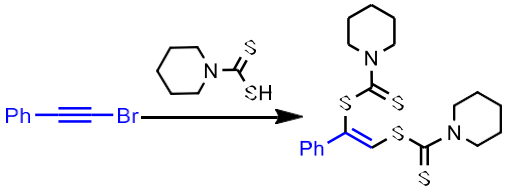
Abstract

Dihiocarbamates are a versatile organic framework with applications in medicine, agriculture, material science, and organic synthesis. A class of bifunctionalized styrene molecules have been prepared by dithiocarbamylation of alkynyl bromides under catalyst and additive free condition. *In situ* generated dithiocarbamic acid reacts with alkynyl bromide to produce alkynyldithiocarbamate intermediate as revealed from HRMS and computational studies of the mechanism. *cis*-Styrenyl-1,2-bis dithiocarbamate compounds are formed stereoselectively by the neighbouring group assisted addition of dithiocarbamic acid to the alkynyl dithiocarbamate intermediate. The protocol is tested on gram scale synthesis and explored on substrates containing bioactive moieties.



PP-32

Supra-molecularly cross-linked nano-assemblies for high encapsulation stability and controlled guest release

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Abstract

The design of amphiphilic macromolecules is of great interest due to their applications in various fields of materials and biomedical science, for example, drug delivery,1 gene transfection,2 cell imaging,3 etc. Specifically, in the context of drug delivery applications, stimuli responsive amphiphilic polymers are widely used as they are capable of self-assembling into various supramolecular nanostructures. The stimuli responsive functionality has been installed to the polymeric structure for location specific triggered guest release and thus overcoming the poor selectivity and severe side effects of chemotherapeutic treatments. Therefore, the design and development of structurally robust nanocarriers with enhanced noncovalent encapsulation stability is highly desirable to improve their performance and reliability.In this study, a new self-immolative amphiphilic polyurethane was synthesized, incorporating redox-responsive disulfide bond, tertiary amines and aromatic units integrated into a polymer backbone, along with regularly spaced tetra ethylene glycol monomethyl ether pendants. In aqueous media the polymer spontaneously forms micelle like nano-assemblies that effectively encapsulate hydrophobic guest molecules. Beyond hydrophobic interactions, the structural integrity of the micellar core is enhanced by supramolecular cross-linking through π-π stacking between aromatic moieties and hydrogen bonding via urethane groups. These combined interactions significantly enhance guest encapsulation stability.In contrast, a second polyurethane was synthesized, incorporating disulfide linkages, tertiary amine groups and aliphatic segments within the polymer backbone, along with periodically distributed tetra ethylene glycol monomethyl ether pendants. In aqueous medium, this polymer also forms micelle like nano-assemblies capable of encapsulating hydrophobic guest molecules through supramolecular cross-linking. However, the encapsulation efficiency of this system is comparatively lower than that of the previously described polyurethane. This reduced performance is attributed to the absence of aromatic moieties, resulting in stabilization primarily through H bonding via urethane groups in addition to hydrophobic interactions.

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PP-33

Visible light induced alkyl chain dependant solid-to-solid or solid-to-liquid phase transition of thiazolylazopyrazoles as energy storage materials

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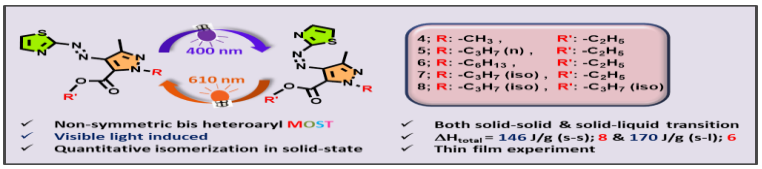
Abstract

MOlecular **S**olar **T**hermal (MOST) energy storage compounds, which can capture and store photon energy (solar energy) in strained chemical bonds via photoisomerization, have emerged as innovative materials. The stored energy can be released as heat on demand.[1] However, the energy storage densities are often hindered by the limited cyclability, the reliance on less abundant ultraviolet light within the solar spectrum, or the diminished charging and discharging rates, as well as the suboptimal photoconversion efficiencies in the solid state. Herein, we demonstrate an effective design strategy of photoswitchable phase change materials based on the nonsymmetric bis-heteroaryl thiazolylazopyrazoles (TAP) scaffold with small terminal substituents (Me, *i*-Pr, *n*-Pr, and *n*-Hex) at the pyrazole part. These compounds display high *trans-cis* and *cis-trans* photoconversion under visible light, fast isomerization rates, suitable thermal stability of the meta-stable *cis* isomer, fast charging/discharging efficiency in neat conditions, and impressive cyclability. Remarkably, *n*-Pr- and *n*-Hex-containing moieties undergo solid-to-liquid phase transition, and *i*-Pr-containing analogues show only solid-to-solid phase transition. These photoswitches exhibited energy storage density of 146 J/g in the solid-to-solid and 170 J/g in the solid-to-liquid phase transitions, which are substantially higher than that of many recently reported azobenzene-based MOST compounds.[2,3] To enlighten on the practical application, we have also embedded TAP photoswitch in PMMA polymer matrices and investigated their efficiencies as MOST materials, which might allow them to be applied as window laminates.[4] The design principles revealed in this work will help design effective and eco-friendly MOST material that operates in condensed phases.



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PP-34

Regioselective *β*-addition of Deconjugated butenolides to donor-acceptor cyclopropane: A Direct Access to *β,γ* -Disubstituted Butenolide Derivatives

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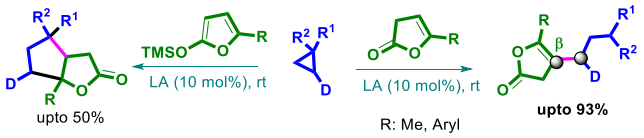
Abstract

Deconjugated butenolides such as *α*-angelica lactone has attracted extensive attention due to its easy accessibility and potential application in the construction of butenolides containing natural products and biologically active molecules.[1] Depending upon the reaction condition these lactones can exhibit nucleophilic reactivity through its α-, *β*-, or *γ*-position.[2] Here we report the first Lewis acid catalysed *β* -selective addition of *β,γ*-unsaturated-*γ*-butenolide to donor-acceptor cyclopropane(DAC) leading to the formation of *β,γ*-Disubstituted Butenolides.[3] *On the other hand, cyclopropanes containing donor and acceptor group at vicinal position(DAC),are useful synthons* in organic chemistry due to their unique reactivity and strained structure. The unique reactivity of DAC has been synthetically exploited to access large variety of 1,3-functionalized compounds including annulated products. Taking advantage of this unique reactivity pattern, we are able to achieve Lewis acid catalysed homo-Michael type addition of deconjugated butenolides to DAC where regioselective *β*-addition product was obtained significantly and at scalable amount.



Scheme 1. Reaction of deconjugated butenolides to DAC under Lewis acid catalysis.

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PP-35

Sustainable Oxidative Lactonization: First Mechanochemical Approach to Bioactive Fluorescent Phthalide Analogues

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Abstract

A stoichiometry-dependent, sustainable mechanochemical oxidative lactonization has been efficiently developed for the synthesis of a fluorescent phthalide analogue from (E)-alkyl 3-(2-formyl-3,4-dihydronaphthalen-1- yl)acrylates in the presence of ^{t}BuOOH, $NaClO_2$, and NaH_2PO_4. This step-economical lactonization involves the sequential oxidation of the –CHO group, oxa-Michael addition, and aromatization under simple solvent-free grinding conditions. A serendipitous formation of a fused cyclopentanone derivative was also observed, marking a noteworthy aspect of this study. Additionally, the Excited State Intramolecular Proton Transfer properties exhibited by the newly synthesized tricyclic lactones add a unique functional dimension to this sustainable protocol.

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PP-36

An Arylazoimidazole-based photoswitchable probe allowing visible-light-triggered rapid detection and imaging of live-cell biothiols via fluorophore release

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Abstract

Elevated levels of biothiols—cysteine, homocysteine, and glutathione—are found in Alzheimer's, cancers, or cardiovascular diseases.[1-2] The discovery of fluorescent probes that can selectively detect biothiols in living cells and organisms holds immense potential for early disease diagnosis.[3-4] Herein, we report a water-soluble biothiol-sensing fluorescent probe that is composed of a 2-(2-amino-5-alkoxyphenyl)benzothiazole fluorophore and a 2-arylazoimidazole photoswitch. Being a photochromic molecule, it exhibits reversible *trans-cis* photoisomerisation with high yields under visible light irradiation in aqueous media. In the initial state, the probe is non-fluorescent, and after incubation with biothiol solutions, both *trans* and *cis* isomers emit green fluorescence (φ_f = 10-19%) *via* azo bond cleavage. The limit of detection of biothiols varies between 2 and 17 μM concentrations. Remarkably, the cleavage of the *cis* azo-bond occurs at a much faster rate (8-14 times) than that of the *trans* isomer, allowing rapid detection of biothiols with a $t_{1/2}$ of 2.4-10 min. The water solubility of the probe permits live-cell fluorescence imaging of biothiols, where the *cis* isomer could produce adequate fluorescent cell images within 15 min of its post-treatment to the cell culture, but the *trans* isomer could not develop any images within this time frame. With the theoretical calculations and the estimation of pK_a of the azo unit, we have elucidated the mechanism of thiol-mediated azo bond cleavage. This type of photoswitchable turn-on fluorescent probe may permit biothiol imaging with enhanced bioavailability of the probe at the target site, spatiotemporal resolution, and high image contrast *via* background fluorescent signal subtraction.

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PP-37

Synthesis of carbazoles via aryl C-H activation triggered by surfactant associated PDNPs in water

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Abstract

The carbazole nucleus is one of the most important heterocyclic units found in both synthetic and naturally occurring alkaloids have antitumoral, antiproliferative, anticancer, anti-bacterial, anti-fungal, and anti-angiogenic activitie[1a]. Photophysical properties such as high hole-transporting efficiency and photoconductivity, offer their applications in optoelectronic materials such as in organic solar cells (OSCs), dye-sensitized solar cells (DSSCs) and organic light-emitting diodes (OLEDs) were shown by carbazole moiety[1b,1c]. An efficient method is reported to prepare functionalized carbazoles in excellent yields under mild conditions through microwave-assisted Pd-catalyzed aryl C-H activation of 2-iodo-*N*-arylanilines. Use of DBU (1,8-diazabicyclo[5.4.0]undec-7-ene) as base in water with CTAB as surfactant is found advantageous. Microwave is found beneficial to shorten the reaction time, improve yield, we also check this reaction at conventional thermal condition, 24h required for complete conversion. DBU act as a ligand as well as base, resulting in improved functional group tolerance and higher yields than those observed with inorganic or other nitrogen bases. Also done analytical study for characterization of PDNPs and kinetic study of the reaction to ensure usefulness of this new path of aryl C-H activation which lead us towards a library of carbazole moiety.

References

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