



DEPARTMENT OF CHEMISTRY

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HoD's Desk...

Myself, as the Head of the Department, welcome all to the 17th issue of the Department of Chemistry Newsletter "Chem News". The Department of Chemistry at Visvesvaraya National Institute of Technology stands as one of the pioneering departments established within our esteemed institution. With a legacy steeped in academic excellence and research innovation, our department has played a pivotal role in shaping the scientific landscape not only within the institute but also beyond its boundaries. Our faculty members, renowned for their expertise and commitment to teaching and research, spearhead numerous interdisciplinary initiatives that contribute significantly to advancing knowledge in various domains of chemistry. Beyond the classroom, our department serves as a crucible for nurturing the next generation of scientists and innovators, instilling in them the values of critical thinking, problem-solving, and ethical conduct. Moreover, our research endeavors span a wide spectrum, from fundamental studies elucidating the intricacies of chemical reactions to applied research addressing pressing societal challenges, thereby making tangible contributions to the fields of materials science, environmental sustainability, and healthcare. In this 16th issue of the Department Newsletter, we continue on our journey of academic and research excellence. We remain steadfast in our commitment to pushing the boundaries of scientific discovery and grooming future leaders who will drive positive change in the world through the transformative power of chemistry.



Mission & Vision

- Promote fundamentals of chemistry through UG and PG courses.
- Offer high end-research projects on concept-theory-practical topics.
- To establish excellent teachers, entrepreneurs and innovative independent researchers.
- Become a nationally recognised centre of chemical sciences.
- To establish state of art centralised research facility.

FACULTY MEMBERS

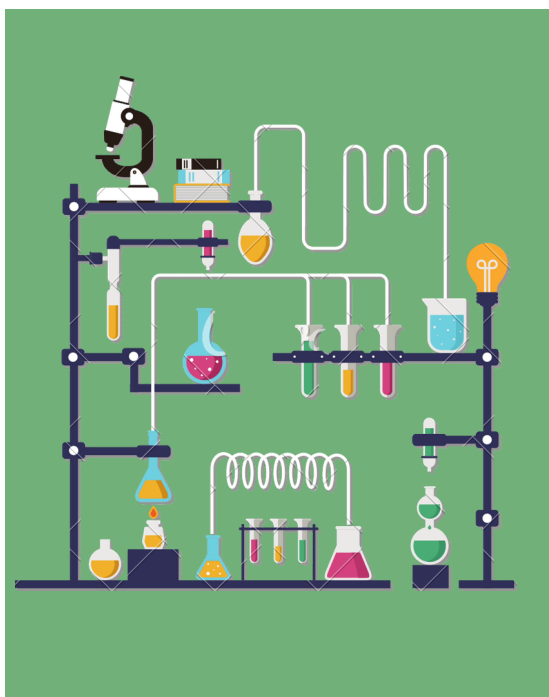
DR. SUJIT K. GHOSH (HoD)
 DR. SURESH S. UMARE
 DR. JAYANT D. EKHE
 DR. ANUPAMA KUMAR
 DR. RAMANI V. MOTGHARE
 DR. CHAYAN DAS
 DR. ATUL V. WANKHADE
 DR. UMESH R. PRATAP
 DR. SANGESH P. ZODAPE
 DR. SUSANTA K. NAYAK
 DR. S. LAXMI GAYATRI
 DR. ABHISHEK BANERJEE
 DR. SANDIPAN HALDER



UNVEILING OUR CHEMISTRY DEPARTMENT

>>> A CLOSER LOOK: CHEMISTRY DEPARTMENT

Department of Chemistry is one of the oldest departments in the Institute. This Department has been serving to cater to the needs of UG and PG level students of sciences and engineering discipline of various branches, in the field of chemistry, since long. Initially involved in the teaching of UG engineering, the department started the two years M.Sc. Programme in Chemistry in 2012. The Department has highly qualified faculty members who are actively engaged in R&D work in different areas of science and technology. Faculty members of the Department have been awarded various research fellowships and grants. Organizing and participation in national and international conferences, and publishing research work in various reputed journals are the regular activities of the Department. The faculties from the department have also authored many books, which are used regularly in course curricula at VNIT and other institutes.



>>> DISCOVERING DEPARTMENT EXCELLENCE

The department has been successful in obtaining Many R&D projects funded by different funding agencies which includes DST, SERB, MHRD, UGC, BRNS, CSIR, MoE and others. Some of the R&D projects have been completed by the department and some are currently under progress. More than fifty Ph.D. degrees have been awarded from the department while above forty students are currently pursuing their research work for Ph.D. Degree. The department has also been involved in Continuing Education programmes such as STTP courses, Seminars and conferences. Department has well equipped laboratories with modern instrumental facilities. Since 2017 the Department has had an unique distinction to be a DST-FIST Sponsored Department !!!



FACULTY MEMBERS

HONORARY TALKS

EXPANDING HORIZONS BEYOND OUR CAMPUS

DR. CHAYAN DAS



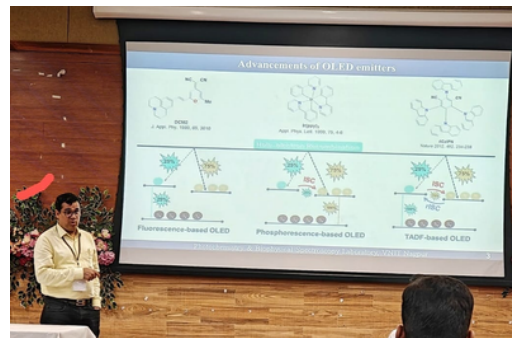
Dr. Chayan Das delivered an Invited talk titled, “Development of Recyclable and Self-Healing Elastomeric Composites via Ferric–Carboxylate Dynamic Crosslinking” in an International Conference on Chemistry for Sustainability (ICCS-2025) in the Department of Chemistry, IIT Hyderabad, from 13th to 16th July, 2025

DR. SUSANTA KUMAR NAYAK



Dr. Susanta K. Nayak delivered an invited talk on “Design and Synthesis of Indolizine–Based Molecules: Structural Analysis, Computational Insights, and Screening for Anti-Tubercular & Anti-Diabetic Activity” at the 52nd National Seminar on Crystallography and Drug Design (NSC-52), September 24–26, 2025, held at the Department of Bioinformatics, Pondicherry University.

PROF. SUJIT KUMAR GHOSH



Prof. **Sujit Kumar Ghosh** delivered an invited talk at M2ChemSF-2025, held from 4th to 6th September 2025 at the National Institute of Technology (NIT) Hamirpur. The talk was presented during the 4th International Conference on Materials to Chemistry for Sustainable Future (M2ChemSF-2025). The invitation reflects recognition of Dr. Ghosh's contributions to advanced chemical and materials research at the national level.

DR. ABHISHEK BANERJEE



Dr. Abhishek Banerjee was invited as a speaker and served as a Session Chair at the International Conference on Advanced Functional Materials and Applications (AFMA-2025), organized from 20th to 22nd February 2025 at BITS Pilani, K. K. Birla Goa Campus.

DOCTORAL TITLE UNVEILED

On september 15, 2025, Conferring degrees to Ph.D graduates in Chemistry



Mr. Piyush Singh

Ph.D. graduate conferred with Doctoral Degree under the guidance of Supervisor

Prof. Sujit Kumar Ghosh



Mrs. Prashu Jain

Ph.D. graduate conferred with Doctoral Degree under the guidance of Supervisor

Dr. Ramani Motghare



Mr. Adarsh Mourya

Ph.D. graduate conferred with Doctoral Degree under the guidance of Supervisor

Dr. Atul V. Wankhade



Mrs. Anuja Jain

Ph.D. graduate conferred with Doctoral Degree under the guidance of Supervisor

Dr. Sangesh Zodape



Ms. Shivali Singh Gaharwar

Ph.D. graduate conferred with Doctoral Degree under the guidance of Supervisor

Prof. Anupama kumar

CHEMISTRY FACULTY EXCELLENCE

>>> DR. SANDIPAN HALDER



(12) PATENT APPLICATION PUBLICATION		(21) Application No: 202521027673 A
(19) INDIA		
(22) Date of filing of Application: 25/03/2025		(43) Publication Date: 22/08/2025
(54) Title of the invention: METAL-FREE SYNTHESIS OF RACEMIC AND NON-RACEMIC FURO-[3,2-C]-QUINOLINES		
(51) International classification		(71) Name of Applicant:
(56) International Application No		1) Dr. Sandipan Halder
(57) International Publication No		Address of Applicant: Department of Chemistry, Visvesvaraya National Institute of Technology (VNIT), South Ambazari Road, Nagpur, Maharashtra Pin: 440010 India Nagpur
(61) Patent of Addition to Application Number		Name of Applicant: NA
(62) Divisional to Application Number		Address of Applicant: NA
(72) Name of Inventor:		1) Dr. Sandipan Halder
(73) Name of Inventor:		Address of Applicant: Department of Chemistry, Visvesvaraya National Institute of Technology (VNIT), South Ambazari Road, Nagpur, Maharashtra Pin: 440010 India Nagpur
(74) Name of Inventor:		2) Dr. Koushik Das
(75) Name of Inventor:		Address of Applicant: Department of Chemistry, Visvesvaraya National Institute of Technology (VNIT), South Ambazari Road, Nagpur, Maharashtra Pin: 440010 India Nagpur
(57) Abstract:		
This invention presents a metal-free, direct synthesis method for F-[3,2-c]-quinoline (F-[3,2-c]-Q) derivatives, utilizing hypervalent iodine reagents. The method offers a versatile and efficient approach to overcome challenges associated with substrate scope limitations, stereoselectivity, and environmental concerns in existing synthetic methodologies. The process involves a carefully optimized series of steps, including the use of cross-dehydrogenative coupling under blue LED light, iodine and hypervalent iodine as mediators, and room temperature reaction conditions in a nitrogen atmosphere. The invention significantly contributes to the field by providing a reliable and sustainable pathway for accessing F-[3,2-c]-Q derivatives, addressing critical issues for the development of efficient synthetic strategies.		
No. of Pages: 49 No. of Claims: 8		

A patent titled “Metal-Free Synthesis of Racemic and Non-Racemic Furo-[3,2-c] Quinoline” has been successfully published by the Indian Patent Office. The patent application (No. 202521027673 A), filed on 25 March 2025, was published on 22 August 2025. The invention, developed by **Dr. Sandipan Halder (Assistant professor)** and **Dr. Koushik Das** from the Department of Chemistry, Visvesvaraya National Institute of Technology (VNIT), Nagpur, presents a sustainable, metal-free synthetic approach for furo-[3,2-c]-quinoline derivatives using hypervalent iodine reagents under mild conditions. This innovation offers an environmentally friendly and efficient route with significant potential in advanced organic synthesis and pharmaceutical research.

STUDENTS EXCELLENCE



>>> MS. SAKSHI BARAD

Ms. Sakshi Barad, Research Scholar from the Department of Chemistry, under the supervision of **Dr. Atul V. Wankhade**, secured the First Position in paper presentation for her work titled at the 8th National Conference (CHEMIX 25) on Intra and Inter Disciplinary Blend of Chemical Engineering, organized by the Indian Institute of Chemical Engineers, Nagpur Regional Centre, and the Department of Chemical Engineering, VNIT Nagpur.



>>> MR. ADARSH KUMAR MOURYA

The research work of **Adarsh K. Mourya**, Research Scholar from the Department of Chemistry, under the supervision of **Dr. Atul V. Wankhade**, has been featured as the cover art in the prestigious ACS journal Industrial & Engineering Chemistry Research. The study presents the design of DFNS/WO₃ nanocomposites synthesized via a hydrothermal route for enhanced photocatalytic oxygen evolution.



RESEARCHER SPOTLIGHT: LATEST PUBLISHED WORK

- Investigating PFOS-induced structural changes and aggregation in hen egg white lysozyme: spectroscopic and molecular insights, Rushali Dudure, Ritika Joshi, Pulak Pritam, Alok Kumar Panda, **Sujit Kumar Ghosh**, Manojkumar Jadhao, Journal of Biomolecular Structure and Dynamics, 2025, 1–19. Taylor & Francis.
- Memory element and data security platforms using self-sufficient molecular assembly through concentration-reliant photo-switching: A latent trait of semicarbazone Schiff base. Journal of Fluorescence, 2025, 1–17. Springer US, **Subham Chattopadhyay**, Piyush Singh, Subham Das, **Sujit Kumar Ghosh**.
- Impact of 4-Aminopyridine on Ferric-ion Mediated Cross-linking of Carboxylated Nitrile Butadiene Rubber, **Shalini Bhattacharya**, Suraj W Wajge, Shrima Bera, Pradip K Maji, Shiva Singh, **Chayan Das*** Polymer, 328, 128429 (2025) (Elsevier) <https://doi.org/10.1016/j.polymer.2025.128429>.
- Evaluation of mesomorphic and photoresponsive behavior for the alkoxy cyano-azobenzene based side chain liquid crystalline polymers and their halogen bonded complexes, **Omkar Dash**, Jyoti Swarup Thakur, Pradip Kumar Mondal, Maurizio Polentarutti, and **Susanta K. Nayak**. Journal of Molecular Liquids (2025): 433, 127893.
- Larvicidal activity, molecular docking, and structural analysis of methoxyindolizine-1-carboxylate derivatives." **Rahul D.Nagdeve**, Pran Kishore Deb, Khatendra T. Reang, Gourav Rakshit, Sandeep Chandrashekharappa, Pradip Kumar Mondal, Maurizio Polentarutti, Raquel M. Gleiser, Osama I. Alwassil, Rajendra Maharaj, Katharigatta N. Venugopala, Viresh Mohanlall and **Susanta K. Nayak**, Journal of Molecular Structure (2025): 1344, 142919.
- Moving Beyond Organosilanes: Tris (hydroxymethyl) aminomethane as a Superior Surface Modifier for Zirconia in NBR Composites **Surabhi S Raut**, Shubham C Ambilkar, Bharat P Kapgate, Amit Das, Subhradeep Mandal, Anik Kumar Ghosh, **Chayan Das*** Polymer, 328, 128405 (2025) (Elsevier) <https://doi.org/10.1016/j.polymer.2025.128405>.
- Development of vitrimer-based reusable prosthetic materials **Suraj W Wajge**, Ashutosh Bagde, Bhupesh Sarode, **Chayan Das*** Molecular Systems Design & Engineering 10, 472–482 (2025) (RSC) <https://doi.org/10.1039/D4ME00173G>
- Development of Zn²⁺ Mediated Hydrogel with Reversible and Dynamic Crosslinking Network **Paresh Nageshwar**, Gopal Lal Dhakar, Shiva Singh, Pradip K Maji, **Chayan Das*** Polymers for Advanced Technologies 36 (4), e70176 (2025) (Wiley) <https://doi.org/10.1002/pat.70176>.

RESEACHER SPOTLIGHT: LATEST PUBLISHED WORK

- Cascade Upgrading of Biomass-Derived Levulinic Acid to γ -Valerolactone (GVL): A Biofuel Precursor over a Zr-Coordinated Hydrothermal Carbon Sphere via Catalytic Transfer Hydrogenation, **Kamleshwar L. Patle**, Pooja Pardhi, Rakesh Kumar Tripathy, **Jayant D. Ekhe**, Kailas L. Wasewar, Industrial & Engineering Chemistry Research, 2025, 64 (45).
- Betacyanin-enriched pectin/gellan gum films for real-time mushroom freshness. **Diksha Lingait**, **Anupama Kumar**, International Journal of Biological Macromolecules, 2025, 145334. Elsevier.
- Circular bioeconomy approach for the recovery of polyphenols and dietary fibres from orange pomace waste, Nupur Srivastava, **Anupama Kumar**, Shilpshri V Shinde, Amrat Pal Singh, Karuna Shanker, Sustainable Chemistry and Pharmacy, 2025, 45, 102038.
- Sulfamic acid coupled polymeric carbon nitride: an efficient photocatalyst for degradation of tetracycline hydrochloride and supercapacitor application, **Pritam Ramteke**, Toshali Bhoyar & **Suresh S. Umare** Journal of Nanoparticle Research, Springer.
- Thermodynamic and Compressibility Studies of Naphazoline Hydrochloride in Aqueous and Aqueous L-Valine Solutions: Insights into Molecular Interactions and Aqueous L-Valine Solutions: Insights into Molecular Interactions and Solvation Behavior, Vandana S Shende, Mahesh B, Vandana Patel, Ratiram G Chaudhary, **Sangesh P Zodape**, Journal of Chemical & Engineering Data, 2025, 70(8), 3123–3139. American Chemical Society.
- Exploring the Molecular Interactions between D-Glucose and Imidazolium-Based Ionic Liquid in Aqueous Media at T = (288.15–318.15) K through a Physicochemical Approach, **Ankita Chandak**, **Sangesh Zodape**, Journal of Chemical & Engineering Data, 2025, 70(5), 1956–1970. American Chemical Society
- Volumetric and Compressibility Studies of an Antimycobacterial Drug in Aqueous and Aqueous D-Glucose Solutions at Various Temperatures. Shende, V. S.; Jain, A.; Mahesh, B.; **Sangesh Zodape**, Journal of Chemical & Engineering Data, 2025, 70(5), 1918–1929. American Chemical Society.
- Molecular Interactions of 1-Butyl-2,3-Dimethylimidazolium Chloride Ionic Liquid in Aqueous L-Alanine Solutions through Volumetric and Compressibility Approaches. **Vandana Patel**, Anuja Jain, **Sangesh Zodape**, Journal of Ionic Liquids, 2025, 5(1), 100140. Elsevier.
- Advanced Palladium-Hybrid Covalent Organic Framework: A Highly Efficient Catalyst for Sustainable Cascade Synthesis of Chromeno[2,3-d]pyrimidine-8-amines. **Ankit Verma**, B. Nayak, P. Jaiswal, S. Sahay, Shivani Bhagat, **Umesh Pratap**, Reactive and Functional Polymers, 2025, 106424. Elsevier.
- Harnessing Synergy: Immobilized Cu(II) and Pd(II) Species on Magnetic Silica-Coated Copper Ferrite for A^3 and Sonogashira Coupling Reactions. **Shivani Bhagat**, Sneha Wahurwagh, Ankit Verma, **Umesh Pratap**, Applied Surface Science, 2025, 687, 162264. North-Holland.
- Amino Acid Derived Hydrogen Bond Donor (HBD) Catalyst for the Synthesis of Cyclic Carbonates and Cyclic Dithiocarbonates: Experimental and Computational Studies **Supratim Halder**, Koushik Das, Saumik Sen, and **Sandipan Halder*** Asian J. Org. Chem. 2025, 0, e00244. (DOI: 0.1002/ajoc.202500244).
- The Cyclic 48-Tungsto-8-Phosphate [H7P8W48O184] 33-Contant-Tézé Polyanion and Its Derivatives [H6P4W24O94] 18-and [H2P2W12O48] 12-: Structural Aspects And Reactivity Sib Sankar Mal, **Abhishek Banerjee**, Ulrich Kortz Dalton Transactions 54, 5208 – 5233.
- A Mixed Metallic and Mixed Valent MoV(4)V(IV)2V(III)2 Complex as Electron Transfer Photo-Catalyst for Hydrogen Evolution Reaction, **Kalyankumar S. Morla**, Dewendra Thakre, Adarsh K. Mourya, Piyush Singh, Harsha S. Karnamkkott, Subuhan Ahamed, Subham Sahoo, Ishita Bhattacharya, Siddhartha Banerjee, Debajit Sarma, Kartik Chandra Mondal, Sujit Kumar Ghosh, Atul V. Wankhade and **Abhishek Banerjee**, Chemical Communications 61, 8919–8922.

Nobel Prize in Chemistry

The 2025 chemistry laureates

CHEM NEWS ISSUE 20



SUSUMU KITAGAWA



RICHARD ROBSON



OMAR M. YAGHI

The Nobel Prize in Chemistry 2025 was awarded jointly to **Susumu Kitagawa, Richard Robson and Omar M. Yaghi** "for the development of metal–organic frameworks". Metal–organic frameworks (MOFs) are porous materials in which metal ions and long carbon–based molecules form crystals with built–in cavities. By varying the building blocks, specific substances can be captured and stored inside the cavities. Following pioneering work by Richard Robson, around the turn of the millenium, Omar Yaghi and Susumu Kitagawa developed more flexible and stable MOFs. These are possible to use, for example, to harvest water from desert air, capture carbon dioxide, store toxic gases or catalyse chemical reactions.

EDITORIAL BOARD

DR. ATUL V. WANKHADE

ASSOCIATE PROFESSOR
avwankhade@chm.vnit.ac.in

Ms. SAKSHI R. BARAD

RESEARCH SCHOLAR
sakshibarad5@gmail.com