Message from HoD's Desk…

CHEM NEWS Issue 12

A Newsletter from the Department of Chemistry, VNIT Nagpur, 2022, **Issue 12**

Published on 15th DECEMBER, 2022

DOWN TO CHEMISTRY…

Welcome to the Department of Chemistry, VNIT Nagpur! We, the Department of Chemistry, feel our enthusiasm to publish the **12th issue** of our departmental newsletter, "***CHEM NeWS***". I, as a head of the department would like to thank all the faculty members, non-teaching staffs and students for their limitless support and sincere efforts for the betterment and development of department. On this occasion, I congratulate all the team members of the editorial board for bringing up this issue in a better shape.

Overview of the Department…

*Department of Chemistry has started the journey from the inception of the institute, initially it has been serving to cater the need of engineering students of various branches. The Department started new program for undergraduate (B.Tech.) in Chemical Engineering in the year of 2006. Later on, the post-graduation program (M.Sc.) in Chemistry for two years duration was commenced in the year of 2012. More than sixty Ph.D. degrees have been awarded till 2019. At present thirty students are pursuing their research work to attain their doctoral degree. The highly motivated students, who understand the research dynamics and upgrade their skills, are strengthening the department's back bone. In their curriculum they are encouraged to take part in different projects to supplement theoretical knowledge with practical experiences. In order to interact with the outside world, the department has active collaboration with the academic as well as research organizations in India and abroad. The department is organizing Continuous Educational Events like STTP courses, Seminars, and conferences. The curriculum is taught by the distinguished faculty members with the combination of academic excellence and diverse research exposure in working different areas of science and technology with complete dedication and commitment. The research field includes Organic synthesis, Solid state chemistry, Crystal engineering and Nano-materials, Polymers and elastomeric composites, Inorganic Chemistry, Photo-catalysis and Bioinorganic Catalysis, Biophysical Spectroscopy and Photobiology, Chemical Thermodynamics, Resource Recovery and Environmental remediation, Bio-catalysis and Organic Chemo-Sensor, Electro-analytical Chemistry. The faculty members of the department have been awarded various national and international research fellowships. They have also authored many books and participated in national and international conference. The publication of their research works in various SCI index journals are the regular activities of the Department. Many R&D projects are being funded by different funding agencies viz. SERB, DST, MHRD, UGC, BRNS, CSIR, etc. Department has well-equipped laboratories with modern instrumental facilities and has been recognized by **DST-FIST** Sponsored Department since 2017!*

FACULTY MEMBERS

DR. ANUPAMA KUMAR (HoD)
DR. SURESH S. UMARE
DR. JAYANT D. EKHE
DR. SUJIT K. GHOSH
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

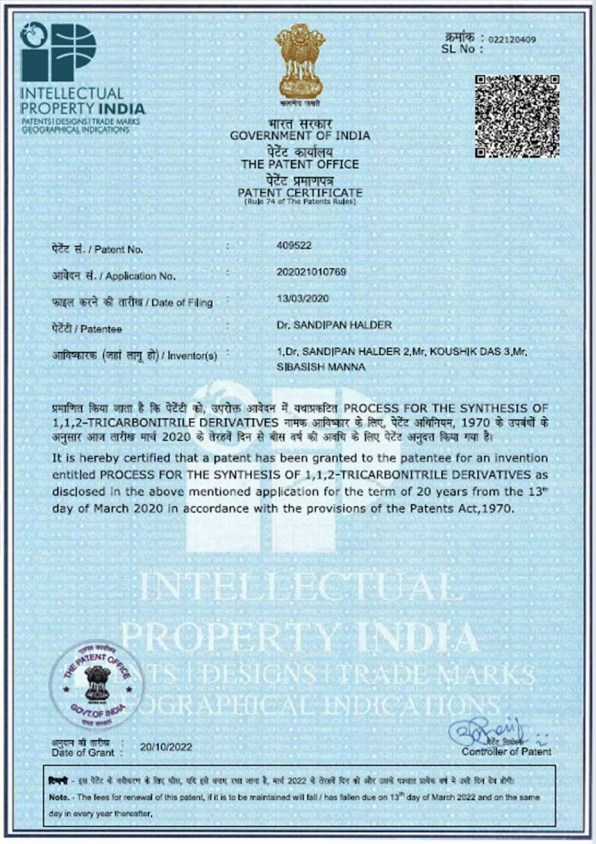
Recent Publications…

1. "Accelerating NADH Oxidation and Hydrogen Production with Mid-Gap States of Nitrogen-rich Carbon Nitride Photocatalyst", Toshali Bhoyar, Dong Jin Kim, B. Moses Abraham, Akanksha Gupta, Nagesh Maile, Nilesh R. Manwar, Surendar Tonda, Devthade Vidyasagar, **Suresh S. Umare,** iScience, **2022,** 12, 103557.
2. "Valorization of potato peel waste: Recovery of p-hydroxy benzoic acid (antioxidant) through molecularly imprinted solid-phase extraction", Ranjita S. Das, V. N Mohakar, **Anupama Kumar**; Environmental Science and Pollution Research, **2023,** 30, 19860–19872.
3. "Light-assisted coupling of phenols with CO_2 to 2-hydroxybenzaldehydes catalyzed by a gC_3N_4/NH_2-MIL-101 (Fe) composite", S Bhatt, RS Das, **A Kumar,** A Malik, A Soni, SL Jain; Catalysis Science & Technology, **2022,**12, 6805-6818.
4. "Exploration of Vanadium(IV)-based Single-Ion Magnet Properties in Diphosphonate Supported Mixed valent Polyoxovanadates", Pragyansh Singh, Sören Schlittenhardt, Dewendra Thakre, Saroj Kumar Kushvaha, Sunil Kumar, Harsha S. Karnamkkott, Mario Ruben, Masooma Ibrahim, **Abhishek Banerjee***, Kartik C. Mondal,* Cryst. Growth Des., **2022,** 22, 5666−5679.
5. "Hervé- and Krebs-Type Magnetic Polyoxometalate Dimers", Aleksandar Kondinski,* **Abhishek Banerjee,*** and Sib Sankar Mal,* Magnetochemistry **2022,** 8, 96−119.
6. "Synthesis of Functionalized Five-Membered Heterocycles from Epoxides: A Hydrogen-Bond Donor Catalytic Approach", Koushik Das, **Sandipan Halder,*** J. Org. Chem. **2022.** https://doi.org/10.1021/acs.joc.2c00902.

Patent Grant…

- Indian Patent Awarded on "**PROCESS FOR THE SYNTHESIS OF 1,1,2-TRICARBONITRILE DERIVATIVES**" on **20th October, 2022** (Patent No. **409522**)

  The invention relates to a process for the syntheses of ethene-1,1,2-tricarbonitrile derivatives having significant electrical and magnetic properties. The synthesis of such tricarbonitrile derivatives was obtained using a nontoxic cyanide source in the presence of a Hydrogen Bond Donor (HBD) catalyst and co-catalyst tetrabutylammonium iodide (TBAI).



INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS | GEOGRAPHICAL INDICATIONS

क्रमांक : 022120409
SL No :

भारत सरकार
GOVERNMENT OF INDIA
पेटेंट कार्यालय
THE PATENT OFFICE
पेटेंट प्रमाणपत्र
PATENT CERTIFICATE
(Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No.	:	409522
आवेदन सं. / Application No.	:	202021010769
फाइल करने की तारीख / Date of Filing	:	13/03/2020
पेटेंटी / Patentee	:	Dr. SANDIPAN HALDER
आविष्कारक (जहां लागू हो) / Inventor(s)	:	1.Dr. SANDIPAN HALDER 2.Mr. KOUSHIK DAS 3.Mr. SIBASISH MANNA

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित PROCESS FOR THE SYNTHESIS OF 1,1,2-TRICARBONITRILE DERIVATIVES नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख मार्च 2020 के तेरहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled PROCESS FOR THE SYNTHESIS OF 1,1,2-TRICARBONITRILE DERIVATIVES as disclosed in the above mentioned application for the term of 20 years from the 13th day of March 2020 in accordance with the provisions of the Patents Act,1970.

INTELLECTUAL PROPERTY INDIA
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THE PATENT OFFICE GOVT OF INDIA

अनुदान की तारीख / Date of Grant : 20/10/2022

Controller of Patent

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, मार्च 2022 के तेरहवें दिन को और उसके पश्चात प्रत्येक वर्ष के उसी दिन देय होगी।

Note. - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 13th day of March 2022 and on the same day in every year thereafter.

Invited Talks…

- **Dr. S. S. Umare** has delivered an invited talk entitled "**Ag/AgO-gC3N4 and Ph-gC3N4 for Energy and Environmental Applications**" organized by Dept. of Chemical Engineering VNIT Nagpur Nonmaterial and Nanotechnology-2022 on **6th July 2022**.
- **Dr. Anupama Kumar** delivered an invited talk on "Chitosan Based Composite for remediation of multiple emerging contaminants" at the International e-Conference on Biopolymers during **14th -16th July, 2022** organized by Asian Polymer Association and Indian Chitin and Chitosan Society.
- **Dr. S. S. Umare** has delivered an invited talk entitled "**Climatic Cresses and Sustainable Development**" at Department of Pharmacy, RTM Nagpur University Nagpur during **10th–12th October, 2022**.

- **Dr. Anupama Kumar** was invited as the chief guest for the inauguration of the chemical society of SFS College Nagpur. She has delivered a talk on **"Sustainability through Molecular imprinting-Idea, Concept and Execution"** on **28th September, 2022.**

- **Dr. S. K. Nayak** delivered an invited talk entitled "**Supramolecular C≡N···I halogen bonded liquid crystalline molecules**" at the 49th National Seminar on Crystallography held during **28th-30th** November 2022 organized by the University of Jammu in association with the Indian Crystallographic Association.

- **Dr. Abhishek Banerjee** has delivered an invited talk at National Seminar on Chemical Sciences (NSCS) 2022 at St. Xavier's College (Autonomous), Kolkata on **16th September 2022**.

- **Dr. Abhishek Banerjee** has delivered an Invited talk on **30th November, 2022** at 49th National Seminar on Crystallography (NSC) 2022 - University of Jammu, Jammu.

- **Dr. Sandipan Halder** has delivered an invited talk entitled as "**Development of Organocatalytic Domino Protocol: Stereoselective Synthesis of Heterocycles"** at International Symposium on Recent Trends and Future Opportunities in Pharmaceuticals (**PHARMACON 2022**). The symposium was organized by National Institute of Pharmaceutical Education and Research (NIPER), Mohali during **10th – 12th November, 2022**.

Achievements…

- **Dr. Chayan Das** has received a **Prototype Development Grant (NewGen IEDC)** under the aegis of National Science & Technology Entrepreneurship Development Board (NSTEDB), Department of Science and Technology, Govt. of India, New Delhi for **1 year** (**2022-23**) duration with funding of **2.5 Lakhs**.
- One article published by the research group of **Dr. Chayan das** in Polymers for Advanced Technologies (Wiley) (Polym. Adv. Technol. 31 (12), 3059-3069; (2020) has been recognized as the ***Top cited article*** during ***2020-2021***.

Joining of Research Associate…

- **Dr. Nupur Srivastava** has joined the department of Chemistry, VNIT Nagpur as an ICMR Research Associate (letter No. 3/1/2/228/2021-Nut.) dated on 17th **August, 2022)** under the mentorship of **Dr. Anupama Kumar,** on **26th August, 2022.** The funding has been granted by The Indian Council of Medical Research (**ICMR**). Govt. of India with total funding of 17.52 Lakhs. Her proposal entitled, "**Sustainable valorization of citrus waste to design innovative nutraceutical resources via molecular imprinting technique for metabolic stress management**".

Conference Participation…

- **Mr. Suraj Wajge** delivered oral presentation entitled, "**Fe (III) based crosslinking in carboxylated nitrile rubber**" in the National Symposium on "Functional Materials for Sustainable Development organised by The National Academy of Sciences, India (NASI), Nagpur Chapter and Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur, during **10th-12th October 2022**.
- **Mr. Suraj Wajge** presented poster entitled, "**Carboxylate coordination based crosslinking in XNBR**" in the International Conference on Frontier Areas of Science and Technology (ICFAST-2022), University of Hyderabad, Hyderabad, India, during **9th-10th September 2022**.
- **Mr. Shubham C. Ambilkar** presented poster entitled, "**Reinforcing Nitrile Rubber Composites by Zirconia**" in the National Symposium on "Functional Materials for Sustainable Development" organized by The National Academy of Sciences, India (NASI), Nagpur Chapter and Rashtrasant Tukadoji Maharaj Nagpur University (RTMU), Nagpur, during **10th-12th October 2022**.
- **Mr. Jyoti Swarup Thakur** received the best poster award at the 49th National Seminar on Crystallography (NSC 49) held during **28th-30th** November 2022, organized by the University of Jammu in association with the Indian Crystallographic Association on topic "**Photo responsive Halogen Bonded L iquid Crystalline Complexes of Cyano alkoxy azobenzene systems**".

Doctoral Degree…

- **Ms. Ranjita S. Das** successfully defended her Ph.D. thesis, entitled "**Designing Carbon Based Composites for Environmental Applications**" on **18th July 2022**, under the supervision of **Dr. Anupama Kumar** and **Dr. Atul V. Wankhade**.

Training Program…

Department of Chemistry, VNIT, Nagpur have successfully conducted, "A One Week Training Program on Characterization using sophisticated Instruments (**STUTI-CSI-2022**)", under the scheme Synergistic Training program Utilizing the Scientific and Technological Infrastructure (**STUTI**), DST-India This program is jointly organized by Visvesvaraya National Institute of Technology (VNIT), Nagpur (SPOKE) & National Institute of Technology, Warangal (HUB) during **08**th-**14**th August, **2022** and supported by DST, India.

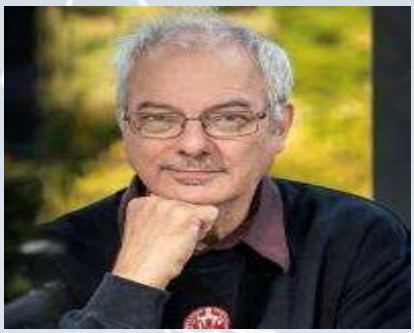
Thirty-five shortlisted participants from various disciplines covering Chemistry, Physics, and Chemical, Mining and Mechanical Engineering have participated from different city and rural areas of India including reputed institutes such as (IIT BHU, SVNIT and NIT, Warangal for this training program. Theory and demonstrations of various scientific instruments in the Department of chemistry were arranged for hands on experience of the participants Hon'ble Director, VNIT, Nagpur, **Prof. Pramod M. Padole**, Chief Guest and Chairman of this program, Guest of Honor was **Prof. V. Rajeswar Rao**, Dean (R & C, NIT Warangal, and Co-chairman of this program.

Following speakers were delivered expert lectures in this program:

- **Dr. V. Rajeswar Rao**: ***Theory session on FTIR***
- **Dr. Abhishek Banerjee:** ***Theory and Hands on Training session on FTIR***
- **Dr. Jayant D. Ekhe:** ***Theory and Hands on Training session on GC-MS***
- **Dr. Sushanta K. Nayak:** ***Theory and Hands on Training session on PXRD & POM***
- **Dr. A. Ramesh Kumar:** ***Theory session on HPLC***
- **Dr. Atul V. Wankhade:** ***Theory and Hands on Training session on*** **UV-DRS**
- **Dr. Suresh S. Umare:** ***Theory and Hands on Training session on BET***
- **Dr. Anupama Kumar:** ***Theory and Hands on Training session on HPLC***
- **Dr. Ramani V. Motghare:** ***Theory and Hands on Training session on POTENTIOSTAT***

THE NOBEL PRIZE IN CHEMISTRY

Carolyn Bertozzi
Professor in the School of Humanities and Sciences & Baker Family Director of Stanford ChEM-H at Stanford University, USA.



Morten Peter Meldal
Professor in the Department of Chemistry, University of Copenhagen, Denmark.

Karl Barry Sharpless
Professor in the Department of Chemistry, The Scripps Research Institute, USA.

The Nobel Prize in Chemistry 2022 was awarded to Carolyn Bertozzi, Morten Meldal and **Barry Sharpless** for their contribution in the functional form of chemistry named as ***click chemistry*** and **bio-orthogonal reactions** in which molecular building blocks snap together quickly and efficiently.

K. Barry Sharpless – who is now being awarded his second Nobel Prize in Chemistry – started the ball rolling. Around the year 2000, he coined the concept of click chemistry. **Morten Meldal** and **Barry Sharpless** – independently of each other – presented what is now the crown jewel of click chemistry: the copper catalyzed azide-alkyne cycloaddition. This is an elegant and efficient chemical reaction that is now in widespread use. Among many other uses, it is utilized in the development of pharmaceuticals, for mapping DNA and creating materials those are suitable for this purpose.

Carolyn Bertozzi utilized click chemistry to a new level of application to map important but elusive biomolecules on the surface of cells – glycans – she developed click reactions that work inside living organisms. Her **bio-orthogonal reactions** take place without disrupting the normal chemistry of the cell.

Editorial Board

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