NEWSLETTER

DEPARTMENT OF CHEMISTRY

(DST FIST SUPPORTED)

BIT MESRA, RANCHI

ChemOreiká

(JULY-DECEMBER ‘24)

Editors:
Dr. Sumit Mishra
Dr. Joydeep Dhar

Student Editors:
Abhijit Pingal Sanga
Nipun Tirkey

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DEPARTMENT OF CHEMISTRY

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DEPARTMENT OF CHEMISTRY

CURRENT FACULTY PROFILE

The faculty members from the Department of Chemistry are engaged in research in pure chemistry, applied and interdisciplinary areas of all branches of chemistry, specializing in emerging materials for various applications from biomaterials, environmental remediation, energy harvesting materials, composites, sensors, supercapacitors, drug discovery and molecular modelling to theoretical chemistry and quantum chemistry research.

SPECIALIZATION IN CHEMISTRY

INORGANIC

Dr. Sumit Mishra

Dr. Subhendu Naskar

Dr. Barnali Dasgupta Ghosh

Dr. Deep Shikha

Dr. Atul Kumar

RESEARCH AREAS:
Biopolymers & Biomaterials, Coordination Chemistry, Bioinorganic Chemistry, Nanomaterials & Nanocomposites, Supramolecular Chemistry.

PHYSICAL

Prof. P. K. Chattaraj

Dr. Gautam Sen

Dr. S. S. Mahapatra

Dr. Joydeep Dhar

Dr. Debdutta Chakraborty

RESEARCH AREAS:
Computational Chemistry, Electrochemistry, Polymers, Energy Materials.

ORGANIC

Prof. Ashoke Sharon

Dr. Pradip Kar

Dr. Anirban Pradhan

RESEARCH AREAS:
Medicinal Chemistry,Molecular Modeling and Drug Design, Sensor Materials, Novel Aromatics, Materials for Energy Production and Storage

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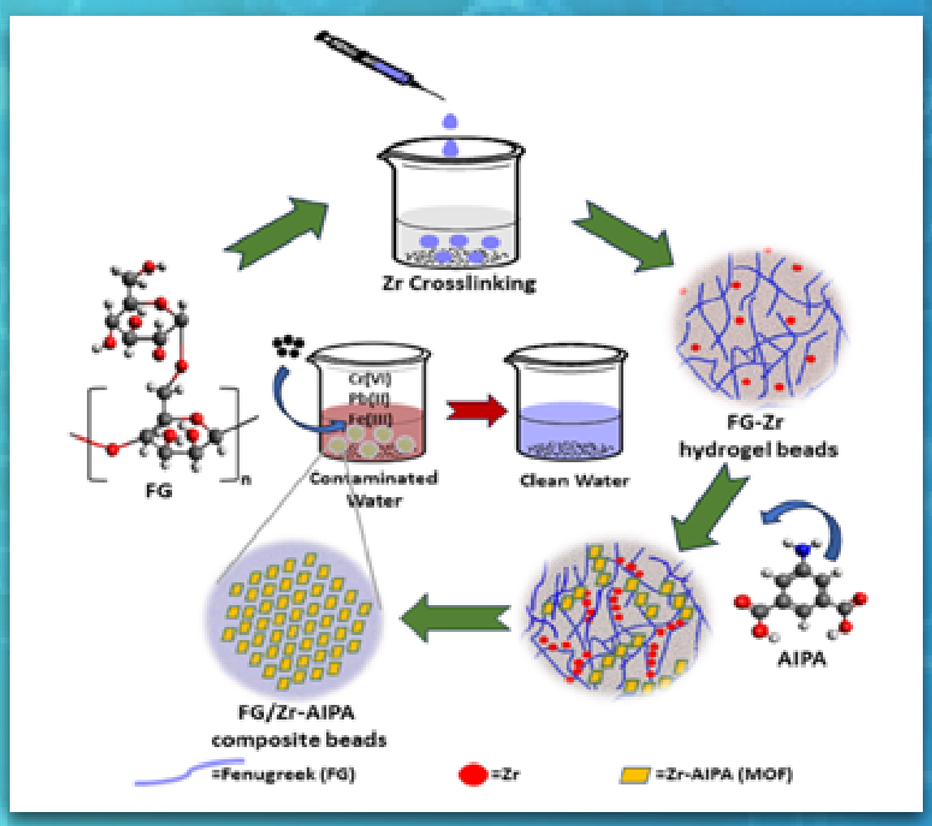
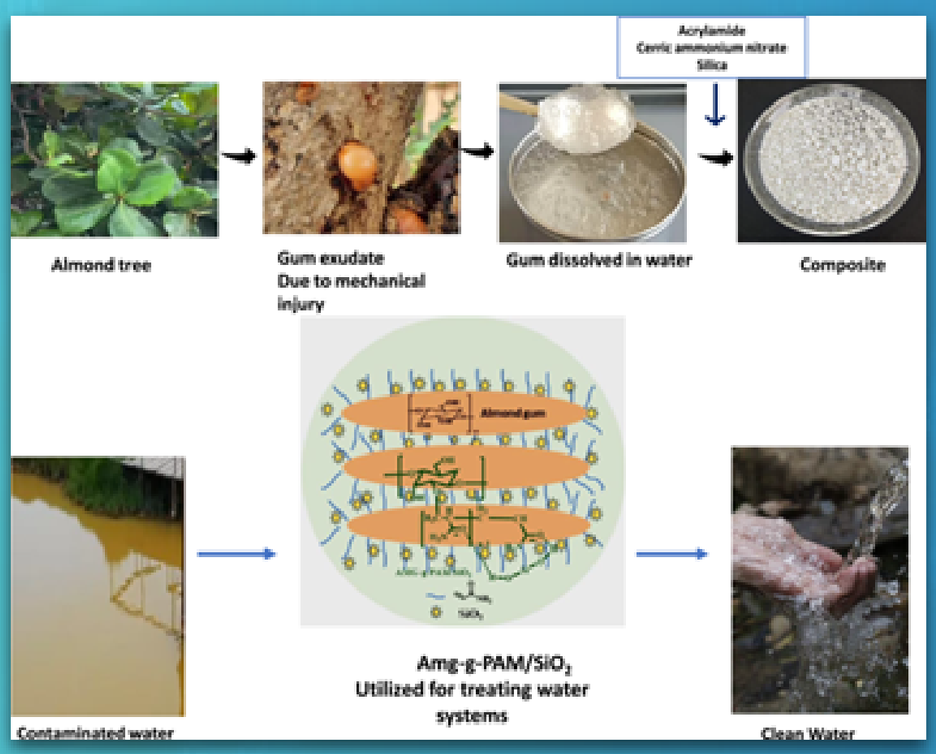
DR. SUMIT MISHRA RESEARCH GROUP

RESEARCH HIGHLIGHTS



Metal Organic Framework for heavy metal removal



Biopolymer-based hybrid material for water treatment

Current Research Scholars

Adya Jha, Mansi Srivastava, Munmun Choudhary, Asmita De, Nipun Tirkey, Ruchi Mishra, Sonika Bara.
IMsc project student: Nistha Mukhopadhayay

Research Objectives

We are working on modification of bio-polymers, biomaterials, metal organic frameworks, and hybrid materials for water remediation, matrices for drug and nutrient release, sustainable packaging and emerging materials for other applications.

Recent Patents and Publications

1. A biopolymer-based hydrophobic adhesive and method of synthesis thereof, Sumit Mishra, Nisha Kumari; Indian Patent Application No. 202431002972 A. Date of filing: 15/01/2024, Publication date: 02/02/2024
2. A method for synthesizing a new fluorescent Metal-organic framework, Sumit Mishra, Asmita De; Indian Patent Application No. 202431018460 A. Date of filing: 14/03/2024, Publication date: 22/03/2024
4. Exploring the potential of waste biomass-derived pectin and its functionalized derivatives for water treatment A Jha, S Mishra. International Journal of Biological Macromolecules, 133613
5. Silica Functionalized Almond Gum Derivatives for Integrated Flocculation Cycles for Natural and Synthetic Water Systems, M. Choudhary, S Mishra. Journal of Polymers and the Environment, 1-21
6. Synthesis of fenugreek gum-based metal–organic framework (FG/Zr-AIPA MOF) composite beads for sequestration of heavy metal ions from aqueous solution. A De, S Mishra Environmental Science and Pollution Research, 1-17

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DEPARTMENTAL ACTIVITIES

Awareness Workshop about Career Prospects in Chemistry (SERB supported)

An educational visit was organized for the students of Chiranjeevee Concept School, Kanke, Ranchi on on 9th August, 2024. The visit aimed to encourage research culture among young minds.

Programme Cordinator: Dr. Barnali Dasgupta Ghosh

दैनिक भास्कर रांची 11-08-2024

चिरंजीवी के छात्रों ने बीआईटी मेसरा का शैक्षणिक भ्रमण किया

रांची| चिरंजीवी कॉन्सेप्ट स्कूल होचर के छात्रों ने शनिवार को बीआईटी मेसरा का शैक्षणिक भ्रमण किया। यहां छात्रों ने वेट लैब तथा परिष्कृत उपकरणों का भ्रमण किया एवं उनके बारे में जानकारियां ली। लाइब्रेरी देखी और कक्षा ग्यारहवीं तथा बारहवीं के विद्यार्थियों को रसायन विज्ञान विषय से संबंधित करियर विकल्प और नौकरी के अवसरों के बारे में भी बताया।

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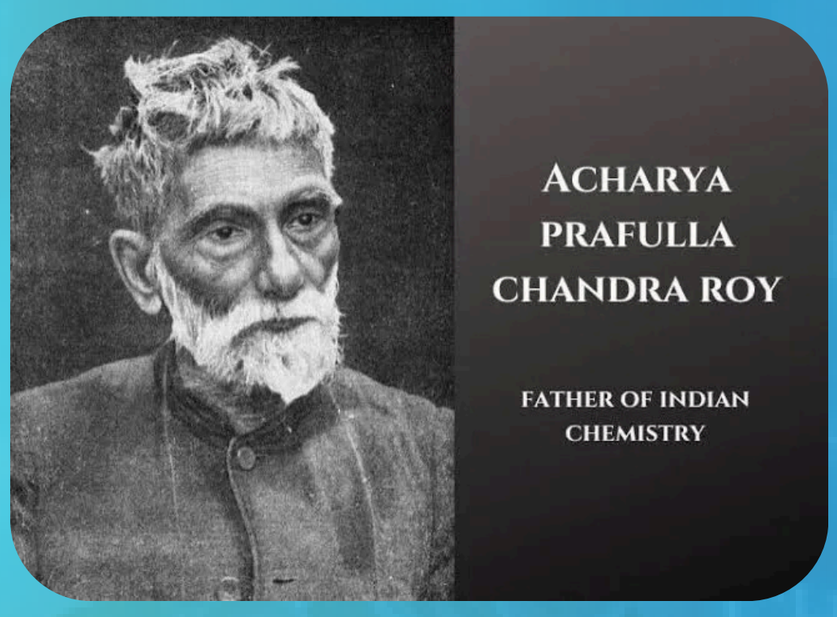
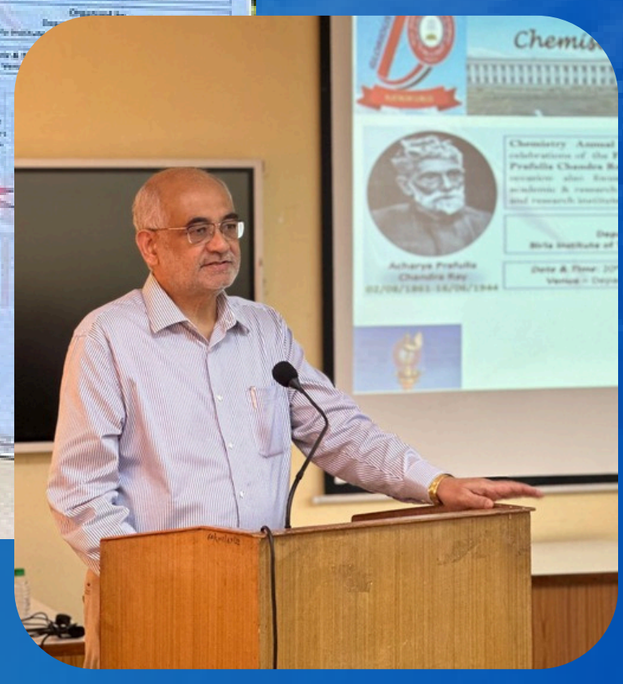
DEPARTMENTAL ACTIVITIES

Chemistry Annual Day
(20th August, 2024)



"The Chemistry Annual Day" was celebrated to commemorate the birth anniversary of Acharya Prafulla Chandra Ray, a pioneer of modern chemistry in India, highlighting his contributions to the field of chemistry.

As part of the Chemistry Annual Day celebrations esteemed professionals from the field were invited for an interactive talk session accompanied by a vibrant poster presentation showcasing scholars work.



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DEPARTMENTAL ACTIVITIES

International Conference on Advances in Materials and Chemical Sciences (AMCS-24) (18th -20th December)

A three day International Conference on Advances in Materials and Chemical Sciences (AMCS-24) was held from 18th -20th December in association with Materials Research Society of India (Jamshedpur Chapter).

Patron: Dr. Indranil Manna (Hon'ble Vice Chancellor)
Chairman: Dr. Ashoke Sharon (Dean of Faculty Affairs)
Convener: Dr. Sumit Mishra (Head, Dept. of Chemistry)
Organizing Secretary: Dr. Barnali Dasgupta Ghosh, Dr. Pradip Kar

The conference covered the following broad areas:

- Advanced Glass and Ceramics
- Advanced Blends and Composites
- Advanced Green Materials
- Advanced Molecular System
- Advances in Chemical Sciences
- Energy and Functional Materials
- Emerging and Hybrid Materials
- Materials in Interdisciplinary Domains
- Engineering Materials
- Advanced Biomaterials
- Advanced Polymers

PRESS MEET

बीआईटी मेसरा में एडवांसेस इन मैटेरियल्स एंड केमिकल साइंसेज पर अंतरराष्ट्रीय सम्मेलन

- शोध पर चर्चा के साथ झारखंड की संस्कृति और पर्यटन की मिलेगी जानकारी

खबर मन्च ब्यूरो

रांची। बीआईटी मेसरा में रसायन विभाग ने अंतरराष्ट्रीय सम्मेलन : एडवांसेस इन मैटेरियल्स एंड केमिकल साइंसेज का आयोजन किया है। मैटेरियल्स रिसर्च सोसाइटी ऑफ इंडिया के सहयोग से यह 18 से 20 दिसंबर तक होगा। बीआईटी मेसरा परिसर में आयोजित सम्मेलन में शोधकर्ता, अकादमिक विशेषज्ञ, उद्योग पेशेवर और छात्र शामिल होंगे। उन्नत सामग्री और रासायनिक विज्ञान में नवीनतम प्रगति का अन्वेषण करेंगे। वे शोध पर चर्चा करने के साथ झारखंड की संस्कृति और पर्यटन के बारे में भी जानेंगे। सम्मेलन मुख्य भाषण, पूर्ण सत्र, आमंत्रित व्याख्यान और प्रस्तुतियों के माध्यम से ज्ञान-साझाकरण, सहयोगी अवसरों और उन्नत सामग्री व रासायनिक विज्ञान में अंतःविषय नवाचारों का मंच प्रदान करेगा।

सम्मेलन में प्रमुख अतिथि प्रोफेसर डॉ सुशांत बनर्जी, इंस्टीट्यूट चेयर प्रोफेसर, सेंट्रल रिसर्च फैसिलिटी (एमएसडी) के अध्यक्ष और भारतीय प्रौद्योगिकी संस्थान, खड़गपुर में मैटेरियल्स साइंस सेंटर के पूर्व प्रमुख शामिल होंगे। बीआईटी मेसरा के कुलपति डॉ इंद्रनील मन्ना इस सम्मेलन के संरक्षक हैं। सम्मेलन के आयोजन के लिए नेतृत्व करने वाली टीम में डॉ अशोक शरण, डीन ऑफ फैकल्टी अफेयर्स, बीआईटी मेसरा (अध्यक्ष), डॉ सुमित मिश्रा, हेड, रसायन विज्ञान विभाग (आयोजक), प्रो. प्रतीम चट्टराज, डिस्टिंग्विश्ड विजिटिंग प्रोफेसर (वरिष्ठ सलाहकार) और डॉ प्रदीप कर और डॉ बर्णाली दासगुप्ता घोष, रसायन विज्ञान विभाग, बीआईटी मेसरा (संगठन सचिव) शामिल हैं।

सम्मेलन में इन विषयों पर होगी चर्चा

ऊर्जा पॉलिमर, ऊर्जा ग्लास और सिरेमिक्स, ऊर्जा मिश्रण और कंपोजिट्स, ऊर्जा बायोमटेरियल्स, ऊर्जा हरित सामग्री, ऊर्जा आणविक प्रणालियां, सतहविज्ञान में प्रगति, ऊर्जा और ऊर्जावान सामग्री, ऊर्जा और जैव सामग्री, ऊर्जा विविध डोमेन में सामग्री और इंजीनियरिंग सामग्री पर चर्चा होगी।

डॉ समित मिश्रा ने बताया कि सम्मेलन विशेषज्ञों के साथ बातचीत करने का एक अनूठा मंच प्रदान करता है, जिसमें उन्नत सामग्री में नवीनतम शोध और विकास पर अंतर्दृष्टि प्राप्त की जा सकती है। प्रतिभागी मूल्यवान ज्ञान अर्जित करेंगे, सहयोगी अवसरों का पता लगाएंगे। इस क्षेत्र में नवीनतम खोजों और नवाचारों को समझने के दायरे का विस्तार करेंगे। यह सम्मेलन सामग्री और रासायनिक विज्ञान में कार्यरत शोधकर्ताओं, शिक्षाविदों और छात्रों के साथ उन पेशेवरों के लिए एक अमूल्य अनुभव है। इसमें पेटेंट और स्टार्टअप पर भी चर्चा होगी। यूके, कनाडा, जर्मनी, न्यूजीलैंड, साउथ अफ्रीका, हांगकांग सहित अन्य देश से विशेषज्ञ आएंगे। सांस्कृतिक कार्यक्रम का आयोजन किया जाएगा। प्रतिभागियों को झारखंड की खूबसूरत स्थलों दर्शन भी कराए जाएंगे।

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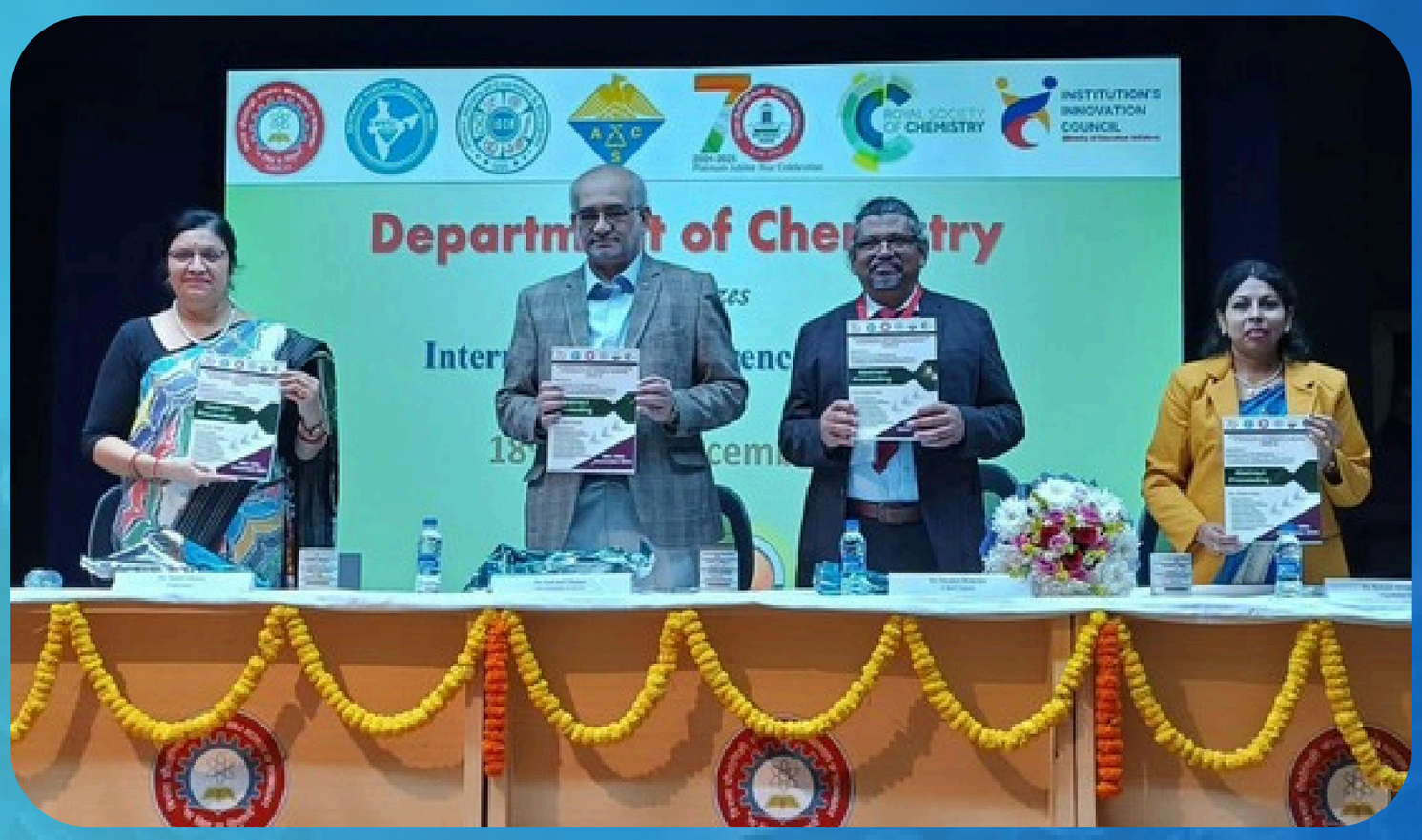
DEPARTMENTAL ACTIVITIES

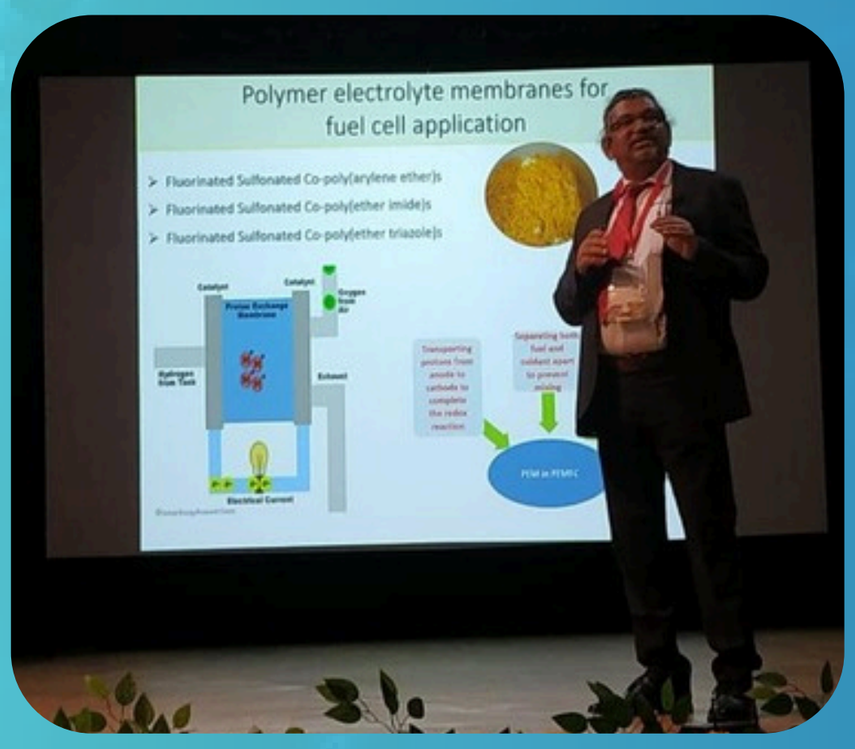
AMCS-24 (18th December) Day I



Inaugration ceremony of AMCS-24

The event was inaugurated with the ceremonial lighting of the lamp, symbolizing the dispelling of darkness and the beginning of knowledge and enlightenment.

Dr. Indranil Manna (Hon'ble Vice Chancellor felicitating the esteemed Chief Guest (Dr. Susanta Bnerjee) with a token of appreciation.



Chief Guest: Dr. Susanta Banerjee

(HAG) & Institute Chair Professor Chairperson Central Research Facility (MSD) Materials Science Centre, IIT Kharagpur.

He presented an insightful lecture on Semi-Fluorinated High-performance Polymers: Membrane Based Applications.

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DEPARTMENTAL ACTIVITIES

AMCS-24 (18th December) Day I

Keynote Speaker: Dr. Seema Agarwal.

Professor, University of Bayreuth Bayreuth, Bayern, Deutschland.

She delivered a talk on the topic: Sustainable polymer design principles for tackling plastic pollution.

Keynote Speaker: Dr. Pratim K. Chattaraj

Distinguish Visiting Professor, Dept of Chemistry, BIT Mesra Ex Professor, Chemistry, IIT Kharagpur.

He delivered an engaging lecture on All-metal aromaticity and Hydrogen storage .

Keynote Speaker: Dr. Trilochan Mishra

CSIR NML Jamshedpur

His talk focused on the Green Hydrogen: Role of defects on 2D heterojunction photocatalyst.

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DEPARTMENT OF CHEMISTRY

DEPARTMENTAL ACTIVITIES

AMCS-24 (18th December) Day I

Invited Lecturers

- **Dr Sagar Pal**

Professor, Department of Chemistry IIT ISM Dhanbad

Topic: Polymeric Gels and Micelles: An Overview from Synthesis to Applications.

- **Dr. Pradip Maji**

Professor, Polymer and Process Engineering, IIT Roorkee

Topic: Unveiling the Potential of Nanocellulose: A Comprehensive Evaluation of its Performance and Applications in Sustainability.

- **Dr. Prasanth Raghavan**

Cochin University of Science & Technology

Topic: Rational Design and Fabrication of Smart Textiles based Energy Harvesting and Storage Devices for a Sustainable Future.

- **Dr. Sunanda Roy**

Mechanical Engineering, Alliance University, Bangalore

Topic: Unlocking Potential in Waste: Sustainable Methods for Driving Product Innovation

- **Dr. Samarendra Maji**

SRM Institute of Science and Technology

Topic: Detection and Catalytical Reduction of Biologically and Environmentally Relevant Analytes: Polymer-Based Approaches.

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DEPARTMENT OF CHEMISTRY

DEPARTMENTAL ACTIVITIES

AMCS-24 (18th December) Day I

Invited Lecturers

- **Dr Amiya Priyam**

Professor, Central University of South Bihar

Topic: Hollow Plasmonic Nanocrystals: Soft Synthesis, Vis-to-NIR tunability and Some Interesting Applications

- **Dr Chayan Das**

Department of Chemistry, Visvesvaraya National Institute of Technology, Nagpur.

Topic: Ferric assisted crosslinking of Elastomer and role of organic bases therein.

- **Dr. Upendranath Nandi**

Professor, Department of Physics Scottish Church College, Kolkata

Topic: Probing the Internal Dynamics of Energy Storage Systems with Electrochemical Impedance Spectroscopy.

- **Dr. Debasish Panda**

Professor, C. V. Raman Global University, Bhubaneshwar

Topic: Nanoscale nociceptor using binary oxide based transparent memristor.

- **Dr. Ganesh Basak**

Hindalco Industries Limited Belagavi Works:Post Bag 1, Karnataka .

Topic: Alumina Trihydrate: A Versatile Flame-Retardant Material.

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DEPARTMENTAL ACTIVITIES

AMCS-24 (18th December) Day I

CULTURAL NIGHT

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DEPARTMENTAL ACTIVITIES

AMCS-24 (19th December) Day II

Keynote Speakers

- **Prof. Sabu Thomas**

Mahatma Gandhi University Kottayam, Kerala

Topic: Circular Economy: New Opportunities in Sustainable Nano Materials and Polymer Bio-Nanocomposites.

- **Dr. Vijay Kr Thakur**

SRUC UK

- **Dr. Kheng Lim Goh**

Director of Research, Mechanics of Composite Materials Newcastle University in Singapore

Topic: Advancements and Sustainability in Composite Materials: Driving innovation across industries & some case studies on manufacturing by 3D printing .

Invited Lecturers

- **Dr. Gajendra Prasad Singh**

Department of Metallurgical & Materials Engineering (Formerly Dept of Nanoscience and Technology), Central University Jharkhand

Topic: Hererojunctions photocatalysts for photocatalytic water splitting hydrogen evolution .

- **Dr. Kalisadhan Mukherjee**

Department of Chemistry Pandit Deendayal Petroleum University, Gandhinagar

Topic: Understanding the interactions of gas phase toxic analytes with nano-structured SMO chemiresistors

- **Dr. Prabhat K. Jaiswal**

Department of Physics IIT Jodhpur

Topic: Kinetics of wetting and phase separation of mixtures: effect of surface potential and mixture composition.

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DEPARTMENT OF CHEMISTRY

DEPARTMENTAL ACTIVITIES

AMCS-24 (19th December) Day II

Invited Lecturers

- **Dr. Devdutta Chaturvedi**

Professor and Dean at Mahatma Gandhi Central University

Topic: Versatility of Triarylphosphine Based Reagents in Syntheses of Biologically Potent Scaffolds"

- **Dr. Pratyoosh Shukla Professor**

School of Biotechnology, Institute of Science, Banaras Hindu University

Topic: Microalgal biotechnology from genomics to biopolymers, an emerging insight

- **Dr. Abhilash**

Senior Principal Scientist & Associate Professor (AcSIR)Group CSIR NML, Jamshedpur

- **Dr. R. K. Dey.**

Professor & Head, Department of Chemistry, Central University of Jharkhand

Topic: Hectorite supported hybrid metal oxide(s) as new, efficient, and recyclable catalyst(s) for biodiesel production – Optimization study using Response Surface Methodology (RSM)

- **Dr. Indra Bahadur**

Professor of Physical Chemistry, FNAS, North-West University South Africa

Topic: Green Solvents: Alternative for Sustainable Development

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DEPARTMENT OF CHEMISTRY

DEPARTMENTAL ACTIVITIES

AMCS-24 (19th December) Day II

Invited Lecturers

- **Dr. Abhijeet Kumar**

Department of Chemistry Mahatma Gandhi Central University

Topic: Design and Development of Pyrazole based soluble epoxide hydrolase inhibitor: A discovery of potential drug against Niemann-Pick disease type C (NPC).

- **Dr. Sangeetha Dharmalingam**

Director, Centre for Composite Materials Professor of Chemistry, Anna University

Topic: Functionalized Polymer and Nanofillers as novel Polymer Nanocomposite Membranes for Microbial Fuel Cells

- **Dr. Palanivelu**

Centre for Climate Change and Environment School of Civil Engineering, VIT Chennai Campus, Chennai

Topic: Separation of CO2 from flue gas with Polymeric Composite Membranes

- **Dr. Vishal Mishra**

School of Biochemical Engineering IIT (BHU)

- **Dr. Ratnesh Das**

Department of Chemistry Dr. Harisingh Gour Central University Sagar

Topic: Nanomaterial a Versatile Innovation: As a Electrochemical Sensor, Catalyst & Electrode Material

- **Dr. D. S. Bag**

Scientist of Polymer Materials, DMSRDE (DRDO), Kanpur

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DEPARTMENTAL ACTIVITIES

AMCS-24 (20th December) Day III

Invited Lecturers

- **Dr. Salini Divya**

CEO & Co-Founder, Tasmanlon

Topic: Moving to affordable and safer aluminium-ion batteries

- **Dr. Anupam Ghosh.**

Department of Management, BIT Mesra

Topic: Sustainable Business and Startups

- **Dr. Bipin Kumar Gupta Senior**

Principal Scientist CSIR NPL, New Delhi

Topic: Indigenous Development of Strategic Luminescent Materials formulated Security Ink for Societal Benefits to Make Self-Reliant India

- **Mr. Suraj Prakash**

Chief Executive Officer of TEXMIN, IIT, ISM Dhanbad

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AMCS-24 (20th December) Day III

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ACHIEVEMENTS

- **Dr. Barnali Dasgupta Ghosh received institute award for “Highest funded Project 2023”.**

Project: Electrospun PVDF based piezoelectric nanocomposite energy harvesters for self-powered smart wearable and implantable electronics.

SERB funded (45 Lacs)

- Ms. Anindita Mukherjee (PHD/AC/10051/20) won the best oral presentation award in the 4 Research Colloquium (RESCOL-IV).
- Ms. Sadhana Kundu won the best poster award in the 4 Research Colloquium (RESCOL-IV).

- Mr. Vishal Singh won the best poster presentation award at (AMCS-24).

- Mr. Mukul Deo won the 2nd best poster presentation award at (AMCS-24).

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ONGOING PROJECTS

S.No.	Project Title	PI	Funding Agency	Sanctioned Amount (Lacs)
1	Bottom-up solution phase synthesis of curved polycyclic aromatics, nanographene, carbon nanoribbons and nanobelts for next-generation optoelectronics.	Dr. Anirban Pradhan	SERB-DST	31.18
2	Metal organic frameworks and sequential electrocoagulation for remediation of mining effluents.	Dr. Sumit Mishra	SERB	25.01
3	Biocompatibility and mechanical studies of nanostructured HAP, metal doped nanostructured HAP on alumina by RF Magnetron Sputtering.	Dr. Deep Shikha	SERB	27.72
4	Photo-responsive tetra-aryl pyrazole based emissive organic nano-cage as an artificial-light harvester for heterogeneous photocatalysis.	Dr. Atul Kumar	SERB-DST	31.76
6	Electrospun PVDF based piezoelectric nanocomposite energy harvesters for self-powered smart wearable and implantable electronics.	Dr. Barnali Dasgupta Ghosh	SERB	45

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DEPARTMENT OF CHEMISTRY

ONGOING PROJECTS

Sl. No.	Project Title	PI	Funding Agency	Sanctioned Amount (Lacs)
6	Electrospun PVDF based piezoelectric nanocomposite energy harvesters for self-powered smart wearable and implantable electronics.	Dr. Barnali Dasgupta Ghosh	SERB	45
7	Investigating the Effect of Molecular Doping in Halide Perovskites Based Energy Harvesting Devices.	Dr. Joydeep Dhar	SERB-DST	30.09
8	Polyphenylenediamine/silver hybrid based non-enzymatic gutamate sensor.	Dr. Pradip Kar	SERB ANRF	26.65
9	Development of Low cost Electrocatalysts for the Hydrogen production by Water Splitting	Dr. Subhendu Naskar (PI)/ Dr. S. S. Mahapatra (CO-PI)	SERB ANRF	44.16

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DEPARTMENT OF CHEMISTRY

RESEARCH FACILITIES

The Department of Chemistry is equipped with several state-of-the-art laboratories with advanced instruments.

The Department houses many sophisticated instruments for in-house and collaborative research

- NMR Spectrometer (400 MHz),
- UV-vis spectrophotometer,
- IR spectrometer,
- Solar simulator,
- Sourcemeter
- Microwave reactor,
- Rotary evaporator,
- Polarimeter,
- Electrochemical analyzer and others

Recently, new instrumentation facilities were added to the department:

- UV-Vis Spectrophotometer from Shimadzu was installed on 30th August 2024.

UV-Vis Spectrophotometer

ChemOreiká

DEPARTMENT OF CHEMISTRY