



ASSOCIATION OF CHEMISTRY TEACHERS NEWS LETTER

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Promoting Excellence in Chemistry Education

Association of Chemistry Teachers

News Letter, January - April 2024

Contents of the News Letter : Issue - 28

1.	From Editorial Desk and Editorial Board Members	02
2.	Honorary Members of ACT	03
3.	Report of Activities of ACT	
	i) National Science Day 2024 Stem School, Vidhya Nagar, Guntur	04
	ii) Handwritten Science Magazine Pragyan released on National Science Day	06
	iii) National Science Day at CPS International School, Morena	08
	iv) SRM Institute of Science & Technology, Chennai Report of National Science Day	09
	v) Training Program on Interactive Methods of Teaching	11
	vi) Five days Online Faculty Development Program on “Nanotechnology and Its Applications”	12
4.	One Day National Conference on "frontiers In Chemical and Pharmaceutical Sciences for the Development of Novel Therapeutics-2024".	13
5.	Report of Two Day Workshop on “Framing of Innovative Questions”	15
6.	Report of ICFM - 2024	17
7.	Report of GWB - 2024	19
8.	CONTECH 2023-24: A Report	32
9.	The (H,H ₂) Exchange Reaction	36
10.	Academic Participation of ACT Members	39
11.	Views, News and more	
	1. Lithium and More	40
	2. Why do we shed tears when we chop onions?	41
12.	List of ACT Life memberships	42
13.	Life Membership Form of ACT	44



From Editorial Desk

Prof. Wasudeo Gurnule

Editor

Kamla Nehru Mahavidyalaya,
Nagpur, Maharashtra.



I welcome the Newsletter of issue 28, January-April 2024, as an efforts undertaken by editor and editorial board members. Wishing you a very happy, healthy and prosperous New Year 2024. The Editorial Board members has put in its bit of efforts, to make the newsletter as attractive and informative as possible. We are happy to inform you that the contribution of ACT ranges from International Olympiads, Organizing International and National Conferences, demonstration of new interesting experiments, oral and poster presentation by teacher participants. Apart from several regional level conferences and symposia, workshops are also held for the benefit of post-graduate and research students. The present issue of Newsletter includes the reports on the ACT activities, trends in chemistry and scientific news. We tried to direct the attention of our readers towards research trends taking place across the globe so as to motivate them to take up initiative in re-orienting themselves towards sustainability. We have also included reports on National and International Chemistry events. This issue also contains the reports of Global Women Breakfast, GWB -2024 organized by different zones across the country.

I take this opportunity to say many, many thanks to all my Editorial Board Members for their whole hearted co-operation extended to me.

With warm regards to one and all

Members of Editorial Board

- ▶ **Prof. Dr. Brijesh Pare**, Govt.Madhav Science College, Ujjain
- ▶ **Prof. Dr. Damodar V. Prabhu**, Wilson College, Mumbai
- ▶ **Dr. Hemant Khanolkar**, Fr. Conceicao Rodrigues College of Engg., Mumbai
- ▶ **Prof. Dr. M. Swaminathan**, KARE, Krishnankoil
- ▶ **Dr. Subhash P. Singh**, A.N.College, Patna
- ▶ **Dr. Hemant Pande**, Formerly Hislop College, Nagpur
- ▶ **Dr. Rakhi Gupta**, IIS (deemed to be University) Jaipur
- ▶ **Dr. Umesh C. Jain**, Academic Heights Public School, Morena
- ▶ **Dr. Gitimoni Deka**, Rangia College, Rangia
- ▶ **Dr. Helen Kavitha**, SRM Institute of Science and Technology, Chennai
- ▶ **Dr. Vijay P. Singh**, N.C.E.R.T. New Delhi
- ▶ **Dr. Mannam Krishnamurthy**, Varsity Education Management Limited, Hyderabad
- ▶ **Prof. Dr. Sudesh Ghoderao**, RNC Arts, JDB Commerce and NSC Science College, Nashik Road, Nashik

Honorary Members of ACT

We have great pleasure in bringing the updated list of honorary members of Association of Chemistry Teachers, who are sources of inspiration, guidance and support in activities of ACT.

The editorial board of ACT News Letter is proud of the academic achievements of these legendary honorary members.

Bharat Ratna Prof. C.N.R. Rao, FRS

National Research Professor : Linus Pauling Research Professor,
Jawaharlal Nehru Centre for Advanced Scientific Research, Jakkur, Bengaluru - 560 064
E-mail : cnrrao@jncasr.ac.in



Padma Vibhushan Prof. M.M. Sharma, FRS

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Padma Vibhushan Dr. R.A. Mashelkar, FRS

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President, Global Research Alliance, National Chemical Laboratory, Pune - 411 008.



Dr. Nitya Anand

Former Director, CSIR-Central Drug Research Institute, Lucknow.
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Former Vice-Chancellor, North Maharashtra University, Jalgaon.
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Padma Shri Prof. Dr. G. D.Yadav,

National Science Chair, SERB, New Delhi
Emeritus Professor of Eminence, Institute of Technology, Mumbai
Former Vice Chancellor, Institute of Technology, Mumbai
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Prof. Dr. A. K. Bakhshi

Chairman, National Resource Centre for Chemistry, MoE, GOI
Chairman, Guru Angad Dev Teaching Learning Centre for e-Learning,
SGTB Khalsa College, University of Delhi, Delhi
Founder Vice Chancellor, PDM University, Bahadurgarh, Haryana
Email : akbakhshi@yahoo.com



Prof Dr John Warner

Father of Green Chemistry and Coauthor of 12 Principles of Green Chemistry with
Prof Paul Anastas President and Chief Technology Office, Warner-Babcock Institute for
Chief Chemistry President, Beyond Benign
Distinguished Professor of Green Chemistry, Monash University, USA
Email : john_warner@uml.edu



Report of Activities of ACT

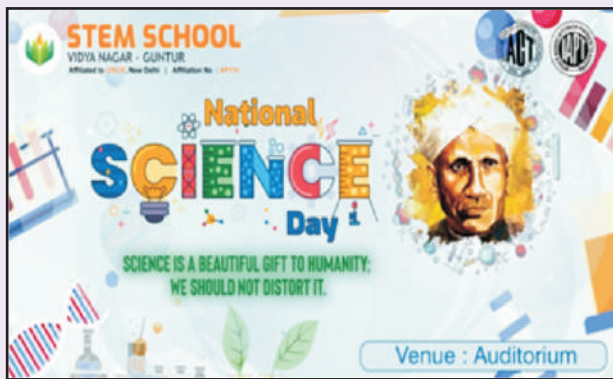
NATIONAL SCIENCE DAY 2024 STEM School, Vidhya Nagar, Guntur, A.P.

National Science Day was celebrated at **STEM School**, Vidhya Nagar, Guntur, A.P. State with the support of **Association of Chemistry Teachers (ACT)** and **IAPT**, during **26-28, February 2024**. **Dr. Mannam Krishna Murthy**, Secretary ACT South zone coordinated these celebrations. Talent search tests were conducted, in four standards, coordinated by **Mr Alapati Dillep**, ACT life member from Vikas Education group, Bhubaneswar and 346 students registered for these tests.

About 70 students prepared exhibits, based on simple concepts of Science. The exhibition was inaugurated by **Fr. Y.J.R.B. Reddy** on 28, February 2024 forenoon and about 500 students of near by school visited these exhibits in the afternoon.

There were two invited presentations on the concepts of science, one is a ppt by **Dr. Mannam Krishna Murthy**, Varsity Education Management Ltd., Hyderabad and another demo experimentation by **Mr. U. LakshmanaSuri**, Sri Chaitanya Educational Institutions, Vijayawada.

In the concluding session, students interacted with resource persons. Winners of the test were rewarded. A certificate of participation and a free book of "Experimentation in Physical Science" were presented to all registered students.



Event banner of NSD 2024 organised at STEM school, Guntur



Mr U Lakasmana Suri, performing an open demo of Spectrum



Dr Mannam Krishna Murthy was felicitated by school management



A portion of science exhibits by students of STEM School, Guntur

Handwritten Science Magazine Pragyan released on National Science Day 28 February 2024

National Science Day was celebrated by Eureka Science Club and Association of Chemistry Teachers (ACT) in Government Education College, Ujjain. On this day, on 28 February 1928, the great scientist Dr. C.V. Raman dedicated the important discovery of Raman Effect to the nation. He was awarded the Nobel Prize in 1930. On this occasion, Dr. Sandeep Nadkarni, Assistant Professor of the college, addressed the academic members of the college. Started the program by garlanding and offering prayers to the picture of Mother Saraswati.

Program coordinator Dr. Yogendra Kumar Kothari said that on this occasion, the lives and achievements of various scientists were highlighted by the B.Ed and M.Ed trainees, including. Dr. C.V. Raman, Dr. Homi Jahangir Bhabha, Dr. Vikram Sarabhai, Dr. Hargobind Khurana, Dr. S. Chandrashekhar, Dr. A.P.J. Abdul Kalam, Dr. J.C. Bose, Dr. P.C. Roy, Dr. Ramakrishna Venkatraman, Dr. K. Kasturirangan, Dr. M.S. Swaminathan, Dr. S. Somnath, Dr. S.N. Bose, Aryabhata, Charak, Sushruta, Nagarjuna, Vagabhatta and Patanjali etc. are prominent.

In Seminar, Gorishankar Palasia, Jugalkishore Malviya, and Amol Gosavi secured first, second and third places respectively.

On the occasion of National Science Day, the handwritten science magazine "Pragyan" prepared by Eureka Science Club was released by Assistant Professor Sandeep Nadkarni and Dr. Yogendra Kumar Kothari with college academic staff and science club members. College Principal Dr. Rajeev Pandya extended warm wishes to everyone on National Science Day and congratulated the winning participants and all the members who contributed in writing the magazine. Vote of Thanks was given by Science Club President, Smt. Pallavi Namdev.



Group Photo

Quiz Competition

Eureka Science Club and Association of Chemistry Teachers (ACT) organized Quiz competition in Govt. College of Education, Ujjain (M.P) on 19th February in which questions based on general knowledge, science, sports, education, literature, and latest events were asked to the participants.

As per the instructions of Principal Mr. Dr. Rajeev Pandya, the participants for the quiz competition were selected through a test paper on 15th February, in which 103 participants took part. The 16 participants who scored the highest marks in this examination were selected in order of merit. 8 teams were formed on 16th February by the Quiz Master Dr. Yogendra Kumar Kothari and his associate Mr. Pradeep Punjabi by casting lots.

Harshita Tomar and Bhagwat Rao of Vararuchi team secured the first position. Santosh Rathore and Kundanlal Mandovar of Kshapanak team secured second place. Yogendra Singh and Deepa Sharma of Ghatkarpar team and Nidhi Jain and Tina Ujjaini of Kalidas team secured third place. Participation certificates were provided to the winning teams.

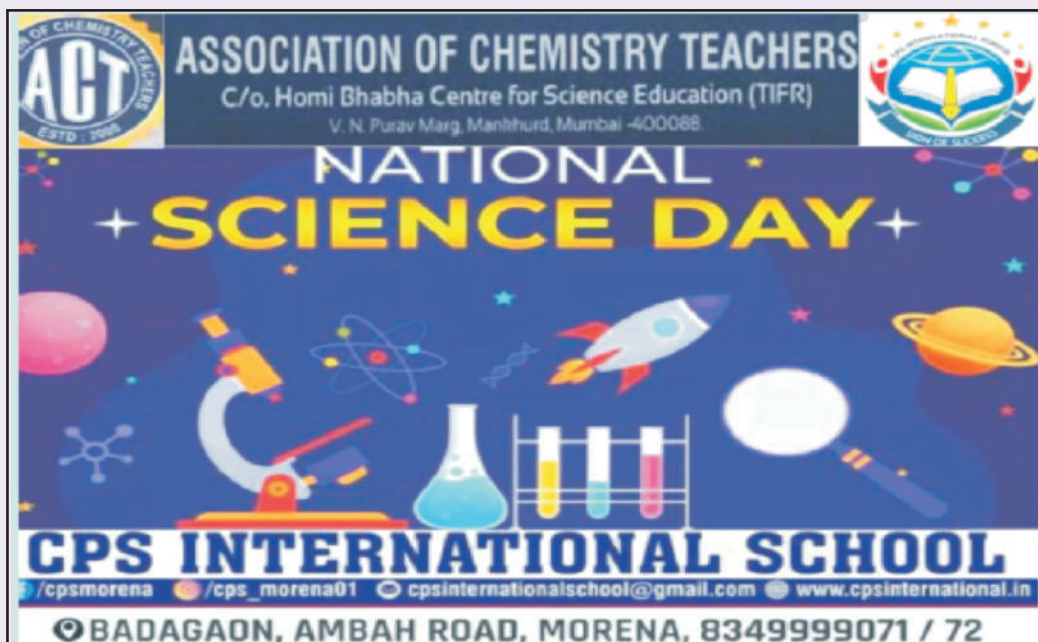


Dr. Yogendra Kumar Kothari conducting the event



Dr. Yogendra Kumar Kothari with Quiz Teams

National Science Day at CPS International School , Morena



On 28th Feb'24, CPS International School, Morena organized a National Science Day in collaboration with Association of Chemistry Teachers (ACT), TIFR, c/o Homi Bhabha Center for Science Education, Mumbai. The inauguration ceremony was graced by the School Director and Chief Guest, Mr. Manav. School Principal, Dr. Umesh Chandra Jain conducted an engaging session for students of classes X and IX, emphasizing the significance of science in our daily lives and encouraging the development of a scientific temperament among students. Additionally, a science quiz was organized for students of classes VII to X.



Dr. Umesh Chandra Jain engaging the session for a total of 120 student participants of NSD program

SRM Institute of Science & Technology, Ramapuram, Chennai Report of National Science Day 2024

The Department of Chemistry, SRM Institute of Science and Technology, Ramapuram in association with the **Association of Chemistry Teachers (ACT) Mumbai and The Society for Advancement in Chemical Sciences and Education (SACSE), IGCAR, Kalpakkam** celebrated "**National Science Day-2024**" for the school students on 28-02-2024 from 9.00 am to 4.00 pm with great enthusiasm.

The chief guest **Dr. V. Jeyaraman, Associate Director, Materials Chemistry and Fuel Cell Group, IGCAR, Kalpakkam**, Inaugurated the Science Day and motivated the students to have keen observation of the events and critical thinking so as to become a scientist. He quoted many Scientists and their Discoveries. Respected **Chief Director SRMIST Ramapuram and Trichy Campus** presided over the function and Respected **Dr. M. Muralikrishna, Dean E&T** facilitated the gathering. Earlier **Dr. Helen P. Kavitha** Professor and Head Chemistry welcomed the participants and gave an overview of the program.

Project display by students was inaugurated by the Chief Guest. In the post lunch session a scientific experiments were lively demonstrated by **Dr. N. Harish Kumar, Professor of Physics IIT Madras**. Students were thoroughly enjoyed the session. Which helps stimulate the interest of science among the student community.

This mega Science festival attracted over 300 school students from various schools in Chennai. On the occasion of National Science day various competitions, such as **Essay writing, Speech Competition, Quiz, Drawing and Project competitions** were conducted in two categories (category-I VI to VIII std, category-II IX & XI).

In an earlier of this programme, **oral and poster presentation competitions** were conducted for **first year B.Tech students** in the title of "**Science for a Sustainable Future**" and "**Contributions of Indian Scientist for Global Well Being**". Around 30 students were participated enthusiastically.

During the Valedictory session, Prizes and Certificates were given to all the winners and participation certificate was given to all the participants.



Registration and Reception Desk

Inauguration Ceremony



Competitions



Valedictory session



Training Program on **INTERACTIVE METHODS OF TEACHING**

At Nirmala English Medium High School, Vinukonda, Palnadu, A. P.

A two day training program to the PG teachers on interactive methods at Nirmala English Medium High School, Vinukonda, Palnadu District of Andhra Pradesh State was organized on February 21 and 22, 2024, with the joint academic support of Association of Chemistry Teachers (ACT) and Indian Association of Physics Teachers (IAPT).

Sr. Rani Govind, Principal of the School presented a welcome address to resource persons and teacher participants. The training program was inaugurated by *Sr. Kasper Mary*, Correspondent of the School.

There were about 50 teachers handling students of Class X and Class IX participated in the training program, in which 50 percent were science teachers.

Dr. Mannam Krishna Murthy, Secretary, ACT South zone from Varsity Education Management Ltd., Hyderabad, presented three sessions on 'Conceptual teaching', 'Experimentation in Chemistry' and 'Objective Chemistry' on the first day of the training program. The second day schedule was coordinated by *Er. Kondamudi Ravindra Kumar*, from SKCM Educational Trust, Vijayawada.

Mr. Podili Anjaneyulu and *Mr. Alapati Dileep* supervised all local arrangements. Participants interacted with the resource persons at the concluding session and felt that the training was much useful to them.



Resource persons and School management members



Science Teacher participants



Report on
**Five days Online Faculty Development Program on
“Nanotechnology and Its Applications”**
April 22nd to 26th 2024

Faculty development program's (FDPs) empower the faculty members in strengthening their professional competencies and elevate the standard of education. “Nanotechnology and its Applications” was the topic of a five-day online faculty development program organized by the Department of Chemistry at SVIS, Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore. Five distinguished professionals from Indian universities and NITs were asked to contribute their knowledge and extensive experienced on the subject.

On April 22, 2024, Inaugural Ceremony of the FDP was held at online, featuring the blaze of auspicious lamps and Saraswati Vandana. Dr. D.V. Prabhu, General Secretary, ACT, Wilson College, Mumbai, was greeted as the occasion's chief guest by Dr. K. N. Guruprasad, Director SVIS and HoD of Chemistry, SVVV. Dr. Kavita Sharma, Professor, Department of Chemistry, SVIS, SVVV and Convener FDP-2024 welcomed the speaker Dr. Subrato Bhattacharya FRSC, Professor of Inorganic Chemistry, Institute of Science, Banaras Hindu University, Varanasi, Uttar Pradesh. Dr. Kavita Sharma shared the objectives of FDP & about Nanotechnology & its applications followed by discussing detailed schedule of 5 days. In his welcoming speech, Dr. K. N. Guruprasad, Director SVIS, SVVV, discussed the background and significance of nanoparticles in the fields of agriculture and medicine. The chief guest Dr. D.V. Prabhu in his speech, discussed the upcoming activities of ACT as well as the significance of phase transfer and green catalysis in Synthetic organic chemistry. Dr. Subrato Bhattacharya, the guest speaker on the first day of the FDP, discussed the crucial role of chemists in the growth of nanoscience and nanotechnology. He also discussed the top-down and bottom-up approaches to nanoparticle synthesis and their function in the field of agriculture science. On the first day of FDP 2024, words of thanks by Dr. Radha Mehra, Coordinator, FDP Dr. Ujla Daswani served as the master of ceremony.

The second day, Tuesday, April 23, 2024, began with a lecture by Dr. Navinchandra Gopal Shimpi, Professor, Department of Chemistry, University of Mumbai on the most current advancements at nanotechnology as they relate to bio-electrochemical systems and their applications.

On the third day of FDP (Wednesday, 24/4/2024) the eminent speaker of the session was Dr. Arvind Mungray, Professor, Chemical Engineering Department, National Institute of Technology, Surat, Gujarat. He delivered the lecture on sustainable applications of environment and chemistry.

Dr. K. Venkatachalam, Professor, Analytical Chemistry, University of Madras delivered a Lecture on fourth day (Thursday, 25/4/2024), the speaker focused on the basics of FTIR and instrumentation of IR. Further speaker explained the synthesis and characterization of microporous and mesoporous catalysts and the recent development of catalysis in nanoscience.

As per schedule the Fifth day (Friday, 26/4/2022) the eminent speaker of the session was Dr. Babasaheb Raghunath Sankapal, Professor, Department of Physics, Former Assoc. Dean (Exam) Visvesvaraya National Institute of Technology, Nagpur. The speaker delivered the lecture on colorful solar cell and flexible solid state super capacitors: state of art through Nano and gave detailed information about supercapacitors. Dr. Kavita Sharma gave closing remarks in all five days of FDP and proposed words of thank on fifth day of FDP. This Faculty Development Program “Nanotechnology and Its Applications” received overwhelming response. All participants responded & attended all sessions very enthusiastically. Every day the session ended with questions and answers.

Zoom platform was used for the entire Faculty Development Program and the session links, feedback links were shared to the participants. The registered participants were engaged in a WhatsApp group and by email. The recordings are being uploaded on the YouTube Channel of Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore.

ONE DAY NATIONAL CONFERENCE ON "FRONTIERS IN CHEMICAL AND PHARMACEUTICAL SCIENCES FOR THE DEVELOPMENT OF NOVEL THERAPEUTICS-2024".

Date: 16th February 2024

**Venue: School of Pharmaceutical Sciences-Tezpur,
Girijananda Chowdhury University, Tezpur campus**

The conference venue was really well organized for national level conference. The one day national conference on “Frontiers in Chemical and Pharmaceutical Sciences for the development of novel Therapeutics” was organised by School of Pharmaceutical Sciences (GIPS-T), GCU, Tezpur Campus in collaboration with Associations of Chemistry Teachers (ACT), Mumbai and Rangapara College, Rangapara during 16th February 2024. The conference was sponsored by the Associations of Chemistry Teachers (ACT), Mumbai, Rangapara College, Rangapara and BS Trading, Kolkata.

Eminent Scientists, researchers, Ph.D. scholar and students (UG & PG) were participated during this prestigious conference. I am happy to announce that 200 delegates from various universities, research laboratories, institutes were present and 12 abstracts for oral presentation and 56 abstracts for posters had been submitted by participant at this One Day National Level conference and oral as well as poster presentation competition fraternity.



The inaugural session commenced with spot registration followed by a warm welcome addressed by Shri Jasoda Ranjan Das, President of Srimanta Shankar Academy, Guwahati. The inaugural session featured a thought provoking speech by Prof. (Dr.) Dipankar Saha, Registrar, Girijananda Chowdhury University (GCU), Professor (Dr.) Abdul Baquee Ahmed, Principal of School of Pharmaceutical Sciences at GCU, Tezpur Campus and Dr. Ranjan Kalita, Principal of Rangapara College. Dr. Rama Dubey, Scientist “F” from the Defense Research Laboratory (DRL), Tezpur was invited as a keynote speaker. Dr. Dubey delivered an enlightening speech on “Harnessing the power of Microencapsulation Technology in Pharmaceutical Science”.

The scientific session was covered by representing vast areas of biotechnology, phytochemistry and spectroscopy and wide variety of techniques used for analysis drugs and pharmaceuticals. The scientific session commenced with notable features leading to technical sessions and delivered an enlightening speech by the following speakers:

Technical session-1: Dr. Nima D. Namsa, Assistant Professor, Department of Molecular Biology and Biotechnology, Tezpur University, Tezpur, Assam delivered his talk with a topic “Challenges and opportunities in Drug Discovery from Medicinal Plants”.

Technical session-2: Dr. Rinku Baishya, Senior Scientist, CSIR-NEIST, Jorhat, Assam delivered his talk on the topic “Phytopharmaceuticals: A New Drug class in India”.

Technical session-3: Dr. Palash Moni Saikia, Principal, Darrang College, Tezpur, Assam delivered his scientific talk on the topic “Binding and Stabilization of curcumin by mixed chitosan-surfactant System: A spectroscopic study”.



School of Pharmaceutical Sciences, GCU, Tezpur Campus would like to convey a great appreciation to following honorable guests and keynote speakers.

1. Dr. Rama Dubey, Scientist “F” from the Defence Research Laboratory (DRL), Tezpur.
2. Dr. Ranjan Kalita, principal of Rangapara College.
3. Dr. Nima D. Namsa, Assistant Professor, Department of Molecular Biology and Biotechnology, Tezpur University, Tezpur, Assam.
4. Dr. Rinku Baishya, Senior Scientist, CSIR-NEIST, Jorhat, Assam.
5. Dr. Palash Moni Saikia, Principal, Darrang College, Tezpur, Assam.

I would like to express my special thanks of gratitude to Dr. D. V. Prabhu, General Secretary, Association of Chemistry Teachers, Prof. Kandarpa Das, Hon’ble Vice Chancellor, GCU and B.S. Trading, Kolkata for the perfect logistic support and guidance.

I would like to express my sincere thanks to our President Shri Jasoda Ranjan Das of Srimanta Shankar Academy, Guwahati, Prof. (Dr.) Dipankar Saha, Registrar, Girijananda Chowdhury University (GCU), Prof. (Dr.) Abdul Baquee Ahmed, Principal of School of Pharmaceutical Sciences at GCU, Tezpur Campus for providing encouragement to make this event a grand success.

SRM Institute of Science & Technology, Ramapuram, Chennai Report of Two Day Workshop on “Framing of Innovative Questions”

The Association of Chemistry Teachers (ACT), Mumbai, and the Department of Chemistry, SRM Institute of Science and Technology, Ramapuram, Chennai, conducted Two Day Workshop on “framing Of Innovative Questions at the Ramapuram campus on 26-04-2024 and 27-04-2024.

The workshop is Inaugurated by Respected Dr. N. Sethuraman, Chief Director, SRM Group of Institutions, Ramapuram, Chennai & Trichy, During the Inaugural address Chief Director emphasized the importance of setting good quality questions to test the students learning process and also to test the competency of the students. During the felicitation address, Dr. M. Muralikrishna, Dean (E&T)SRMIST, Ramapuram, Chennai insisted that teachers need to take at most care in setting question paper. Sir also appreciated the Department for taking the initiative of organizing this useful event.



Earlier Dr Helen P. Kavitha, Professor and Head, Department of Chemistry welcomed the gathering and gave an overview about the workshop. Around 25 faculty members from different institutions are participating in this workshop.





On the first day, following the Inaugural Session, Prof. Anupa Kumbhar from the Department of Chemistry at Savitribai Phule University, Pune, Prof. Sujatha Sanjay Kale from Abasaheb Garwar College, Pune, and Prof. Anusha Datar from Abasaheb Garwar College, Pune, delivered an introductory presentation on the art of crafting innovative questions. They also delved into the process of formulating multiple-choice questions for competitive exams, providing several examples. The session concluded with participants being tasked with creating four multiple-choice questions for presentation on the following day. The session fostered constructive discussions among the attendees.

In the Day 2 session, the questions crafted by the participant sunder went thorough analysis, and the resource persons provided valuable suggestions for improvement. After the presentation session, feedback about the workshop was received from the participants. During the valedictory session, all the participants received the participation certificates.



International Conference on Functional Materials (ICFM-2024) at Nabira Mahavidhyalaya, Katol

The inaugural function was graced by the presence of Chief Guest Hon'ble Dr. Y. G. Prasad, Director, ICAR- Central Institute for Cotton Research, Nagpur, Hon'ble Dr. Raju Deshmukh, President Shikshan Parasarak Mandal, Katol was the President of the Inaugural Ceremony, and Guests of Honour Hon'ble Prof. Dr. Bernhard Middendorf, Vice Dean Department of Structural Materials and Construction Chemistry Muenchebergstr University of Kassel, Germany; Hon'ble Shri. Niranjan Raut, Vice President, Shikshan Prasarak Mandal, Katol; Hon'ble Shri Bansilal Nabira Secretary, Shikshan Prasarak Mandal, Katol; Hon'ble Shri. Prakash Chandak, Treasurer, Shikshan Prasarak Mandal, Katol, Hon'ble Prof. N. B. Singh, RDC, Sharda University, Greater Noida; Hon'ble Dr. Bhim Prasad Kafle, Technology for Energy and Environment Pvt. Ltd. Kathmandu Nepal, Prof. W. B. Gurnule, Secretary West Zone, Association of Chemistry Teachers (ACT) Mumbai, Dr. S. K. Navin, Principal of Nabira Mahavidyalaya, Katol, Dr. V. G. Barsagade, Vice Principal of Nabira Mahavidyalaya, Katol. The dignitaries Inaugurated the International Conference by lighting the traditional lamp in front of the idol of Devi Saraswati.

Dr. N. V. Gandhare, Convener, ICFM-2024 welcomed the participants with a warm welcoming speech. He explained the theme and objectives of the International Conference and his inaugural speech was filled with zeal and enthusiasm. Prof. W. B. Gurnule introduces different National and International activities carried out by ACT and the objectives of ACT. He also appeals the participants to become a Life member of ACT.

Hon'ble Dr. Y. G. Prasad inaugurated the Conference and addressed the audience highlighting the need to make the research industrial oriented so that economic growth of our country improves. Dr. Y. G. Prasad said that there is a huge gap between the position of India at the global level in terms of the number of publications and that of innovativeness exhibited by our nation. India holds the sixth position in terms of research publications, whereas it holds the 76th position in terms of innovativeness. He said that the research carried out in India must be transformed into some output or product that can be commercially utilized to uplift the economy on the nation. He concluded his speech by giving best wishes to the organizing committee and participants.



Release of Abstract Book of an International Conference ICFM-2024

Hon'ble Dr. Raju Deshmukh, Chairman of the Inaugural Ceremony, congratulated the organizers for arranging such an event and addressed the participants to make fruitful deliberations in the International Conference. Prof. Bernhard Middendorf, University of Kassel, Germany congratulated the organizing committee for conducting such an International Conference in Katol. He also motivated the participants and students to interact with eminent personalities in various fields at such events.

About 256 delegates from Academics, 149 Research Scholars, and 64 M.Sc. Students from different parts of the country had participated in this conference. Three delegates among the total participants were from abroad, Prof. Bernhard Middendorf, University of Kassel, Germany; Prof Bhim Kafle, (Kathmandu University, Dhulikel, Nepal); Dr. Santosh Kumar Verma (School of Chemistry and Chemical Engineering, Yulin University, Yulin, China).



Prof. W. B. Gurnule Delivering a speech



Prof. Bernhard Meddindorf, University of Kassel, Germany, delivering the key note address



Prof. Dr. W.B. Gurnule addressing the gathering during inauguration

Report of GWB 2024 (India) IUPAC “Global Women's Breakfast”



Global Women's Breakfast (GWB) is a global and prestigious event which is organized every year by IUPAC in association with prestigious chemical societies and institutions (Royal Society of Chemistry, American Chemical Society, DE GRUYTER, BAYER and Royal Australian Chemical Institute (RACI)) to celebrate the achievements of women and girls in Science.

The Association of Chemistry Teachers (India) has been promoting and coordinating GWB in India since 2021. Association of Chemistry Teachers (India) is the national registered organization of Chemistry educators of India and since its inception in 2000, has been promoting excellence in Chemistry education and research.

This year, 78 institutions, colleges and universities from different parts of India registered for the event and organized several activities like e-Symposia, National and International Seminars, workshops, conferences and awareness programs at national and international levels to celebrate GWB 2024, on 27 Feb. 2024 with the theme “**Catalyzing Diversity in Science**” announced by IUPAC for 2024. This year the maximum registrations were from India and our country secured top position in the world.

Prof. Brijesh Pare (President, ACT) Head, Department of Chemistry, Govt. Madhav Science PG, College, Ujjain served as the Convener and **Dr. Vijendra Singh**, Assistant Professor, Department of Chemistry, Institute of Science and Research (ISR) IPS Academy, Indore as National Coordinator of GWB-2024 for India.

Prof. D. V. Prabhu (General Secretary, ACT), Former Head, Department of Chemistry, Wilson College, Mumbai promoted GWB along with all the executive members and life members of ACT from different zones of India.

Some Glimpses of GWB-2024 in India



DEPARTMENT OF CHEMISTRY
Institute of Science and Research,
IPS Academy, Indore, M.P. Bharat

In collaboration with
Association of Chemistry Teachers, Mumbai

Organizes

International Seminar (Hybrid Mode)
on
Catalyzing Diversity in Science

Eminent Speakers

 Dr. Yogendra K Mishra Professor, Southern University Denmark, Germany	 Prof. Supa Hammongbua Professor Bangkok, Thailand	 Dr. Shailza Singh Professor, JNU, Delhi
 Dr. Bipul Saha IUPAC, Bureau Member Hyderabad	 Dr. Apurba K Das Professor, IIT, Indore	

27th February 2024, Tuesday, 2:00 pm onwards (India Time Zone)
Venue: Mess Auditorium, IPSA, Indore





Department of Chemistry, ISR, IPS Academy, Indore, MP



Department of Chemistry, NIRMA University, Ahmedabad, Gujrat

GLOBAL WOMEN BREAKFAST PROGRAM, #GWB2024



INTERNATIONAL UNION OF PURE AND APPLIED CHEMISTRY

Hybrid International Seminar on Catalysing Diversity in Science

An exclusive session with visionaries, innovators and leaders that changed the perception of Diversity in Science.

27 FEBRUARY 2024

9 am - 11 am (IST)

Click [For Free Registration !!!](#)



Dr. Martin Desimone

Professor, University of Buenos Aires, Argentina



Ms. Keshu Lakhota

Senior Food Scientist & NPD Lead, Harvest B, Australia



Dr. Rekha Nair

Professor and Dean, Poomima College of Engineering, India



Dr. Brijesh Pare

Professor, President of Association of Chemistry Teachers, India

ORGANISERS



Dr. Rajesh N Patel

Chief Patron, Director, Institute of Technology



Dr. Neha Patni

Coordinator, Assistant Professor
neha.patni@nirmauni.ac.in



Dr. Milind Joshipura

Patron, Professor and Head

Chemical Engineering Department, Institute of Technology,
Nirma University, India

SPEAKERS

Department of Chemical Engineering, NIMS University, Gujrat

GWB 2024

IUPAC
International Union of Pure and Applied Chemistry

ACT
ASSOCIATION OF CHEMISTRY TEACHERS

Working towards the attainment of Sustainable development Goal 5

Catalyzing Diversity in Science

A Global Women's Breakfast Hybrid Panel hosted by
Govt. Madhav Science College Ujjain
A ++ Grade accredited through NAAC
In Collaboration with
Association of Chemistry Teachers India

February 27 th 2024
12.30 pm.
Venue: Conference Hall

Organized by
P G Department of Chemistry & Pharmaceutical Chemistry

Dr. Subha Kalyanmoorthy
Asstt. Prof. Chemistry
University of Waterloo

Prof. Arpan Bhardwaj
Principal & Prof. Chemistry
Govt. Madhav Science
College Ujjain

Prof. Brijesh Pare
Prof. & Head Chemistry
Govt. Madhav Science
College Ujjain
President ACT

Prof. Kalpana Singh
Prof. Chemistry
Govt. Madhav Science
College Ujjain

Department of Chemistry, Govt. Madhav Science College, Ujjain, MP



IUPAC

About GWB
The Goal of IUPAC Global Women's Breakfast (GWB 2024) is to establish an active network of people of all genders to overcome the barriers to gender equality in science.

Theme-
"Catalyzing Diversity in Science"

Invited Guest Lecture
on
"Catalyzing diversity in Virtual Science Laboratory"

Our Eminent Speaker
Dr. Manohar Sotanki
Assistant Professor of Chemistry
Govt College Thandla
Dist. Jabua

Date : 27.02.2024
Time : 11:30 onward

Poster/Model/Oral Presentation Competition

Guidelines:

- Poster/Model should be prepared based on 2023 Science Concept.
- One line caption to the poster is mandatory.
- Five three lines poster/model will be awarded with certificate and prize.

Date: 27.2.2024
Place: Room No.2

Organizing Committee

Department of Chemistry

Dr. P.K. Choudhary
Dr. Subhasis Paul
Dr. G.L. Bhatia
Dr. Y.C. Sargode
Dr. G.P. Dhang
Prof. Shweta Laha
Dr. Anshu Choudhary

Department of Chemistry, Govt. PG College, Dhar, MP

I U P A C



IUPAC

GLOBAL WOMEN'S BREAKFAST 2024

GET READY TO NETWORK WITH

Department of Chemistry

Navyug Kanya Mahavidyalaya, University of Lucknow, India

LIKE NEVER BEFORE.....



LET'S SHARE OUR VIEWS
ON
"Catalyzing Diversity
in Science"

[https://forms.gle/XFZF
34xGf8m3qGiZA](https://forms.gle/XFZF34xGf8m3qGiZA)

Department of Chemistry, Navyug Kanya Mahavidhyalaya, Lucknow, UP.

शासकीय महाविद्यालय, पुष्परजगढ़, जिला-अनूपपुर, मध्यप्रदेश

ONE DAY NATIONAL SEMINAR ON

Catalytic Diversity in Science for Sustainable Development

(सतत् विकास हेतु विज्ञान में उत्प्रेरक विविधता)

DATE 27 February 2024, Tuesday

Organized By

Govt. College Pushprajgarh, District-Anuppur (M.P.)

Collaboration with

International Union of Pure and Applied Chemistry - Global Women's Breakfast
(IUPAC-GWB 2024)

& Association of Chemistry Teachers (ACT)

Convener Dr. D. K. Satnami - Assistant Professor of Chemistry



I U P A C



Department of Chemistry, Govt. College, Pushparajgarh, MP.



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Science

**Department of Chemistry & Association of Chemistry Teachers
IUPAC Global Women's Breakfast #GWB-2024**

organising

International Virtual Webinar on

"Catalysing Diversity in Science"



Shree. Nilesh M. Desai
Director, Distinguished
Scientist, Space
Application Center,
(ISRO), Ahmedabad



Dr. Shalley Singhal
Professor, Department of
Chemistry, UPES, Dehradun



Dr. Ranjana Agrawal
CSIR-National Institute of
Science, Communication &
policy, New Delhi



Dr. Uplinder Dhar
Vice Chancellor, SVVV



Dr. D.V. Prabhu
Wilson College, Mumbai
Gen. Secretary ACT, India



Dr. K.N. Guruprasad
Director, SVIS, SVVV, Indore



Dr. Brijesh Pare
Professor & Head,
Madhav Science College, Ujjain
President ACT, India



Dr. Kavita Sharma
Professor, Department of chemistry
Convener, GWB 2024

Date : February 27th, 2024

Time : 2:30 p.m onwards

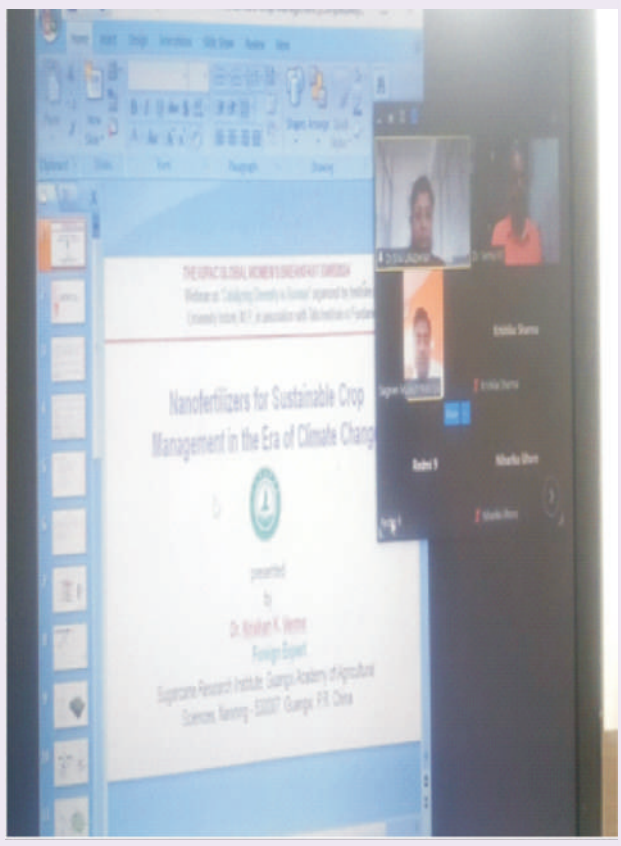
Department of Chemistry, SVVV, Indore, MP.

Aim of the Webinar
(To achieve Sustainable Development Goal 5: Gender equality)
To establish an active network of people of all genders to overcome the barriers to gender equality in science.

Organizing Committee

 Chief Patron Dr. Sudha Silawat Additional Director, DHE, Indore Division	 Patron Adv. Nilash Patidar President Janbhagidari Committee	 Patron Dr. Praveen Ojha Principal Bherulal Patwardar Govt. P.G College, MHOW
 Co-ordinator Dr. Rashida Kanchwala Professor of Home science	 Convener Dr. Monika Sanyal Assistant Professor	 Co-Convener Dr. Ranjana Verma Assistant Professor of Zoology

Our Tagline: "Beecha Shikshit Yuva Sunhara Bhavishya ka Aadhar"



Department of Chemistry, B.L.P. Govt. PG College, Mhow, MP.

Govt. Girls' P. G. College, Ujjain
"Centre for Excellence" & Graded by NAAC in Third Cycle

Department of Chemistry and Pharmaceutical Chemistry
Organizes
Global Women's Breakfast event

Catalytic Diversity In Science for Sustainable Development

Patron

Dr. Hemant Gahlot
Principal
GGPC,
Ujjain

Guest Speaker

Dr. Uma Sharma
Professor & Head
U.S. in Chemistry
Vikram University Ujjain

Date: 27 February 2024
Time: 12:00 Noon
Venue: College Auditorium

Members of Organizing Committee

 Dr. Rashi Bhargava Professor & Head Chemistry	 Dr. G.D. Agrawal Assistant Pharma Chemistry	 Dr. Samra Gurelli Professor Chemistry	 Dr. Deepa Verma Asst. Professor Chemistry
---	---	---	---

IUPAC Global Women's Breakfast - Catalytic Diversity in Science

Organized by
Department of Chemistry and Pharmaceutical Chemistry
Govt. Girls' P.G. College, Ujjain

Guest Speaker

Prof. Dr. Uma Sharma
Professor & Head
U.S. in Chemistry
Vikram University Ujjain

Members of Organizing Committee

 Prof. Dr. Hemant Gahlot Principal GGPC, Ujjain	 Dr. Rashi Bhargava Professor & Head Chemistry	 Dr. G.D. Agrawal Assistant Pharma Chemistry	 Dr. Samra Gurelli Professor Chemistry	 Dr. Deepa Verma Asst. Professor Chemistry
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Department of Chemistry, Govt. Girls, PG College, Ujjain, MP & Department of Chemistry, RNC Arts, JDB Commerce & NSC Science College, Nashik Road, Nashik, Maharashtra



IUPAC INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY



Government SSP College Waraseoni
Department of Chemistry
Organizes
National Webinar
On

“Coordination Chemistry & Electrochemistry of Metal Complexes”

**Date:-
27/02/2024**

Under the aegis of IUPAC-GWB-2024
in association with
Association of Chemistry Teachers
&
Waraseoni Chemical Society

**Time:- 12.30
pm to 3.30 pm**



Patron
Dr. Praveen Shrivastava
Principal
Govt. SSP College
Waraseoni



Eminent Speaker
Dr. Suchismita Ghosh
Research Associate
Department of Chemistry
IIT Bombay




Convener
Dr. Rakesh Choure
HOD (Chemistry)
Govt. SSP College
Waraseoni

Department of Chemistry, Govt. SSP College Waraseoni, MP.




Department of Biosciences, AIMSAR, Indore, MP.

Maulana Azad College of Arts, Science and Commerce, Aurangabad
NAAC Reaccredited 'A' Grade
UGC COLLEGE WITH POTENTIAL FOR EXCELLENCE STATUS




President of Program




Principal
Dr. Mazahar Ahmed Farooqui

Department of Chemistry
ORGANIZES
IUPAC Global Women's Breakfast 2024
In coordination with Association of Chemistry Teachers
(ACT)
Online Session on
"Catalysing diversity in science"
On 27th February 2024
(Time: 11:00 am to 12:30 pm IST)



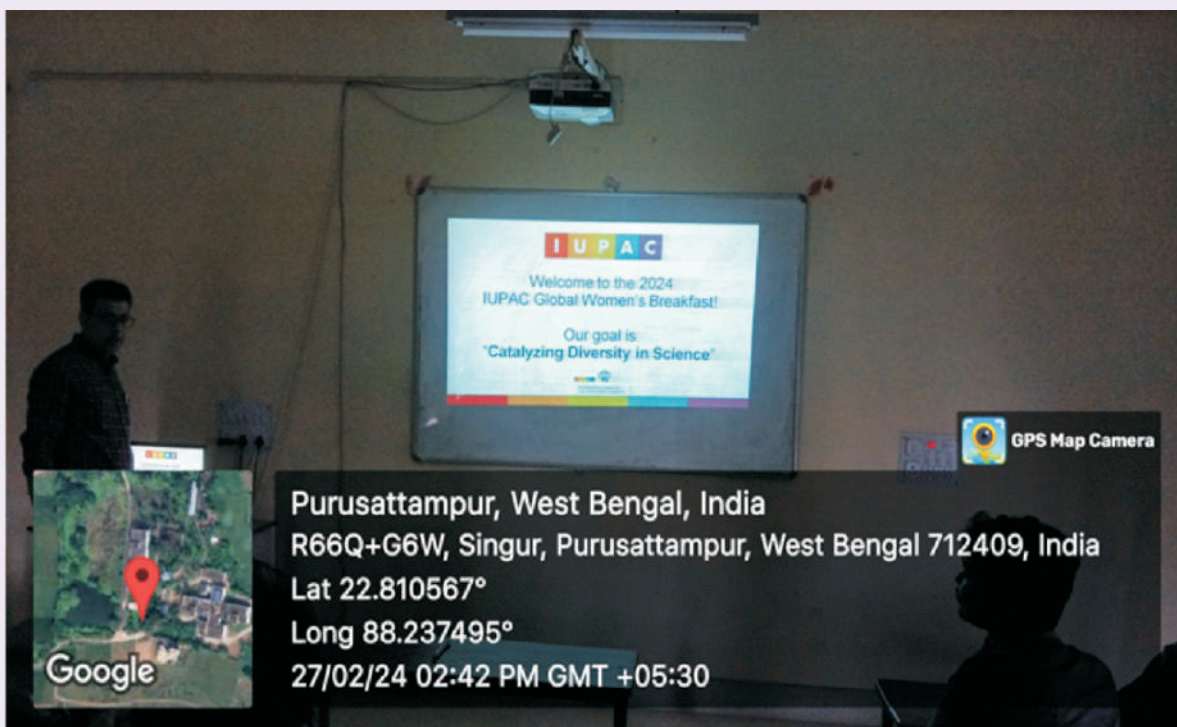
Invited Talk



Dr. Ranjana . K. Jadhav
Associate Professor &
Head, Dept of Chemistry
S.M. Joshi College,
Hadapsar, Pune

Registration Form link: <https://forms.gle/L9mc9mRlRc8l5lP>
Zoom Link: <https://us02web.zoom.us/j/9423456007?pwd=VTp2RkVhZ2c0NzY2NiNlWTFVTzI1ZlB5U0p0>
Meeting ID: 942 345 6007 Pass code: 1963

Maulana Azad College of Arts, Science and Commerce, Aurangabad, Maharashtra, India



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Long 88.237495°
27/02/24 02:42 PM GMT +05:30



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R66Q+G6W, Singur, Purusattampur, West Bengal 712409, India
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Long 88.237475°
27/02/24 02:45 PM GMT +05:30

*Department of Chemistry
Government General Degree College, Singur, West Bengal*



INTERNATIONAL WEBINAR

On

"Catalyzing Diversity in Science"

Organized by

Amar Sewa Mandal's

Department of Chemistry, Kamla Nehru Mahavidyalaya, Nagpur,

(Reaccredited A+ grade with CGPA of 3.53)

Association of Chemistry Teachers (ACT),

C/o Homi Bhabha Centre for Science Education (TIFR) Mumbai

and

Department of Chemistry, Jagat Arts, Commerce &

I. H. P. Science College, Goregaon, Dist Gondia

(Reaccredited B+ Grade with CGPA 2.54)

In Collaboration with

IUPAC, Global Woman Breakfast



GI | W | B
IUPAC

GWB2024

Chief Guest



Hon'ble Prof. Brijesh Pare

President

ACT

Date: 27th February, 2024

Time: 3.30 PM IST Zoom and Live Streaming on YouTube

PATRON



Hon'ble Dr. Suhasini Wanjari
President
Amar Sewa Mandal, Nagpur



Hon'ble Adv. Abhijit Wanjarri
MLC & Secretary
Amar Sewa Mandal, Nagpur



Hon'ble Dr. Smeeta Wanjarri
Treasurer,
Amar Sewa Mandal, Nagpur



Hon'ble Shri Jagatramji Rahangdale
President
Bahujan Hitay Jagat Shikshan
Santha Gondia



Hon'ble Prof. D. V. Prabhu
General Secretary, ACT
Wilson College, Mumbai

EMINENT SPEAKERS



Dr. Gulshan Ara
Professor
Department of Chemistry
Jagannath University
Dhaka-1100, Bangladesh



Dr. Beena Sethi
Associate Professor
Department of Chemistry
K.L.Mehta D.N College for women,
Faridabad -121001



Dr. D. S. Badwalk
Principal
Kamla Nehru Mahavidyalaya,
Nagpur



Dr. N. Y. Lanje
Principal
Jagat Arts, Comm. & I. H. P.
Science College, Goregaon.



Dr. Wasudeo Gurmule
Convener, GWB 2024
Kamla Nehru Mahavidyalaya,
Nagpur



Dr. S. S. Rahangdale
Co-Convener
Jagat Arts, Comm. & I. H. P.
Science College, Goregaon.

ORGANIZERS

Department of Chemistry, Kamla Nehru Mahavidyalaya, Nagpur, India

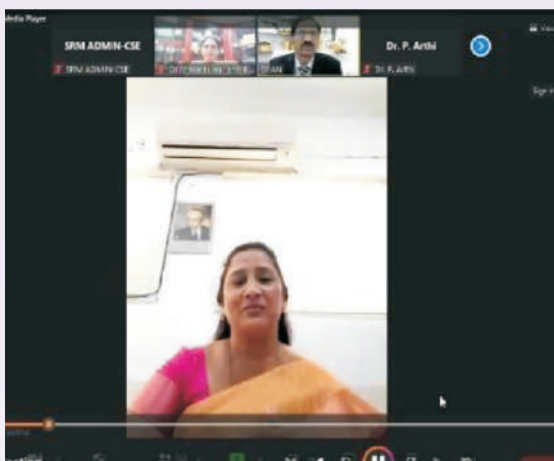
The Association of Chemistry Teachers (ACT), Mumbai, Department of Chemistry, Kamla Nehru Mahavidyalaya, Nagpur and Jagat Arts, Commerce and I.H.P. Science College, Goregaon, India organized GWB on "Catalyzing Diversity in Science" on **27th February 2024**. Around 3480 delegates including Professors, Scientists, Industrialists, Faculty Members, Research Scholars and Students from all over the world actively registered in this mega event.

SRM Institute of Science and Technology Ramapuram Campus, Chennai-89

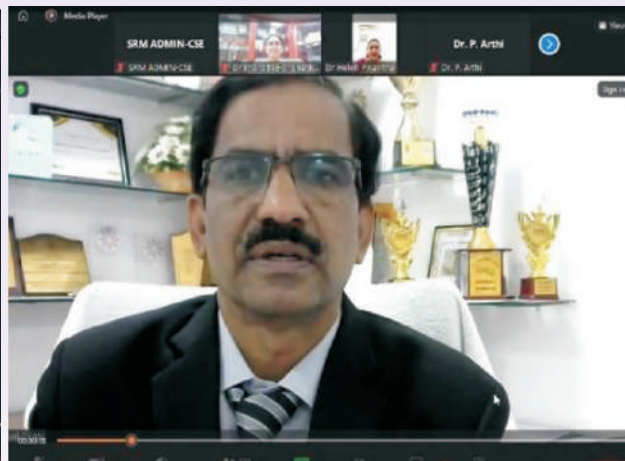
Report of IUPAC - Global Women's Breakfast Webinar

Department of Chemistry, SRM Institute of Science and Technology, Ramapuram Campus, Chennai in association with Association of Chemistry Teachers (ACT) Mumbai. Organized IUPAC - Global Women's Breakfast Webinar on "CATALYZING DIVERSITY IN SCIENCE" on 27 February 2024 between 10.00 AM to 11.00 AM. **Dr. Helen P. Kavitha**, Head of the Department of Chemistry welcomed the chief guest and Dean E&T. **Dr. M. Murali Krishna** dean of Engineering and Technology delivered the presidential address. He underscored the pivotal role of women across diverse fields and elucidated the contributions of women scientist in various domains.

Prof. V. Bharathi Harishankar is the Vice Chancellor of Avinashilingam Institute for Home Science and Higher Education for Women (Deemed University), Coimbatore was the speaker of the day. She delivered wonderful message about the diversity in science. More than 130 participants were joined for this webinar. E-certificate was sent to all the participants.



Dr. Helen P. Kavitha, welcomed the Chief guest and Dean E&T.



Dr. M. Murali Krishna (Dean E&T)



Prof. V. Bharathi Harishankar, spoke about the role of women across diverse fields and insisted the importance of research activity and collaborative work between various institutions.

CONTECH 2023-24: A Report

By

Dr Subhash P. Singh

National Coordinator, ACT – CONTECH, Department of Chemistry

A. N. College, Patna – 800013

As science students transition from senior secondary education to higher studies, they encounter numerous entrance examinations, often grappling with the intricacies of chemistry. Recognizing this challenge, the Association of Chemistry Teachers (ACT) introduced CONTECH, a national-level Concept Test in Chemistry. This initiative serves as a crucial tool for gauging the landscape of chemistry education at the undergraduate (UG) level and equips educators to undertake targeted interventions. CONTECH's overarching goal is to fortify the teaching profession while monitoring the academic progress and accomplishments of UG chemistry students. Since its inception in 2010, CONTECH has been held annually, initially as a single event per year. However, since the academic year 2017-18, it has been conducted biannually, comprising Phase I and Phase II, to better cater to the diverse needs of UG students nationwide.

The test format consists of 80 meticulously crafted Multiple Choice Questions (MCQs), each offering four options with one correct answer, and no penalty for incorrect responses. In response to stakeholder feedback, the questions are structured to evaluate two key dimensions: (i) 75% of the questions assess knowledge, understanding, and the application of theoretical concepts. (ii) 25% of the questions are geared towards evaluating processoriented, problem-solving, and practical skills, presenting scenarios, observations, or experimental situations.

(IA) Zone wise % of Examination Centres during 2023-24

Table-1 and Fig.-1 present Zone wise % of Examination Centres during 2023-24

Table-1

Zone	% of participating colleges
West Zone	43.9
North Zone	19.51
North East Zone	2.43
East Zone	14.63
Central Zone	7.31
South Zone	12.19

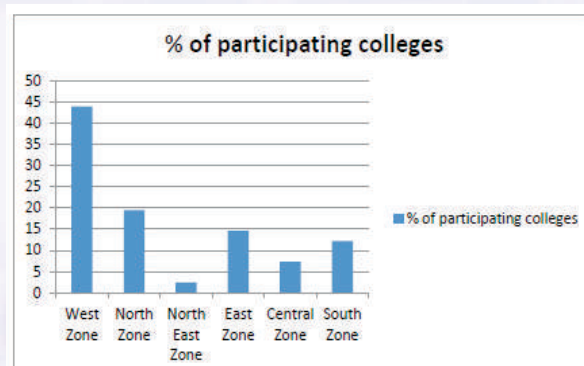


Fig. 1: Zone wise Examination centres' % in 2023-24

(II) Zone wise % of Examinees

Table-2 and Fig.-2 present Zone wise % of examinees in 2023-24.

Table : 2

Zone	% of Examinees (2023-24)
West Zone	52.63
North Zone	11.97
North East Zone	0.89
East Zone	6.86
Central Zone	5.38
South Zone	22.24

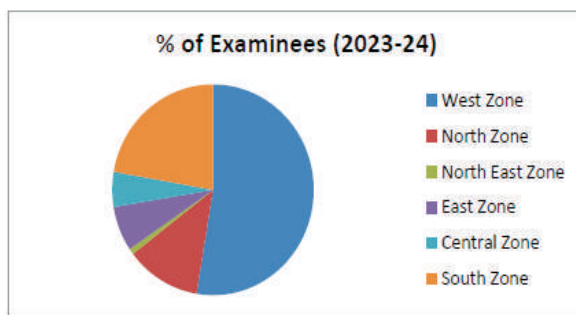


Fig.2: zone wise percentage of examinees appeared in CONTECH during 2023-24

(IIIA) % of Students scoring 30 % or more in their respective zones

The Table-3 and fig.3 show the % of Students scoring 30 % or more in their respective zones.

Table : 3

Zone	% of Examinees scoring 30% or more
West	53.88
North	16.98
North East	1.15
East	11.29
Central	3.92
South	12.75

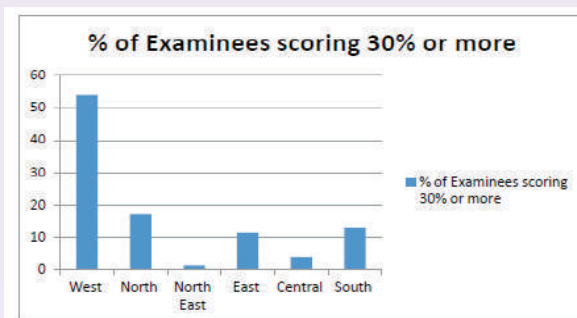


Fig 3 : zone wise % of Examinees scoring 30% or more

(IIIB) % of Students scoring 60% or more in their respective zones during 2023-24

The comparative data of % students scoring 60 % or more in their respective zones during 2023-24 is exhibited in Table 4 which gets displayed by Fig.4

Table : 4

Zone	% of Examinees scoring 60% or more
West Zone	3.97
North Zone	13.9
North East Zone	0
East Zone	37.74
Central Zone	23.17
South Zone	21.19

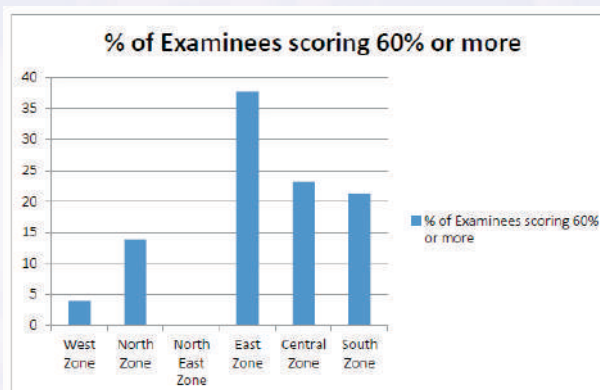


Fig. 4: Zone wise Examinees' % scoring 60% or more in 2023-24

Dr. Mamata T. Sangole, representing the West Zone and affiliated with Shri Shivaji College of Arts, Commerce & Science, Akola, clinched the top spot in the CONTECH 2023-24 participation merit list. Dr. Kiran B. Upar, also from the West Zone and associated with NES Ratnam College, Bhandup, Mumbai, secured the second rank. Dr. Nishamol Kanat from the West Zone, affiliated with K.J. Somaiya College of Science & Commerce, Vidyavihar, Mumbai, claimed the third position. Dr. S. A. Shah from the West Zone, representing Anand Niketan College of Science Arts and Commerce, Warora, Chandrapura, Nagpur, secured the fourth position. Dr. B. Sundaravel from the South Zone, affiliated with Kalasalingam Academy of Research and Education, Kare, Tamil Nadu, grabbed the fifth position.

Following closely behind is Dr. R.B. Toche & Priyanka More from the West Zone, representing Dadasaheb Bidkar Arts, Science & Commerce College, Peth, Tal-Peth, Dist-Nashik, securing the sixth position, Dr Pradip Shivram Mutkule also from the west Zone representing New Arts, Commerce and Science College, Ahmednagar securing seventh position, Dr Kumari Seema (East Zone) from J D Women's College, Patna securing eighth position and Dr Sushama Kadam (West Zone) from Hon'ble Balasaheb Jadhav Arts, Commerce & Science College, Ale, Pune securing ninth position, Dr Seema Joshi (North Zone) from Isabella Thoburn College, 7-Faizabad Road, Luckno secured tenth position.

1. Zone-wise Analysis:

- West Zone: Several colleges participated consistently throughout the years, including K.J. Somaiya College of Science & Commerce, Vidyavihar, Mumbai; Dr. D Y Patil Arts Commerce and Science College, Pune; Anand Niketan College of Science Arts and Commerce, Nagpur; and Shri Shivaji College of Arts, Commerce & Science, Akola.
- Central Zone: Colleges like K G Arts & Science College, Raigarh, and S.S.Jain Subodh P.G. College, Jaipur, maintained participation over the years.
- North Zone: Gargi College, Delhi, showed consistent participation.
- South Zone: Shanmuga Industries Arts and Science College, Tiruvannamalai, and Kalasalingam Academy of Research and Education, Tamil Nadu, were consistent participants.

2. Performance Trends:

- Some colleges exhibited consistent performance improvement, while others fluctuated.
- Notable improvements were seen in colleges like Shanmuga Industries Arts and Science College and K.J. Somaiya College of Science & Commerce.
- Some colleges maintained their positions, like Gargi College and S.S.Jain Subodh P.G. College.

3. Individual College Performance:

- K.J. Somaiya College consistently performed well, especially in the West Zone.
- Shanmuga Industries Arts and Science College exhibited a remarkable improvement, securing top positions in recent years.
- Dr. Nishamol Kanat from K.J. Somaiya College consistently ranked high among coordinators.
- Dr. Mamata T. Sangole from Shri Shivaji College and Dinesh Karthik from Shanmuga Industries Arts and Science College were top performers in recent years.

4. Overall Observation:

- The data suggests varying levels of participation and performance across different zones and colleges.
- Colleges in the West Zone showed consistent participation and competitive performance.
- Continuous monitoring of trends can provide insights into the effectiveness of educational programs and strategies to improve performance.

A preview of select exam centres in 2023-24 is shown below;



Shri Shivaji College of Arts, Commerce and Science, Akola (Coordinator-Mamata T Sangole)



J D Women's College, Patna (Coordinator- Dr. Kumari Seema)

The nationwide success of the exam owes much to the dedicated efforts of teachers who motivated students to participate on a national level. Certificates of Participation, endorsed by the President, General Secretary, National Coordinator, and College Coordinator, are granted to those securing 30% or above. Meritorious students achieving 60% or higher are awarded Certificates of Excellence. Locally, Principals and College Coordinators have discretion in presenting awards to outstanding students. Maintaining quality standards, no certificates are awarded to candidates scoring below 30%, even if they are the top achievers at their centers.

Letters of appreciation are sent to all participating college Principals. College Coordinators receive Certificates of Appreciation upon successful conduct of the Test, while those Local Coordinators who appoint at least 10 active College Coordinators also receive recognition. College Coordinators / Local Coordinators who register 100 or more than 100 participating students shall receive Annual Subscription Fee of Journal 'Resonance'.

A Special Award is reserved for the College Coordinator achieving the highest student participation nationwide.

We have a significant task ahead to ensure the inclusion of all non-participating States and Union Territories. There has been a notable decrease in both the number of exam centers and examinees compared to the pre-Covid period. Several factors could explain this decline:

- i. In the post-Covid era, student attendance nationwide has become irregular.
- ii. Many institutions have shifted to conducting semester exams based on CBCS and NEP.
- iii. Some institutions refrain from financial transactions, including the collection of exam fees.
- iv. There is a widespread expectation of greater rewards for students.

To address this challenge, it's essential to identify 4-5 dedicated teachers in every state to encourage college coordinators to promote participation. ACT Zonal officials are expected to identify such individuals with the assistance of their networks.

Positive feedback from all stakeholders to enhance the popularity of chemistry in the future is highly appreciated. On behalf of ACT and on my own, I express sincere gratitude to all who have contributed to the successful organization of CONTECH 2023-24.

Thank you once again to everyone involved.

The (H,H₂) Exchange Reaction

N. Sathyamurthy

Indian Institute of Science Education and Research Mohali

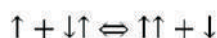
Email: nsathyamurthy@gmail.com

Heisenberg predicted that H₂, the simplest neutral molecule one could think of, could exist in two forms: ortho(*o*)- and para(*p*)-hydrogen and it was verified experimentally. The former has its two nuclear spins parallel (↑↑) to each other and a total nuclear spin of 1. Since the protons are Fermions, the nuclear motion wave function should be antisymmetric with respect to interchange of their indices. Since the two nuclear spins are parallel to each other, the spin part is symmetric. Therefore, the spatial part must be antisymmetric and *o*-H₂ exists in odd rotational ($j = 1, 3, \dots$) states. The *p*-H₂, on the other hand, has its nuclear spins antiparallel (↑↓) to each other. Therefore, the spin part of the nuclear motion wave function would be antisymmetric, and the spatial part symmetric. Thus, the rotational states of *p*-H₂ would be even ($j = 0, 2, \dots$).

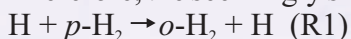
The lowest energy state of *o*-H₂ ($j=1$) is 121.6 cm⁻¹ (0.35 kcal/mol) higher in energy than the lowest energy state of *p*-H₂ ($j = 0$). Spectral transition between the two states is optically forbidden because H₂ does not have a permanent dipole moment. Only transitions between states of the same symmetry (odd or even) are allowed in inelastic transitions also. Therefore, *o*-H₂ will remain *o*-H₂ and *p*-H₂ will remain *p*-H₂ left to themselves. Interconversion between the two cannot take place without breaking the chemical bond as the total spin of the nuclei is conserved:



An atomic hydrogen (H) can, however, facilitate the interconversion through the exchange reaction:

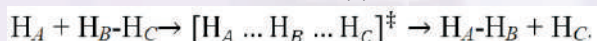


Therefore, the seemingly simple reaction



is of fundamental importance in chemical kinetics and dynamics as it reveals interesting quantum effects like nuclear spin and tunneling. It is an excellent system to explore the isotopic effects on the observed dynamical results also.

Although the spectroscopic bond dissociation energy (D_0) of H₂ is 103.25 kcal/mole, the interconversion between *p*- and *o*-H₂ was found [1] to take place with an Arrhenius activation energy (E_a) of ~5.5 kcal/mol. This was puzzling and the puzzle was resolved by invoking the breaking of the old bond while a new bond was formed in a concerted manner through the formation of a transition state (‡):



Although the H atoms are indistinguishable, they are labelled here for convenience and to drive home the point about the formation of the transition state.

Here we must point out that the H₂ molecule in its ground electronic state ($^1\Sigma_g^+$) has its two electrons with anti-parallel spins ($\uparrow\downarrow$). While the incoming H atom with its \uparrow spin, for example, can readily pair with an electron of opposite spin (\downarrow) in the old covalent bond and form a new covalent bond, it will be repelled by the other electron of same spin (\uparrow) in the old pair due to Pauli repulsion. In other words, there is an attractive force as well as a repulsive force operating when an H atom approaches an H₂ molecule (in addition to the Coulombic repulsion between the nuclei and between the electrons, and the Coulombic attraction between the electrons and the nuclei).

Taking the collision radius (r_c) for the reaction (R1) to be 1 Å the rate coefficient (k) at 873 K could be estimated to be

$$k = \langle \sigma v \rangle = \sigma \bar{v} = (\pi r_c^2) \left(\frac{8k_B T}{\pi \mu} \right)^{1/2} = 1.66 \times 10^{-10} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1},$$

if every collision led to reaction. Here σ is the reaction cross section and \bar{v} is the average relative velocity of the reactants. The reduced mass $\mu = (2/3) \text{ amu} = (2/3) \times 1.66 \times 10^{-27} \text{ kg}$; Boltzmann constant $k_B = 1.38 \times 10^{-23} \text{ J/K}$. However, if the reaction has an E_a of 5.5 kcal/mol, the estimated value of k would be $1.66 \times 10^{-10} \exp(-5500/1.99 \times 873) = 7.0 \times 10^{-12} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$, significantly larger than what was obtained experimentally: $2.2 \times 10^{-12} \text{ cm}^3 \text{ molecule}^{-1} \text{ s}^{-1}$ at that temperature [1]. Therefore, one must apply a steric factor ($\ll 1$) to the collision theory result to obtain results in agreement with experiment. This implies that not every collision is successful even if the activation energy is taken into account.

Schulz and LeRoy [2] determined the value of k using a flow tube apparatus for T in the range 300 – 444 K and found the Arrhenius ($\ln k$ vs $1/T$) plot to exhibit a positive curvature near the room temperature suggesting the presence of tunneling at lower temperatures.

While Heitler and London [3] explained the formation of the covalent bond in an H₂ molecule in valence bond terms, London [4] proposed an equation for the potential energy of H₃ in collinear geometry. This enabled Eyring and Polanyi [5] to construct the first potential energy surface (PES) for any chemical system and to identify the saddle point with the transition state and to point out that the reaction could have an activation energy of the order of a few kcal/mol, much less than the energy required to break the H-H bond in H₂. They also proposed that the reaction could be envisaged as the motion of a fictitious atom of $\text{mass} = \frac{m_A(m_B + m_C)}{(m_A + m_B + m_C)}$

moving along the reaction coordinate in what was called scaled and skewed coordinates, transforming the reactants into products through a transition state. While the dynamics could not be investigated due to lack of computational tools at that time, Eyring [6] showed that the rate coefficient could be estimated using the activated complex theory that made use of the estimated properties of the transition state in a thermodynamic treatment.

The best estimate of the barrier height for the reaction from an ab initio calculation came first through the work of B. Liu [7] at IBM for the collinear geometry and the full PES (including nonlinear geometries) was published subsequently by Siegbahn and Liu [8]. It has been refined further by Boothroyd et al. [9]. A graphic illustration of the PES for the collinear H₃ system is given in Figure 1(a).

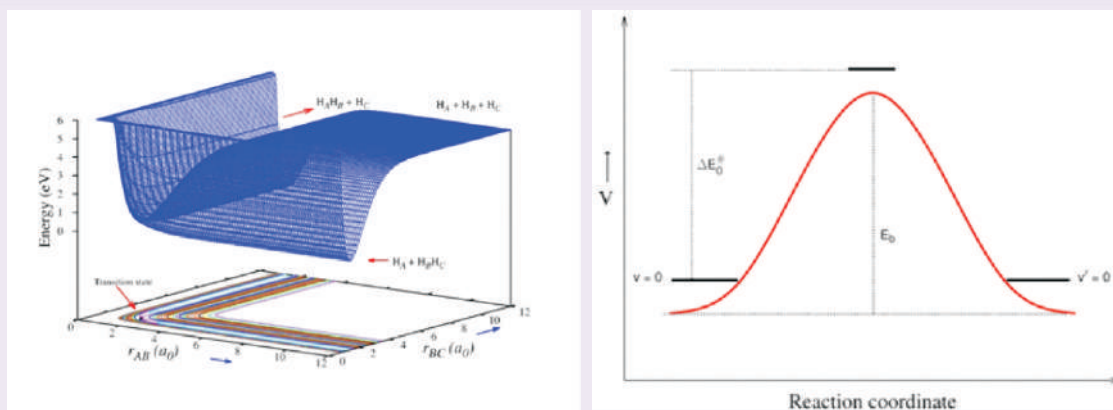


Figure 1. (a) Potential energy surface and the potential energy contours obtained from an ab initio electronic structure calculation [9] for the collinear geometry of the reaction (R1). Credit: SugataGoswami and Arun Kumar Kanakati of S. Mahapatra's Lab, School of Chemistry, University of Hyderabad.(b) Potential energy profile along the reaction coordinate. Credit: Siddharth Sankar Dutta, NISER, Bhubaneswar.

Energy profile along the minimum energy path on the PES is given in Figure 1(b) to illustrate the difference between the classical barrier height (E_b), computed from the bottom of the potential well of the reactants to the saddle point (transition state) and the energy of activation (ΔE_0^\ddagger) the energy difference between the zero point energy of the transition state and the zero point energy of the reactant(s). It is important to point out that these two measures (E_b and ΔE_0^\ddagger) are not necessarily equivalent to the Arrhenius activation energy (E_a). The latter is a phenomenological parameter and can depend on the reaction conditions, while the former two can be computed by good quality ab initio calculations.

The kinetics of the reaction (R1) and its isotopic analogs under different conditions have been reviewed by Truhlar and Wyatt [10] and Aoiz et al. [11].

The first classical dynamical study of the collinear (H , H_2) exchange reaction using modern electronic computers was carried out by Wall, Hiller, and Mazur [12] in 1958. Karplus, Porter and Sharma [13] studied the dynamics of the reaction in three dimensions using a semi-empirical PES for the system. There have been several other classical and quantum mechanical scattering calculations using more refined ab initio PESs for the system, and the results have been compared with the available experimental results at the state-to-state level [11]. For a recent quantum mechanical study of the exchange reaction (R1) using the best ab initio PES available and its astrophysical implications, the reader is referred to the work of Lique [14].

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Academic Participation of ACT Members

1. **Prof. M. Swaminathan**, EC Member of ACT South Zone, delivered a Talk on “Functional Nanomaterials in Energy Applications and Organic Transformation” in International Conference on Functional Materials, (ICFM-2024) organized by Nabira Mahavidyalaya, Katol on 15th March 2024.
2. **Prof. Wasudeo Gurnule**, Secretary of ACT West Zone, Delivered Invited Talk on “Emulsion Polymerization of Styrene-Butadiene Rubber Nanocomposites with Nano Filler and Its Applications” in International Conference on Functional Materials, (ICFM-2024) organized by Nabira Mahavidyalaya, Katol on 16th March 2024.
3. **Prof. M. Swaminathan**, EC Member of ACT South Zone, delivered a Talk on “Eco-friendly Nanomaterials for Organic Transformation” in International Conference on Advanced Sustainable Futuristic Materials, (ASFM-2024) organized by Kamla Nehru Mahavidyalaya, Nagpur on 15th March 2024.
4. **Prof. D. V. Prabhu**, General Secretary of ACT, as an Editor for the edited book titled **Futuristic Trends in Chemical Material Sciences & Nano Technology Book Volume 3 Book 18, 2024 of Interactive International Publishers (IIP Series)**.
5. **Prof. Wasudeo Gurnule**, Secretary of ACT West Zone, Delivered Invited Talk on “Nanomaterials: A Green Approach for Sustainable Development” in 7 Days Faculty Development Programme, on Recent Research Advances in Sustainable Development and Capacity Building” organized Govt. Bilasa Girls PG College, Bilaspur, 3rd February 2024.
6. **Prof. Wasudeo Gurnule**, Secretary of ACT West Zone, Delivered Invited Talk on “Advanced Sustainable Multifunctional Nanomaterials and Applications” in International Conference, on Emerging Trends in Basic Sciences Physical, Chemical, Biological and Environmental Sciences, ” organized Uttam Memorial College, Raigarh, 26th February 2024.
7. **Prof. Wasudeo Gurnule**, Secretary of ACT West Zone, Delivered Invited Talk on “Advanced Sustainable Functional Materials and Its Applications” in Two Days International Conference, on Environment and Sustainable Development: Perspectives and Issues (ISESD-2024), ” organized by Govt. Shyamla Prasad Mukherjee College, Sitapur, Surguja, 10th February 2024.
8. **Prof. Wasudeo Gurnule**, Secretary of ACT West Zone, Delivered Invited Talk on “Advanced Sustainable Functional Materials” in International Conference, on Recent Technology in Innovative Smart System (RTISS-2024) ” organized by K. L. Mehta Dayanand College for Women, Faridabad, 20th January 2024.

Lithium and More

Syncing Mining and Battery Tech R & D Crucial to India's Atmanirbhar Goals

In mixed progress for India's battery tech ecosystem Chattisgarh's Korba district has seen one block of lithium move to the auction stage and another block showing promising deposits of the minerals. This comes after setbacks such as the cancellation of auctions for the lithium blocks in J & K's Reasi district due to insufficient investor interest and shelving of exploration plans in Manipur's Kamjong districts due to local resistance. But if India is to emerge as a top player in sunrise manufacturing sectors such as electric vehicles (EV's) and consumer goods, it has to get ahead in the battery game, lithium ions and others.

Lithium Ion Challenge: In 2022, China accounted for as much as 77 % of global lithium ion battery production capacity. Beijing is projected to retain this dominance even in 2027. It's on the strength of this lithium-ion battery manufacturing capacity that the Chinese are looking to dominate the global EV market. India is way behind here. If it's not to remain dependent on Chinese suppliers, it must ramp up its own lithium-ion battery production base or look for alternatives.

Poor Technical Depth: India also faces handicaps such as under developed mineral reporting standards. This leads to figures for mineral reserves for several blocks being inconclusive, hindering investments. Plus, most of the lithium found in India is in the form of hard rock granites and pegmatites, marking it difficult to extract the minerals.

Alternatives on Anvil: There are other battery options too, but they need significant R & D. Metal air battery used atmospheric

oxygen and metals such as aluminium, zinc and iron. They can be a light weight, budget friendly and recyclable but non rechargeable, option. Then, China is heavily investing in cheaper sodium batteries. For India to follow suit, it has to heavily invest in battery research and line up appropriate mining industry tech and processes. That's the only way India can emerge as an alternative battery hub to China.



Why do we shed tears when we chop onions?

Onion is one of the most routinely used spicy vegetables in curries all over the world. There are hundreds of species of onions cultivated under the genus, *allium*. In India, many consume onion even in raw state. Onions become very pungent when rotten.

Each layer of onion contains thousands of cells and in each cell there are certain aminoacids linked with sulfoxide (S=O) terminals. Aminoacid-sulfoxide can be represented as (AA)RS=O where (AA) is the aminoacid and R is certain other organic chemical moiety. In the same onion cells, there are enzymes, called, *alliinases*, but positionally maintained away from the aminoacid-sulfoxides.

When we chop the onions, the cells are damaged and the aminoacid-sulfoxides and the allinases get mixed.

The action of alliinases on the aminoacid-sulfoxides produces, through a series of biochemical reactions, some volatile compounds, known as, Alkyl sulfenic Acids.

This in turn is immediately, acted upon by another enzyme, called, Lachrymatory Factor Synthase (LFS), leading to the formation of very volatile propanethiol S-oxide.

Being lighter and volatile, this propanethio-S-oxide spreads like a mist in the aerial currents and reaches our eyes. In the eyes, it reacts with the water molecules leading to the formation of small doses of sulfuric acid which causes the burning sensation in our eyes.

This burning sensation, in turn, activates the lachrymatory (tear) glands of the eyes, secreting tears.



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