



MILESTONE

POSTGRADUATE DEPARTMENT OF CHEMISTRY

November 2023

Vol. 3 Issue. 1



Look Out

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- College Day

EDITORIAL TEAM

Dr. T. Sobana Premlatha

Dr E. Thamarai Selvi

Ms. K. Priya Sudha

Dr. R. Vashantha

Dr. A. Sumita

Dr. V. Sribharathy

Dr. K. Sangeetha

Dr. R.J.Kavitha

Dr. N.S. Sangeetha

Dr. N. Suganya

CHEMISTRY NOBEL LAUREATES- 2023



Mounqi G. Bawendi
Massachusetts Institute of Technology
USA



Louis E. Brus
Columbia University
USA



Alexei I. Ekimov
Nanocrystals Technology Inc.
USA

Mounqi G. Bawendi, Louis E. Brus and Alexei Yekimov are awarded the Nobel Prize in Chemistry 2023 for the discovery and development of quantum dots. Quantum dots (QDs) exhibits unique optical and electronic properties, including the ability to transport electrons and emit light of various colors when exposed to UV light. These artificially synthesized semiconductor nanoparticles have a wide range of potential applications, including use in composites, solar cells, fluorescent biological labeling, displays, lighting, and medical imaging.

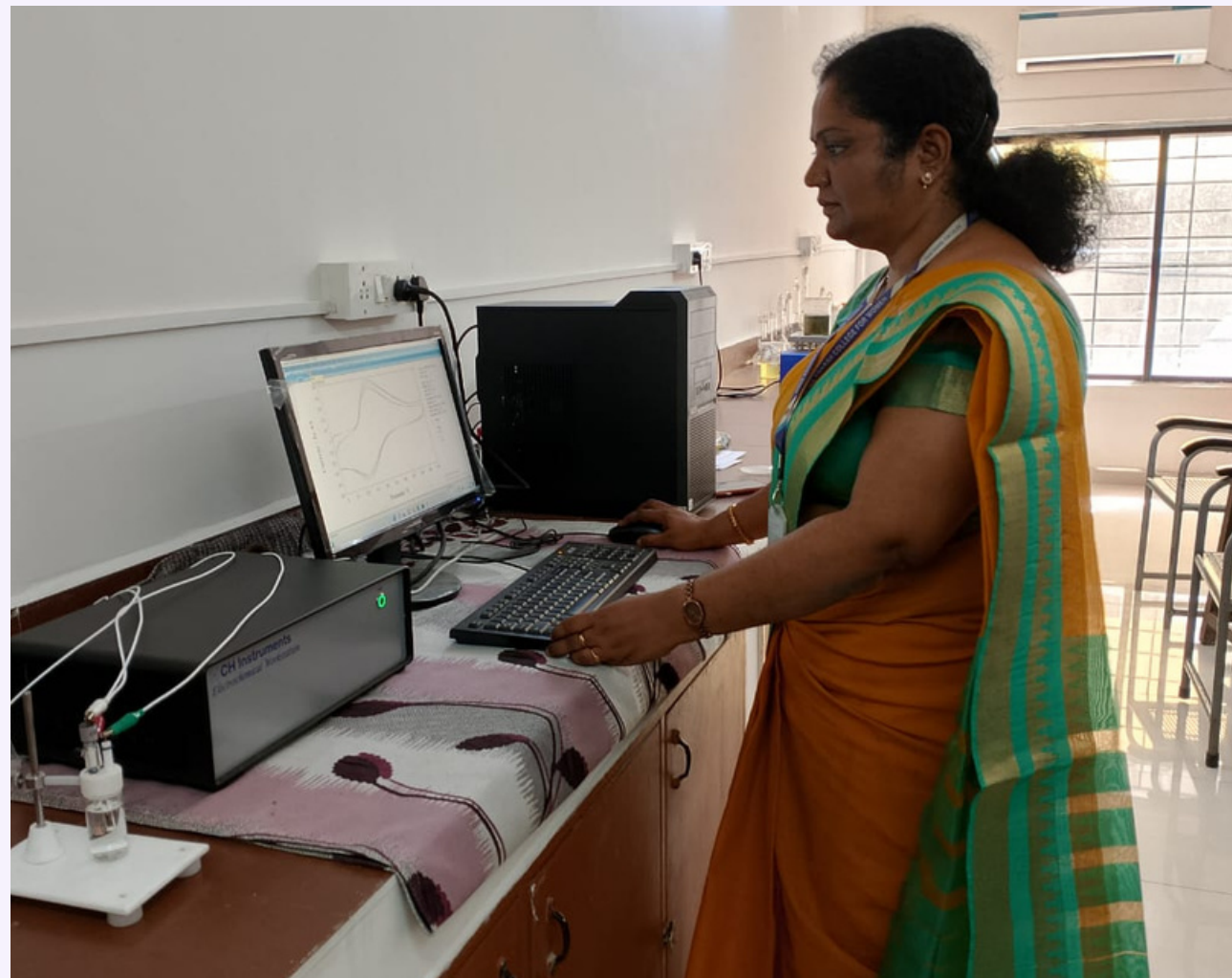
BENCHMARK

ONGOING RESEARCH PROJECT MANAGEMENT FUNDED PROJECT ON

“DESIGNING AND APPLICATION OF NANOHYBRID SENSORS FOR HORMONE DETECTION”

PROJECT PROGRESS

Filed Indian Design Patent on
“BLOOD HORMONE
MONITORING DEVICE”
dated 22nd November 2023



FORM 1
APPLICATION FOR REGISTRATION OF DESIGNS
[See section 5 and 44]

(For Fee see First Schedule)	
^A Insert number of class	You are requested to register the accompanying in Class: 24-00-Medical and laboratory equipment and Sub-Class: 24-02- medical instruments, instruments and tools for laboratory use. in the name of: Anna Adarsh College for Women , an Educational Institution, Address: Affiliated to University of Madras Address: A-1, II Street, 9th Main Road, Anna Nagar, Chennai - 40. who claim(s) to be the proprietor(s) thereof. Natural Person () Start-up () Small Entity () Others (✓)
^B Insert (in full) address and nationality	
^{B1} Category of applicant [Please tick (✓) for the appropriate category]	
^C State whether drawings, photographs, tracings or specimens.	Seven exactly similar drawings of the design accompany this request.
^D Insert name of article or articles to which the design is to be applied or state trade description of each of the articles contained in the set	The design is to be applied to “ Blood Hormone Monitoring Device ”.

The hormone monitor sensor (HMS) design proposed for patenting will be a highly promising device to automatically estimate the blood hormonal level. Monitoring the blood hormone levels in real time can help to make more informed decisions about the medications to be taken. The proposed HMS send and display information through the smartphone automatically. These HMS can be called “real-time” HMS devices.

STAFF ACHIEVEMENTS



PATENT

- **Dr. N. S. Sangeetha** received a UK design patent on “**Portal Device for Measuring Sugar Level through Saliva**”, Design number: 6317034 dated 12th October 2023
- **Dr. N. S. Sangeetha** filed Indian design patent on “**Blood Hormone Monitoring Device**” dated 22nd November 2023

PROJECT APPLIED

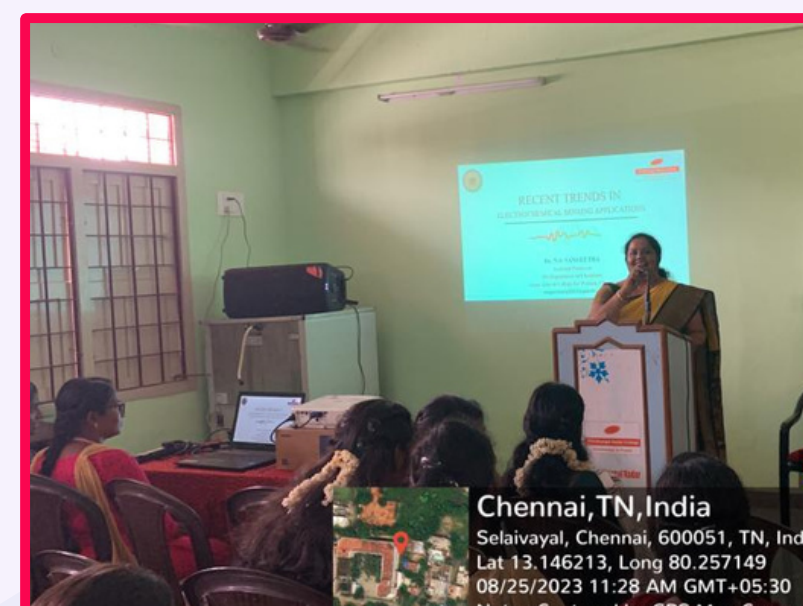
Dr. N. S. Sangeetha has submitted project under TNSCST 23-24 titled “**Fabrication of hormone sensor using MOF derived from PET bottles**”

REVIEWER

Dr. E. Thamarai Selvi is a Reviewer for the Research journal “**Oriental Journal of Chemistry**” Publisher (7/9/2023)

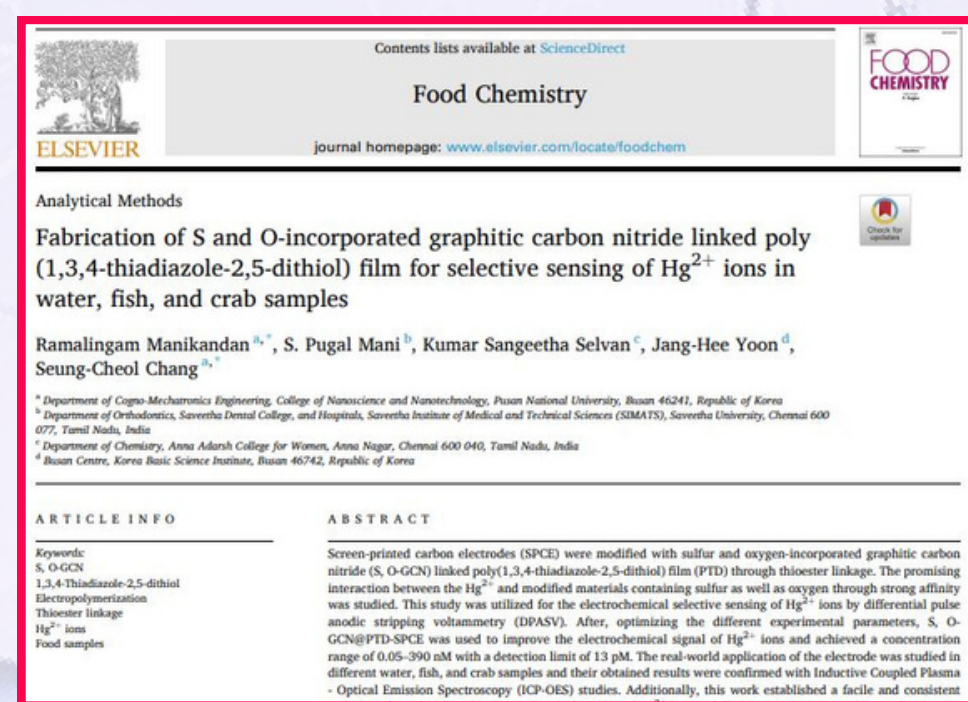
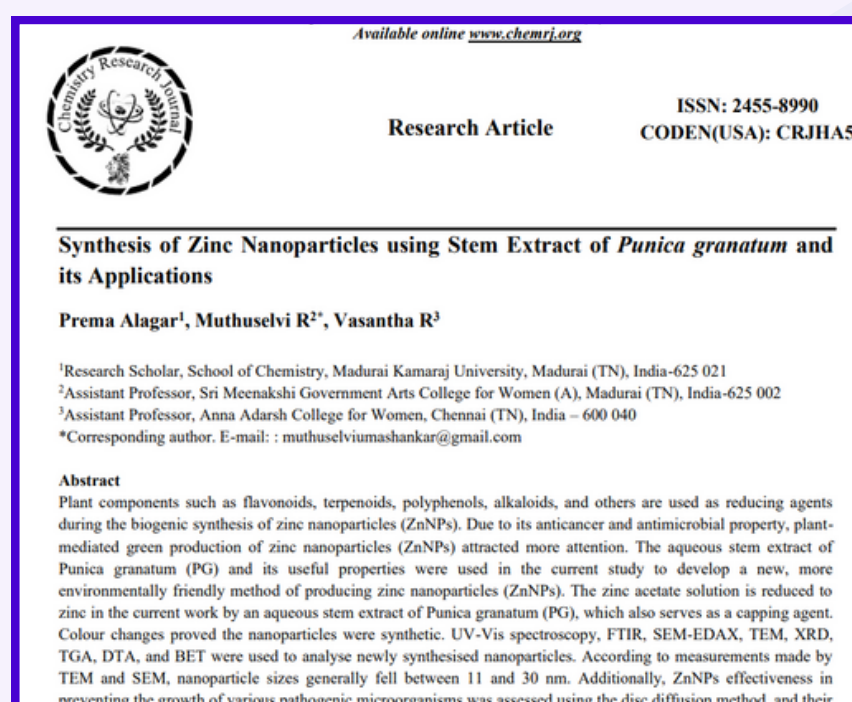
RESOURCE PERSON

Dr. N.S. Sangeetha delivered a talk on “**Recent Trends in Electrochemical Sensing Applications**” organized by Department of Chemistry, Thiruthangal Nadar College, Chennai on 25th August 2023



PUBLICATIONS

- **Dr.R. Vashantha** published a paper titled “**Synthesis of Zinc Nanoparticles using Stem Extract of Punica granatum and its Applications**” Chemistry Research Journal, ISSN:2455-8990
- **Dr.K.Sangeetha** published a paper titled “**Fabrication of S and O-incorporated graphitic carbon nitride linked poly(1,3,4-thiadiazole-2, 5-dithiol) film for selective sensing of Hg²⁺ ions in water, fish, and crab samples**”, Food chemistry journal, ISSN: 1873-7072



Presentation in National/ International Conference

- **Ms. K. Priya Sudha** presented a poster titled “**Study of Optical Non-Linearity in para -methoxy group functionalized 1,2- disubstituted Benzimidazole**” at National Conference on Functional materials for Sustainable Energy & Information Technology (FuMSIET-2023), organized by School of Physical and Chemical Sciences, B.S.Abdur Rahman Crescent Institute of Science and Technology on 27th November 2023 & 28th November 2023
- **Dr.V.Sribharathy** presented a Poster at 3rd International Conference on Recent Trends in Analytical Chemistry (ICORTAC 2023) titled “**Electro chemical Activities of Ni-Ti Super Elastic Alloy in Artificial Blood Plasma in presence Trigonella Foenum Graecum seeds**” at Department of Analytical Chemistry, University of Madras, from 26th June 2023 to 28th June 2023.
- **Dr. K. Sangeetha** presented a poster at 3rd International Conference on Recent Trends in Analytical Chemistry (ICORTAC 2023) titled “**Highly sensitive and simultaneous electrochemical voltammetric detection of Pb²⁺ & Cd²⁺ ions in fish sample using sulfur incorporated Titanium /MCM-41 modified graphite electrode**” at Department of Analytical Chemistry, University of Madras from 26th June 2023 to 28th June 2023
- **Dr. R.J. Kavitha** presented a poster at 3rd International Conference on Recent Trends in Analytical Chemistry (ICORTAC 2023), Department of Analytical Chemistry, University of Madras on the title “**Electro chemical Activities of Ni-Ti Super Elastic Alloy in Artificial Blood Plasma in presence Trigonella Foenum Graecum seeds**” on 28th June 2023
- **Dr. N.S. Sangeetha** presented a poster at 3rd International Conference on Recent Trends in Analytical Chemistry (ICORTAC 2023), Department of Analytical Chemistry, University of Madras on the title “**Development of Electrochemical Sensor for the detection of Paracetamol and Riboflavin in Vitamin Tablets**” on 28th June 2023
- **Dr.N.Suganya**, presented a paper as oral presentation titled “**Optimising the efficiency of natural dye sensitised solar cells based on nanocomposite polymer gel electrolytes utilising Ce/Al doped MnO₂**” at International conference on Advanced Energy materials and energy storage (ICAEMES-2023), Vels institute of science, Technology & advanced studies, on 13th October 2023

STAFF ACHIEVEMENTS

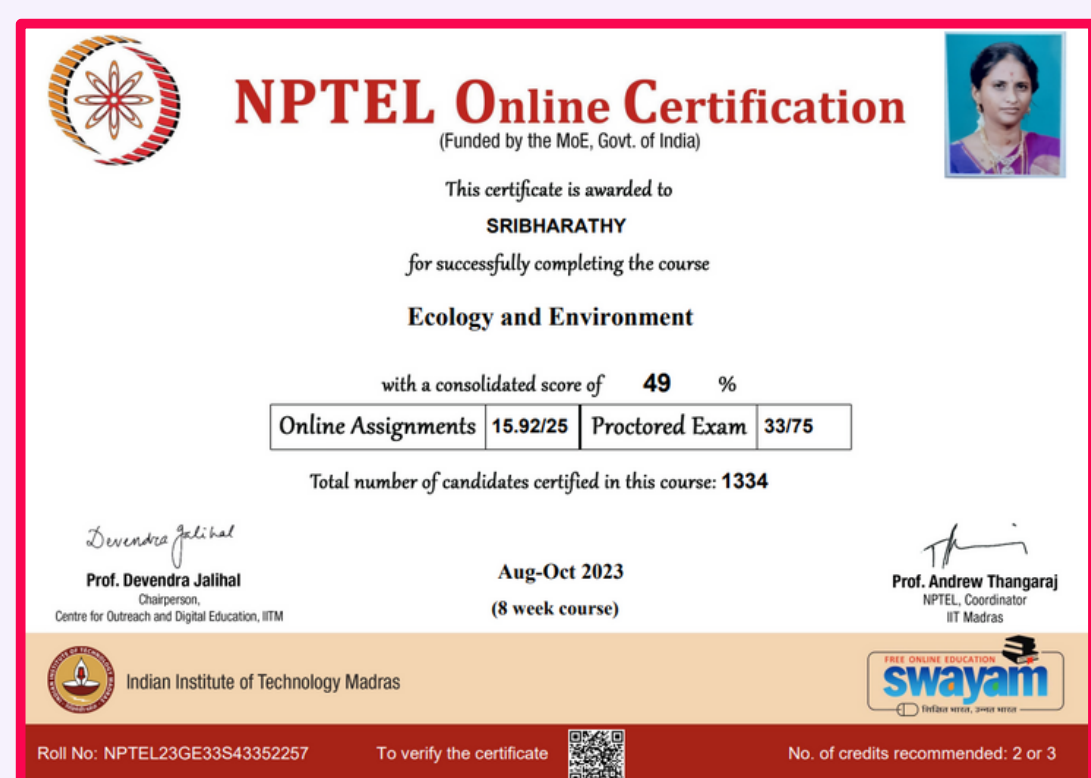
Participation in FDP/ Refresher Course/ SDP/workshop/Webinar

- **Dr. T. Sobana Premlatha** participated in FDP course on the topic “**How to write and publish the research paper in Scopus/WOS/ESCI/UGC indexed journal**” held at Jeppiar College of Arts and Science on 29th July 2023
- **Dr. T. Sobana Premlatha** attended Refresher Course on the topic “**Selective Topics in Organic Chemistry - Phase IV**” conducted by Sathyabama University from 02nd August 2023 to 19th August 2023
- **Dr. E. Thamarai Selvi** attended refresher course on the topic “**Selective Topics in Organic Chemistry - Phase IV**” conducted by Sathyabama University from 02nd August 2023 to 19th August 2023
- **Ms. K. Priya Sudha** attended One Week National Level Faculty Development Programme (online mode) on the topic “**Advanced Research Methodology**” conducted by A.C.T. Academy, Tamil Nadu from 24th July 2023 to 30th July 2023
- **Dr. R. Vashantha** attended Five days FDP on the topic “**Outcome Based education: Learning and Assessment under NEP 2020**” organized by IMS Ghaziabad (University Courses Campus) from 31st July 23 to 04th August 2023
- **Dr. R. Vashantha** attended Skill Development Program on “**Research writing and Anti-plagiarism tools**” conducted by ACT Academy, Tamil Nadu on 30th August 2023 & 31st August 2023
- **Dr. R. Vashantha** attended National Level SDP cum lecture workshop on the topic “**Insights and Recent Trends in Virology**” conducted by A.C.T. Academy, FDP Division, Tamil Nadu on 18th September 2023 & 19th September 2023
- **Dr. R. Vashantha** attended One week FDP on the topic “**From Research to Publication**”, organized by Adhiyaman Arts and Science College for Women, Krishnagiri, Tamil Nadu from 04th September 2023 to 11th September 2023
- **Dr. A. Sumita** attended one week online National level FDP on the title “**Emerging Trends in Chemistry for Multidisciplinary Applications (ETCMA 2023)**” conducted by Department of Chemistry, Sathyabhama Institute of Science and Technology from 4th October 2023 to 10th October 2023
- **Dr. A. Sumita** attended one week National level FDP on the title “**e-Content Development**” organized by Guru Angad Dev Teaching Learning Centre, SGTB Khalsa College, University of Delhi under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNTT), Ministry of Education, Government of India" from 10th October 2023 to 16th October 2023
- **Dr. A. Sumita** attended a FDP course for 5 days on the topic “**International Regulatory Requirement in Good Manufacturing Practices**” at University of Madras in collaboration with Pharmagenie under Nan Mudhalavan Scheme from 17th July 2023 to 21st July 2023
- **Dr. V. Sribharathy** has attended two day SDP cum research workshop on “**Research writing and Anti-plagiarism tools**”, ACT Academy, Tamil Nadu on 30th August 2023 & 31st August 2023
- **Dr. V. Sribharathy** attended National Level workshop on “**Intellectual Property Rights in Academic Institutions**” organized by Patrician college of Arts and Science on 1st September 2023
- **Dr. V. Sribharathy** attended five day FDP on the title “**Empowering Management Scholars: Fostering Research competencies**” organized by Assam down town University from 19th September 2023 to 23rd September 2023
- **Dr. V. Sribharathy** attended Four week faculty induction orientation programme conducted by Teaching Learning Center, Ramanujan College, University of Delhi under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNTT), Ministry of Education, Government of India secured Grade B+ from 22nd June 2023 to 21st July 2023
- **Dr. V. Sribharathy** attended International online Work shop on “**General paper on Teaching Global institute of Statistical solutions**” from 4th November 2023 to 8th November 2023
- **Dr. K. Sangeetha** attended one week workshop on the topic “**Concept of Computational Chemistry (WCC-2023)**” Sathyabama Institute of Science and Technology from 11th July 2023 to 17th July 2023
- **Dr. K. Sangeetha** participated National webinar on “**Yoga & its importance in life**” conducted by Government College, Makdone dist ujjain-India sponsored by MP higher education , Govt. of M.P, Bhopal on 25th August 2023
- **Dr. K. Sangeetha** attended two day SDP cum research workshop on “**Research writing and Anti-plagiarism tools**”, ACT Academy, Tamil Nadu on 30th August 2023 & 31st August 2023
- **Dr. K. Sangeetha** attended National Level SDP cum lecture workshop on the topic “**Insights and Recent Trends in Virology**” organized by A.C.T. Academy, FDP Division, Tamil Nadu on 18th September 2023 & 19th September 2023
- **Dr. K. Sangeetha** attended one week National level FDP on the title “**e-Content Development**” organized by Guru Angad Dev Teaching Learning Centre, SGTB Khalsa College, University of Delhi under the Pandit Madan Mohan Malaviya National Mission on Teachers and Teaching (PMMMNTT), Ministry of Education, Government of India" from 10th October 2023 to 16th October 2023
- **Dr. K. Sangeetha** attended FDP on “**Recent advances and applications in Chemical Science**” organized by Mohamed Sathak A.J College of Engineering from 14th August 2023 to 18th August 2023
- **Dr. K. Sangeetha** attended two weeks interdisciplinary Refresher Course on “**Advanced Research Methodology**” and secured “**Grade A**” organized by Ramanujan College, University of Delhi, under the aegis of Ministry of Education from 22nd September 2023 to 06th October 2023
- **Dr. N. Suganya** attended a refresher course on the topic “**Selective Topics in Organic Chemistry - Phase IV**” conducted by Sathyabama University from 02nd August 2023 to 19th August 2023
- **Dr. N. Suganya** attended six days National level FDP on the title “**Charging Ahead: Exploring Next-Generation Battery Technology**” organized by Department of Chemistry, SRM Institute of Science and Technology, Ramapuram, Chennai from 9th October 2023 to 14th October 2023

STAFF ACHIEVEMENTS

Other Highlights

Dr. T.Sobana Premlatha judged the slogan writing competition conducted by road safety club of Anna Adarsh College for Women, Chennai on 29th September 2023



Dr.V.Sribharathy completed NPTEL course on "Ecology and Environment" at IIT-Madras on 20th November 2023

Dr. R.J. Kavitha chaired a session at 3rd International Conference on Recent Trends in Analytical Chemistry (ICORTAC 2023), Department of Analytical Chemistry, University of Madras from 26th June 2023 to 28th June 2023



Dr. N.S. Sangeetha chaired a session at 3rd International Conference on Recent Trends in Analytical Chemistry (ICORTAC 2023), Department of Analytical Chemistry, University of Madras from 26th June 2023 to 28th June 2023

Dr. N.S.Sangeetha judged prathibhaa expo conducted by Department of Hindi, Anna Adarsh College for Women, Chennai on 12th September 2023

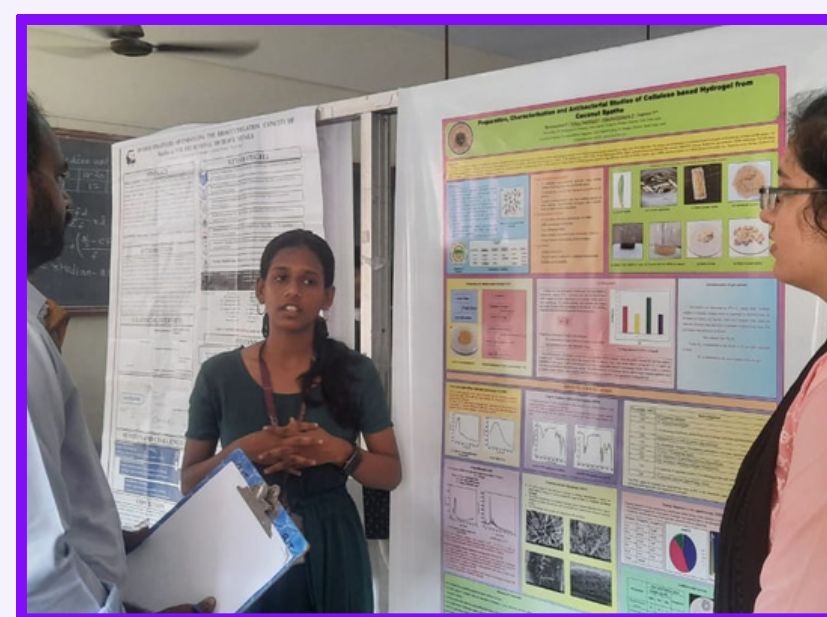
Staffs were presented with token of appreciation by the management for their contribution towards NAAC accreditation



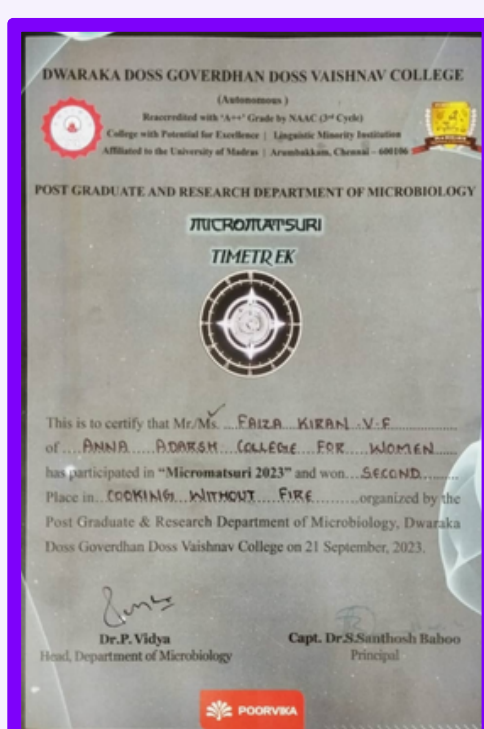
STUDENT ACHIEVEMENTS



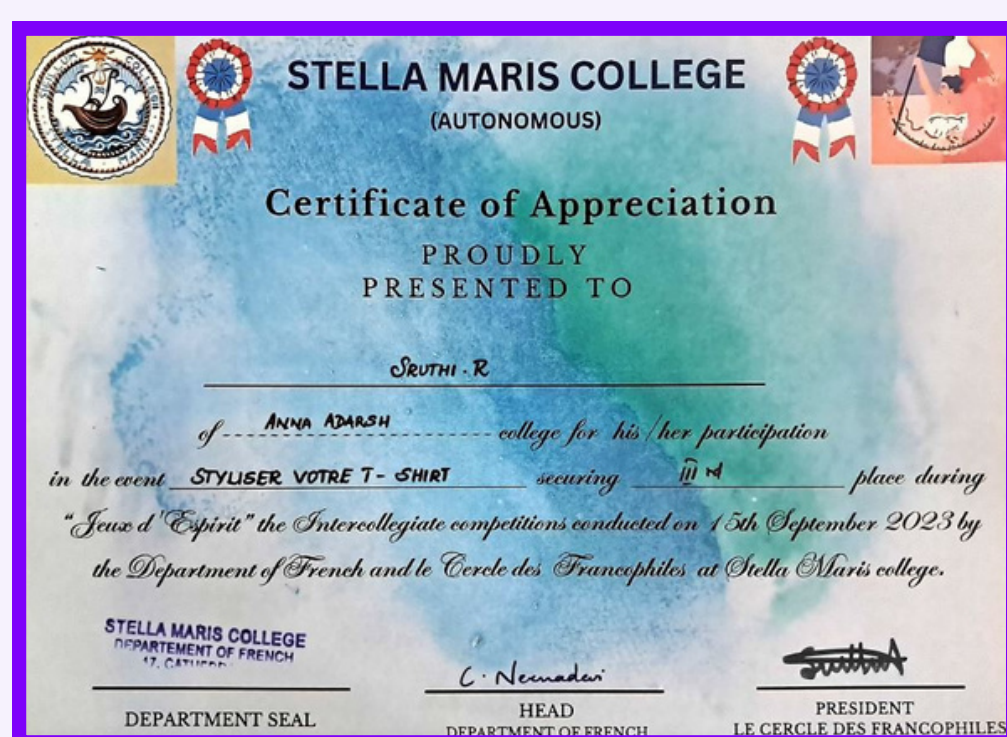
Nithya Nandhini G, Atheeba Firdouse T of II M.Sc., Chemistry presented Poster in ICORTAC -2023- Department of Analytical Chemistry- University of Madras, Chennai- 26th June 2023 to 28th June 2023



Nithya Nandhini G, Atheeba Firdouse T of II M.Sc., Chemistry presented Poster in ICBS-2023- SRM University, Chennai- 12th October 2023 & 13th October 2023

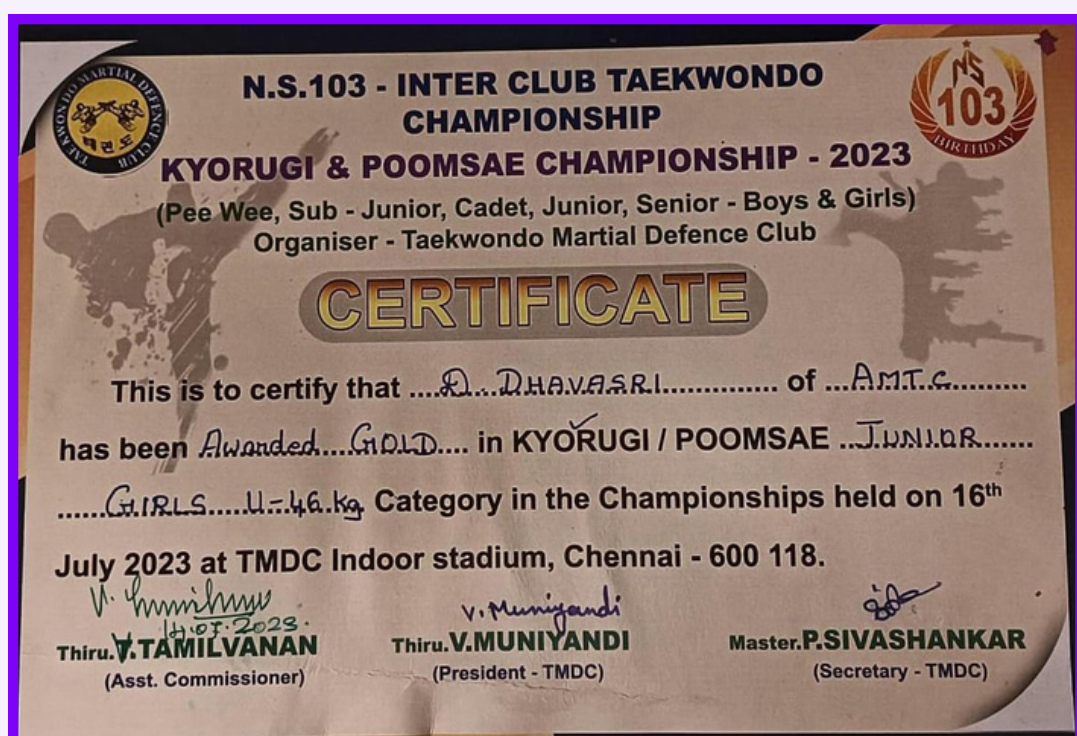


Nithya Nandhini G, Faiza Kiran V. F of II M.Sc., Chemistry won second place in Cooking without Fire- Micromatsuri 2023- PG & Research Department of Microbiology, DG Vaishnav College - 21st September 2023



Sruthi R, Keerthika. V of II B.Sc., Chemistry won third place in styliser votre T-shirt in Jeux d Spirit, the intercollegiate competitions conducted by Department of French, Stella Maris College on 15th September 2023

STUDENT ACHIEVEMENTS



Ms. D. Dhavasri of I B.Sc., Chemistry received Rs.1000/- cash prize from our Correspondent as an appreciation of the Gold medal that she had won in the district level Taekwondo competition on 16th July 2023



Ms. Tamilmani, III B.Sc., Chemistry, state basketball player was honoured by our management with a cash award of Rs. 10,000/- at Radisson blue hotel on 10th October 2023



Ms. R. Suganthashree of I B.Sc., Chemistry participated TNCA Freyer Cup one day league cricket tournament

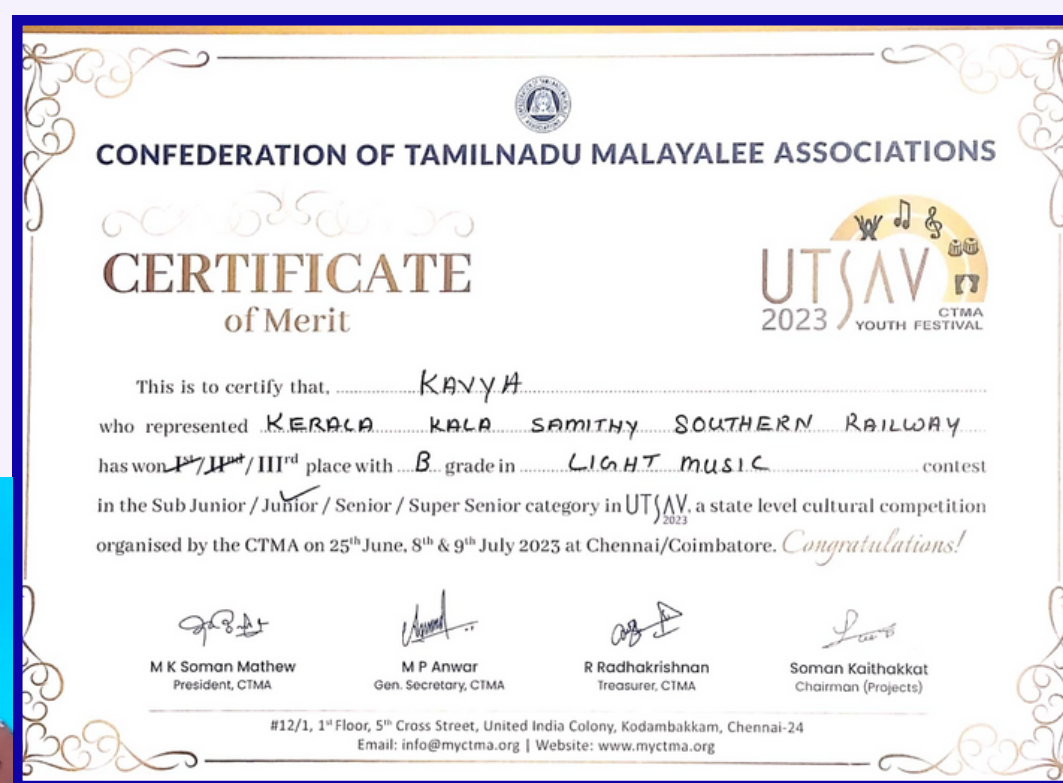


Ms. R. Suganthashree of I B.Sc., Chemistry was awarded the best performer in a state level cricket tournament held at Salem from 12th August to 14th August 2023

STUDENT ACHIEVEMENTS



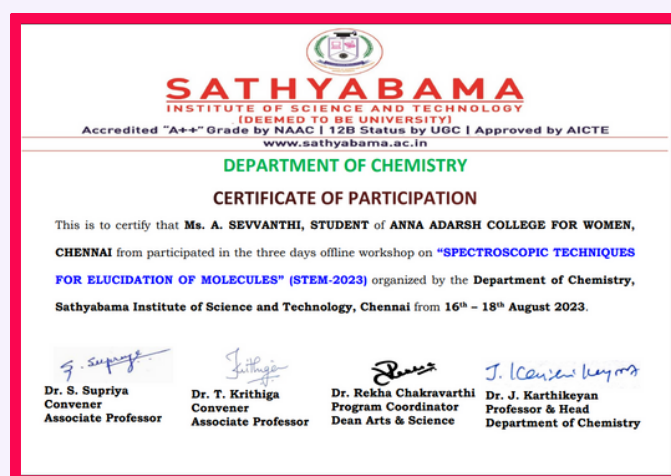
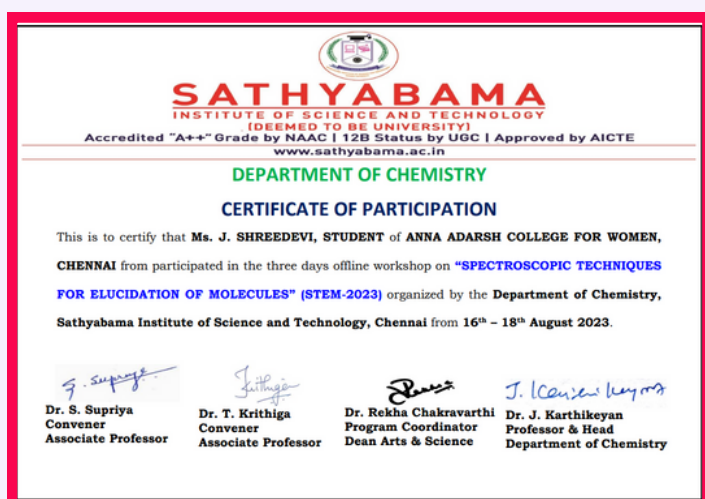
I B.Sc., Chemistry students participated in various events during Manjari held in our College



Ms. V.Kavya, I B.Sc., Chemistry student participated and secured A & B grade in various competition conducted by confederation of Tamil Nadu Malayalee association



OTHER ACTIVITIES



II M.Sc., Chemistry students participated three days workshop on Spectroscopic techniques for elucidation of molecules (STEM-2023) organised by the Department of Chemistry, Sathyabama Institute of Science & Technology, Chennai from 16th-18th August 2023



11 students from II M.Sc., Chemistry students participated three day seminar on "Integrated Water Resources development : A march towards sustainable Water Management , Issues, Challenges and practices" organised by Science City, Chennai from 30.08.203to 01.09.2023

INDUSTRIAL VISIT

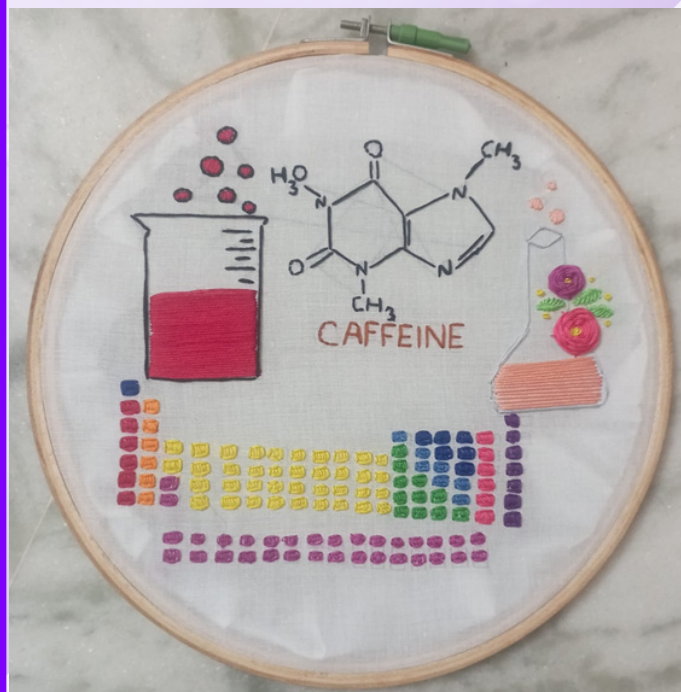


Students from I M.Sc., & II M.Sc., Chemistry participated in open day organised by CSIR- CLRI, Chennai on 26.09.2023

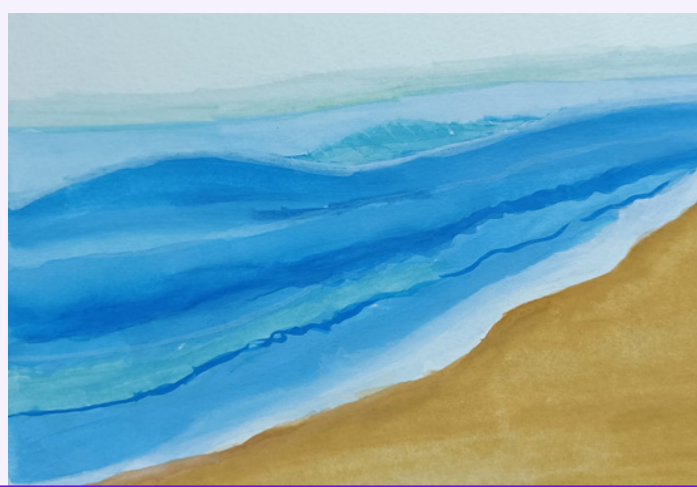


STUDENT'S CORNER

Dharaneshwari III UG



Samyuktha IIIUG



Gopika I UG



Gopika I UG



Gopika I UG



Gopika I UG



Gopika I UG



Rakshitha I UG



Rakshitha I UG



Rakshitha I UG

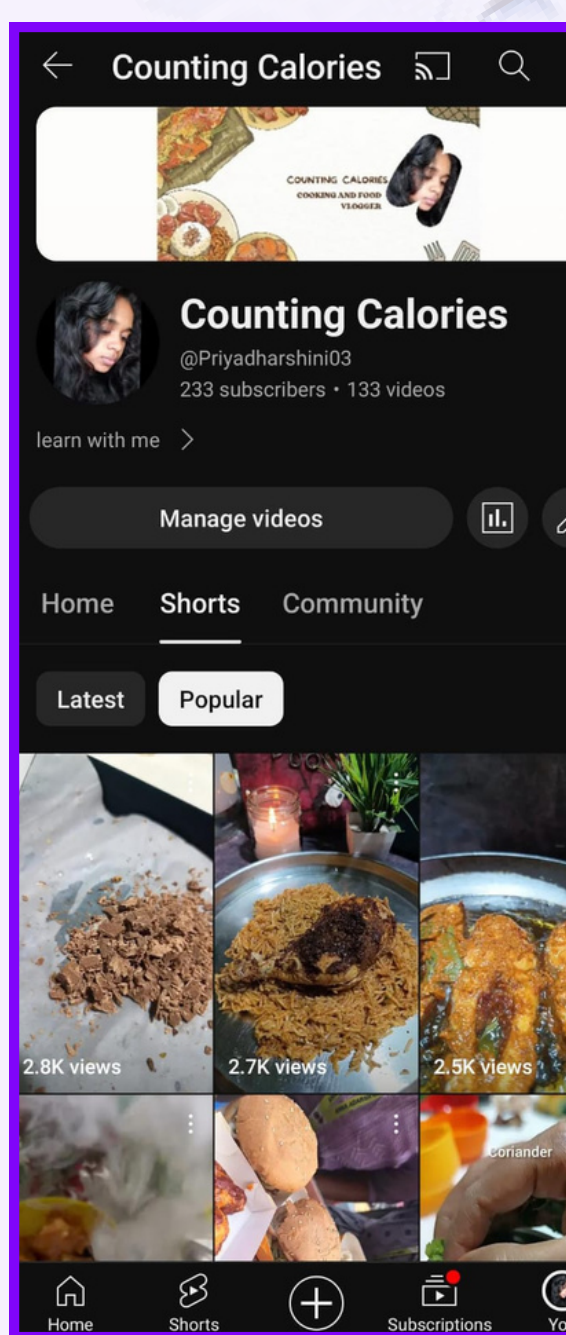
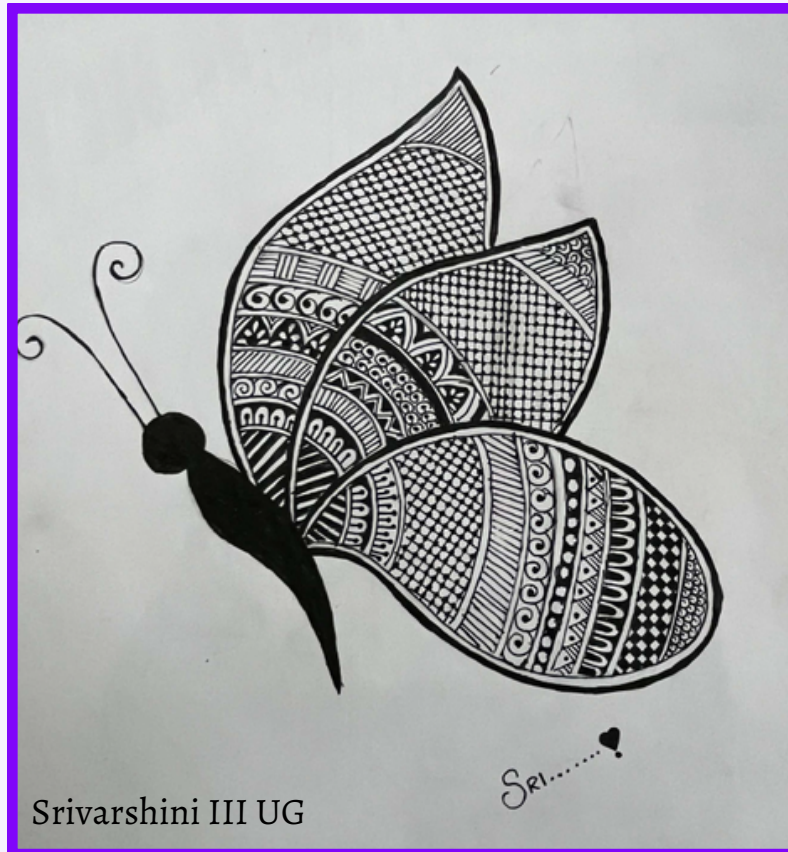


Rakshitha I UG



Rakshitha I UG

STUDENTS CORNER

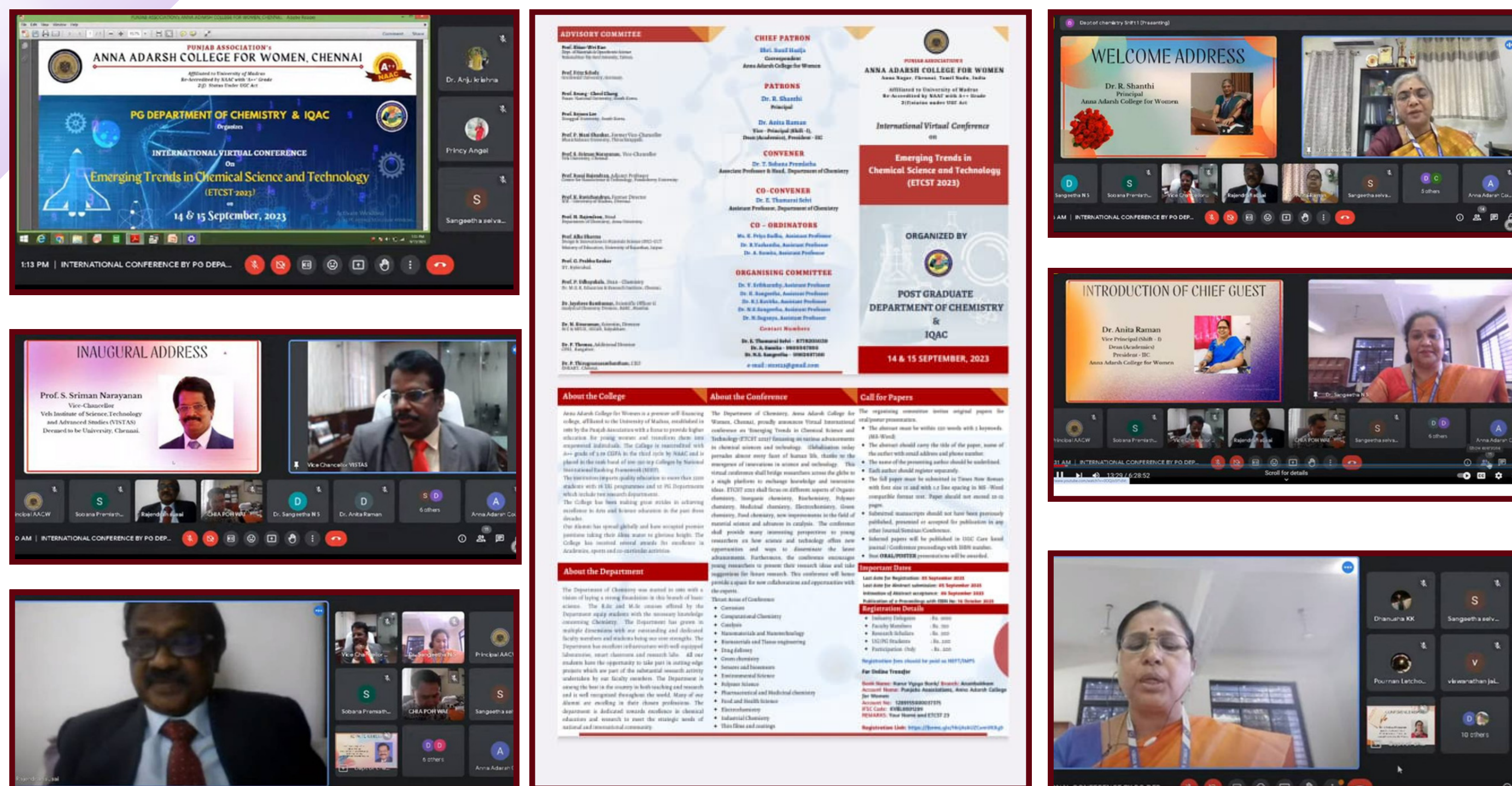


IPG students
@
College day

INTERNATIONAL CONFERENCE

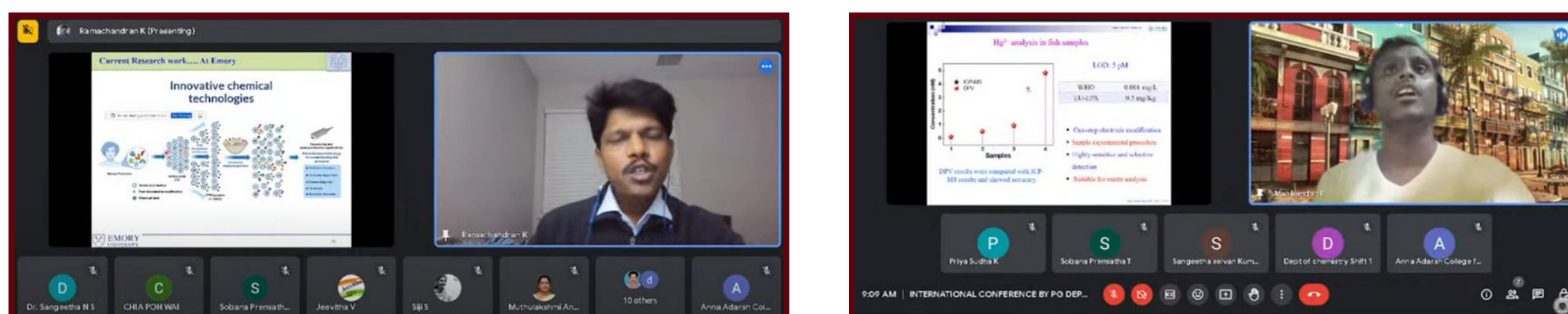
International Virtual Conference on Emerging Trends in Chemical Sciences and Technology (ETCST-2023)

The Conference was conducted on two days - 14th & 15th September 2023. It was inaugurated by Prof. S. Sriman Narayanan Vice-Chancellor, Vels Institute of Science, Technology & Advanced Studies (VISTAS) Deemed to be University, Chennai. Prof. Susai Rajendran Adjunct Professor, Centre for Nanoscience & Technology, Pondicherry University, Coeditor - Journal of Materials Protection delivered the keynote address. The programme was graced by Dr.R. Shanthi, the Principal & Dr. Anita Raman, Vice-Principal (Shift - 1) and Dean (Academics) IIC President. The overview of the conference was presented by Dr.T.Sobana Premalatha, Associate Professor & Head, PG Department of Chemistry

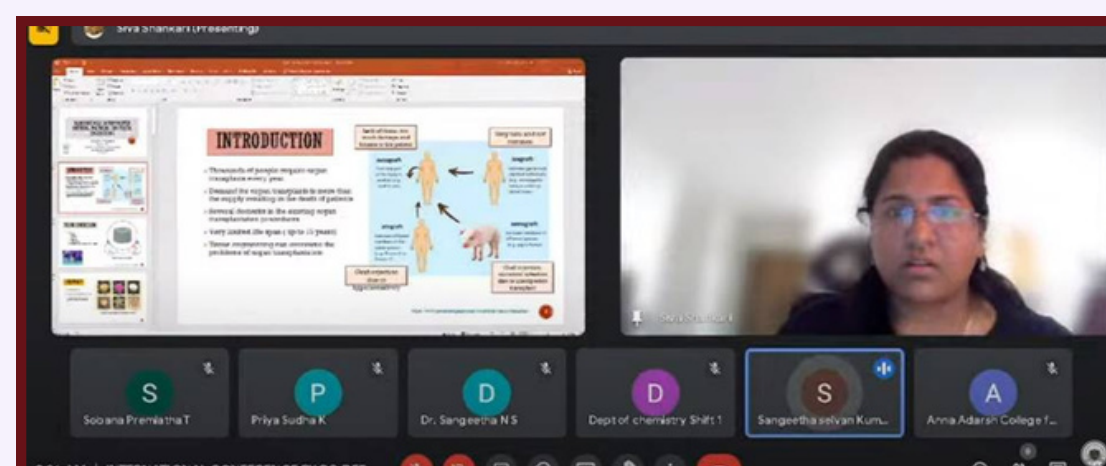
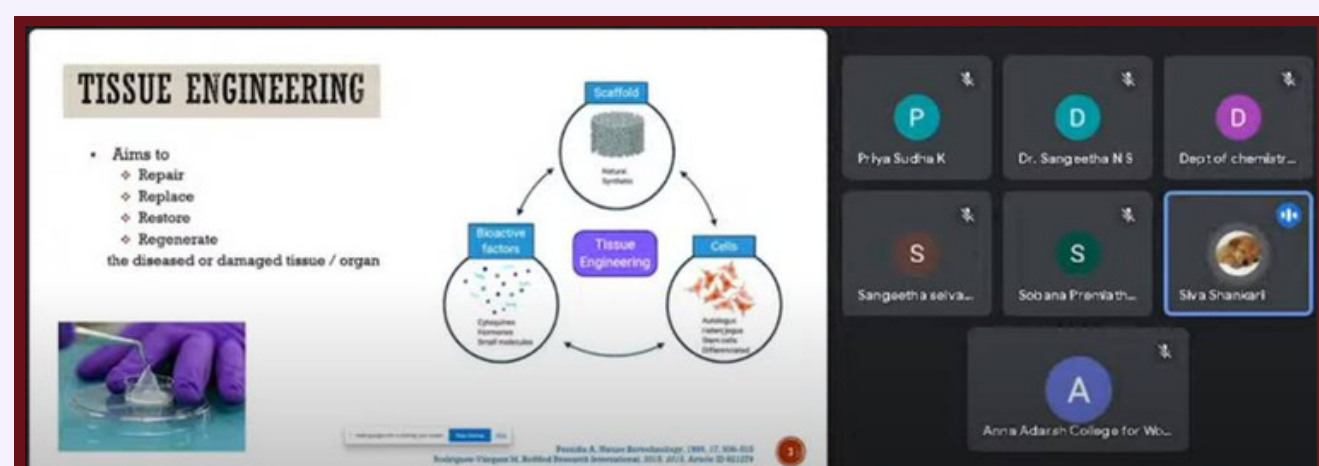


Six invited talks by international guest speakers were arranged for the two-day Conference. ETCST'23 provided a special occasion for renowned scientists, technologists, and researchers from academic institutions and research centres from different parts of India and abroad to gather on a common platform and interact with one another and share their research activities in chemistry.

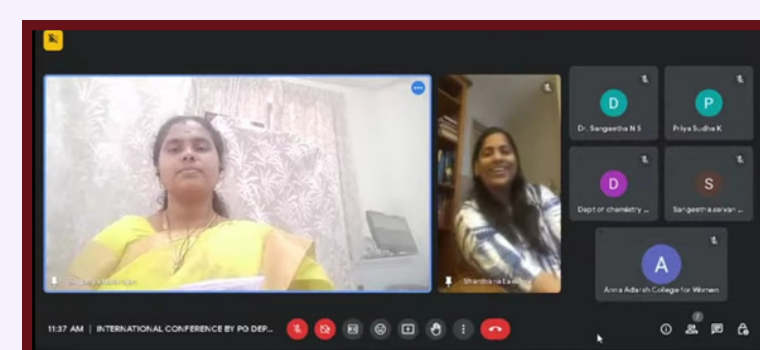
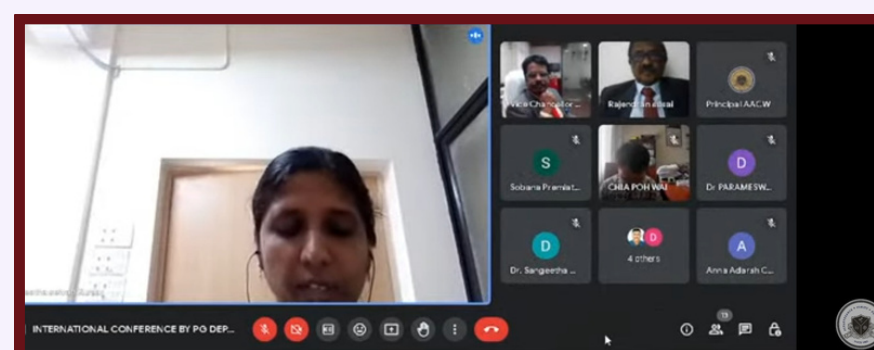
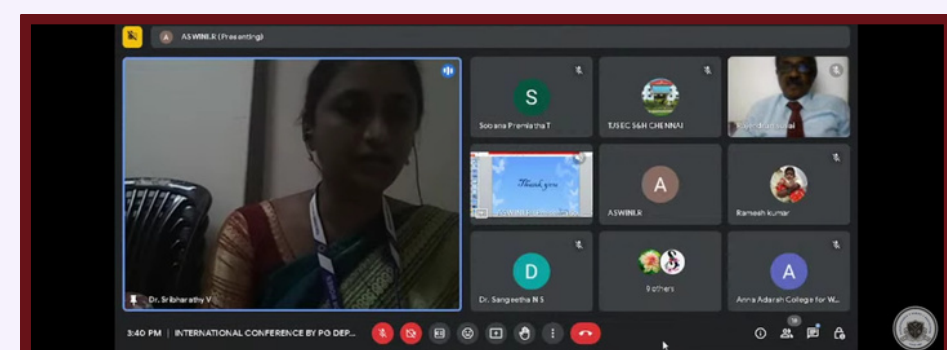
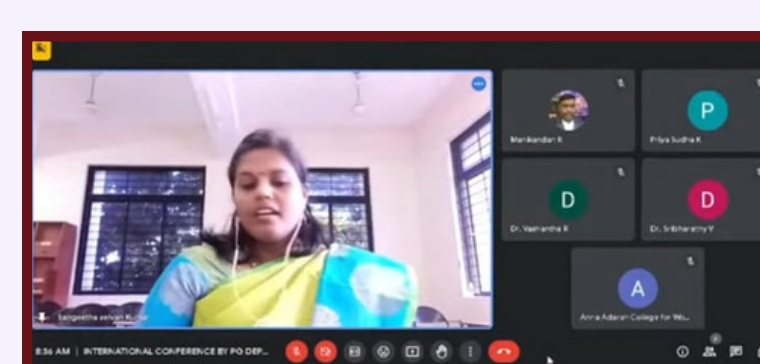
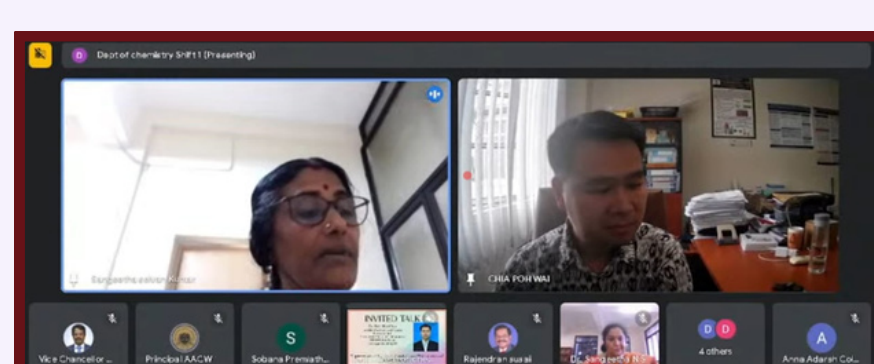
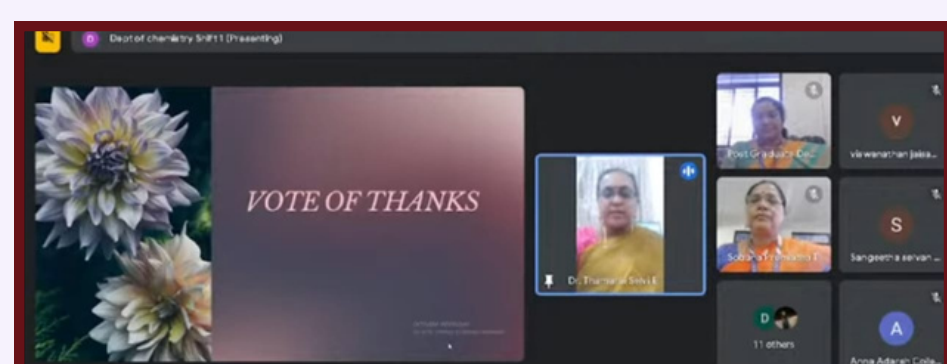
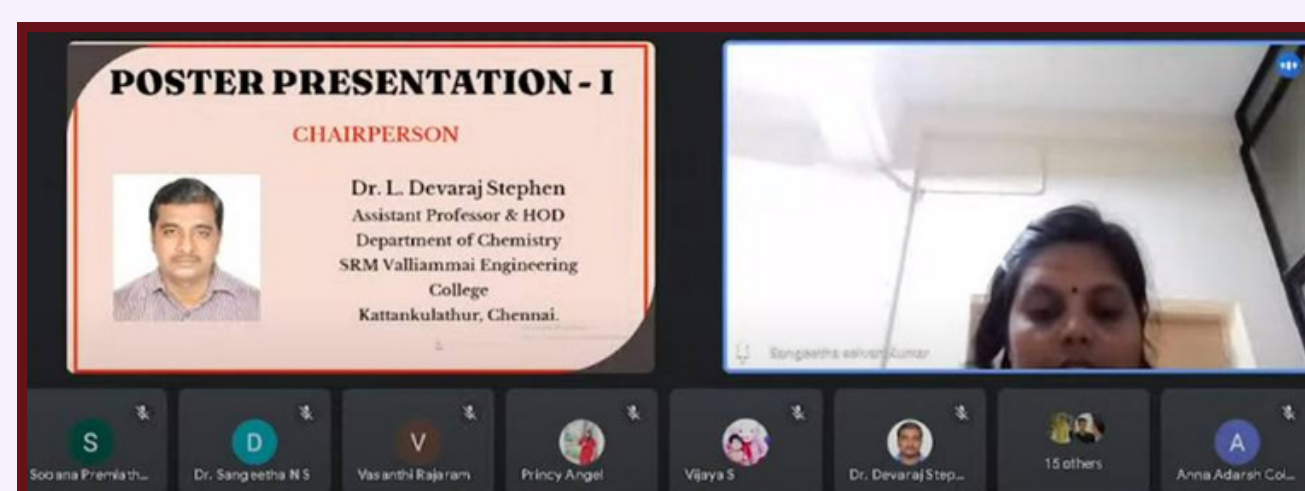
- Dr. Poh Wai Chia, Faculty of Science and Marine Environment, University of Malaysia
- Dr. Ramachandran Kuppan, Emory University, Atlanta, USA
- Dr. Ramalingam Manikandan, College of Nanoscience & Nanotechnology, Pusan National University, Republic of Korea
- Dr. Siva Shankari. P. Rajasekaran Post Doctoral Fellow, School of Dentistry, Oregon Health and Sciences University, USA Portland
- Dr. Adhigan Murali, Faculty of Nanotechnology and Advanced Materials Engineering, Seoul, Sejong University, Republic of Korea
- Dr. D. Shanthana Lakshmi, Air Quality Research Consultant, RSK Environment Ltd., Hempstead, UK,
- Dr. Marijia Erecgovic, Senior Research Associate, Institute for Technology of Nuclear and other Mineral raw materials, Belgrade. Dr. Aleksandra. M. Dakovic, Research Assistant, Institute of General and Physical Chemistry, Belgrade, Dr. Marko Krpic, Chief at TRAYAC Corporation & Faculty of Chemistry, University of Belgrade, Serbia and Dr. Sladjana Maslovara, Research Assistant, Vinca Institute of Nuclear Science, Serbia.



INTERNATIONAL CONFERENCE



Dr. R. Kumaran, Associate Professor, PG & Research Department of Chemistry, D G Vaishnav College and Dr. L. Devaraj Stephen, Assistant Professor & HOD Department of Chemistry SRM Valliammai Engineering College judged the Oral session and Poster session respectively



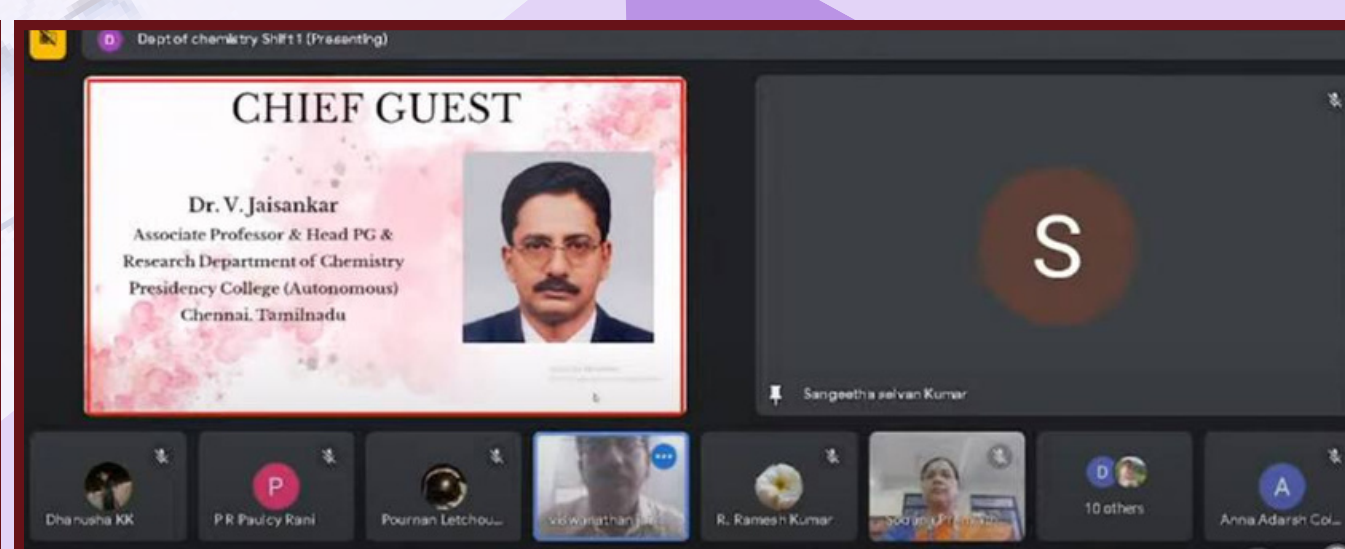
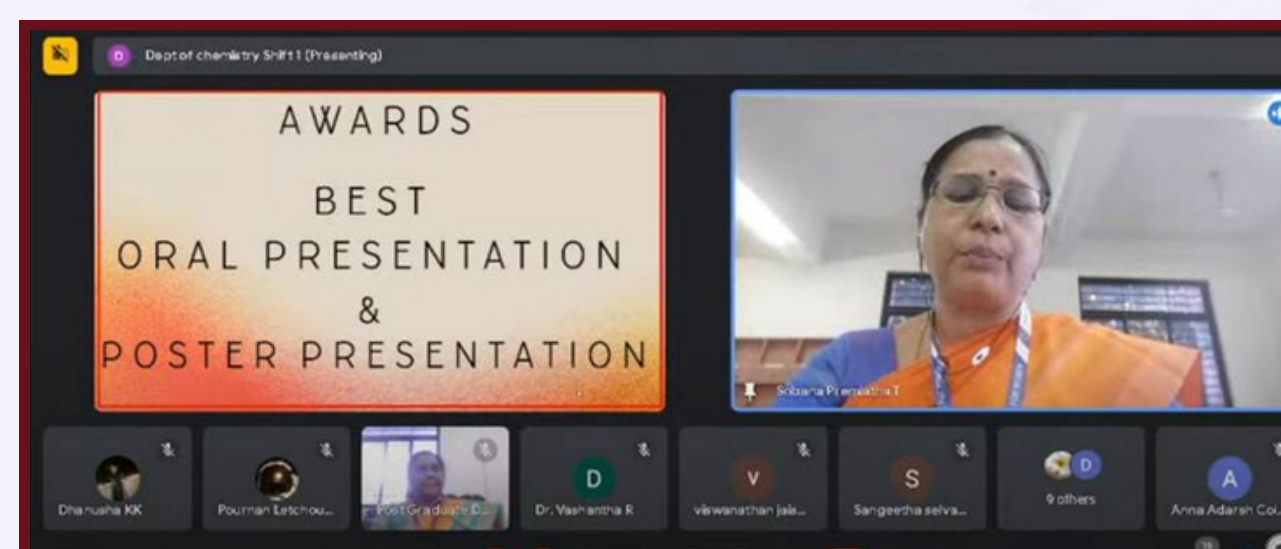
The valediction was presided by Dr. V. Jaisankar, Associate Professor & Head, PG & Research Department of Chemistry, Presidency College, Chennai. Dr. E. Thamarai Selvi, Assistant Professor, PG Department of Chemistry delivered the Vote of Thanks. The abstract of research works presented during the conference is brought out as a Proceedings book with ISBN number. Selected full length articles will be published in the international journal – The Materials Protection.

ETCST'23 explored avenues for emerging trends in research in chemical science and technology. ETCST'23 highlighted research in major areas of chemistry with latest applications in the fields of sensors, batteries, supercapacitors, photocatalytic degradation, nanoscience and biomedical applications. The virtual conference had more than 300 participants. It was live streamed on Youtube and the count of viewers had crossed 1000. The conference has received 71 research papers. These were divided into oral and poster sessions. There were 39 oral presentations and 32 poster presentations.

Best Paper presentation and Best Poster Presentation were awarded during the conference.

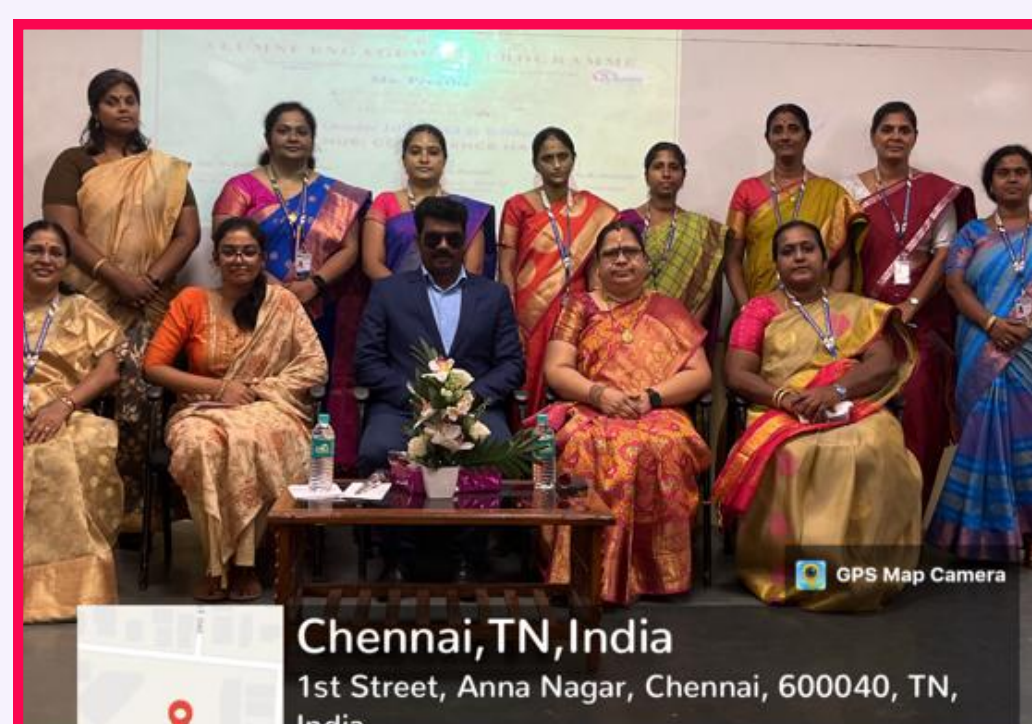
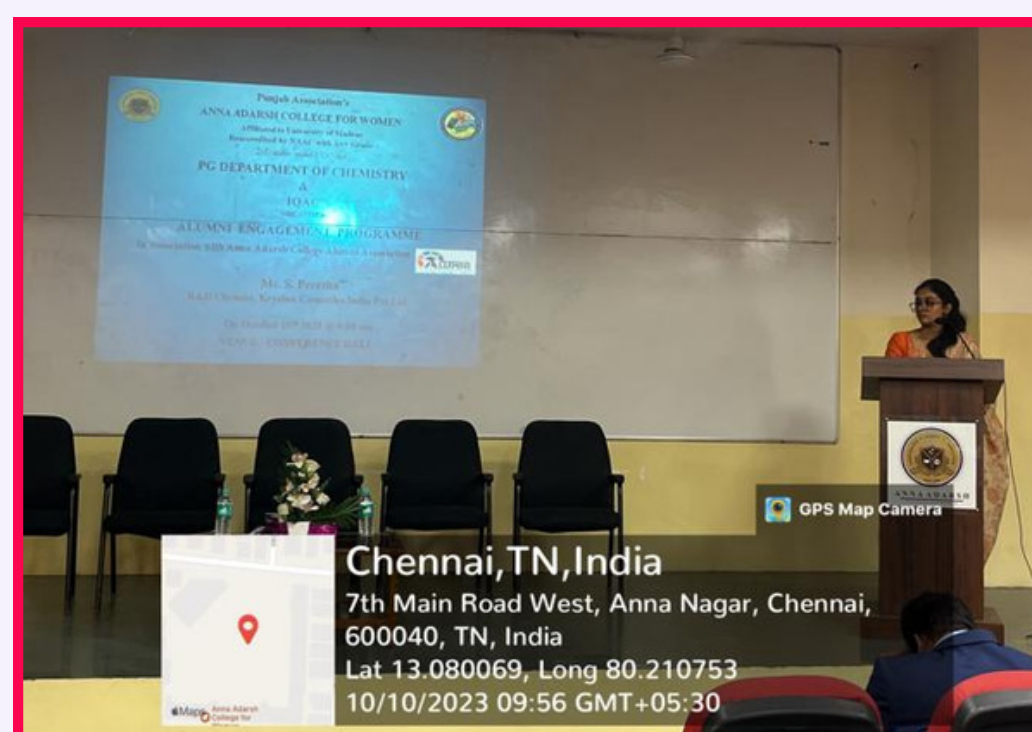
- P. Giftynol Elizabeth, Research Scholar, Department of Analytical Chemistry University of Madras, Guindy Campus, Chennai - Best Poster award
- Benazir Ali L, Research Scholar, PG and Research Department of Chemistry, The New College (Autonomous), Chennai - Best Oral award
- Aswini.R, Research Scholar (Ph.D), Post Graduate Department of Chemistry, The New College, Chennai - Best Oral award

The abstract of research works presented during the conference will be brought out as a Proceedings book with ISBN number. Selected full length articles will be published in the international journal – The Materials Protection.



CAREER GUIDANCE & ALUMNI ENGAGEMENT PROGRAMME

- PG Department of Chemistry, IQAC and Alumni association of Anna Adarsh College organised a Career Guidance Programme and alumni engagement programme on October 10, 2023, in the Conference Hall
- The Chief Guests for the session were Mr.V. Gunasekaran, Pharma and BioPharma Consultant and Ms.Preetha. S (2016-2017 Batch), R&D Chemist, Krylon Cosmetics, Chennai
- The programme was inaugurated by Dr. Anita Raman, Vice Principal, Dean (Academics), President-IIC in the presence of the Chief Guests, Head of the Department Dr. T. Sobana Premlatha, Department staff members and the students
- Mr.V. Gunasekaran briefed the students about the opportunities available for the Chemistry graduates and Postgraduates in various industries like Pharmaceutical, biopharmaceutical, Cosmetics, Food & Beverages etc
- Ms. Preetha shared her experiences with the students and motivated them to explore the industrial opportunities
- The session was attended by 10 staff and 155 students



TEACHERS DAY CELEBRATION

“The art of teaching is the art of assisting discovery”

- Mark Van Doren

Teacher's day was celebrated by UG and PG students with zeal and zest on 5th September 2023 .
The entire celebration paved a new hope for staff to rejoice the journey as a teacher.



COLLEGE DAY

- The 38th College Day was celebrated on 8th November 2023 in conference hall
- The Chief Guest of the day was Thiru. T. Vasanthan, IRS, Commissioner of Income tax . The passed out students of 2022-2023 batch who had excelled in their academic performance received the prizes. The occasion was graced by the presence of Dr. Jeyavathana Samuel, Retired professor and Former Head , Department of Chemistry

- Srisubkeskar Rolling trophy and cash prize instituted by Srisubkeskar trust for Meritorius Performance in Chemistry
 - a) V. Rajeshwari (UG)
 - b) S. M. Priyadarsini (PG)
- Dr. Jeyavathana Samuel Endowment Prize
 - a) S. Gokulalakshmi (UG)
 - b) B.Kavipriya (UG)
 - c) S. Harini (PG)
- Nirmala Vishwanathan , K. Gayathri & Ganapathi merit cum means Endowment Prize
 - a) Sowmiya Sankar (UG)
- Proficiency prize in Chemistry Instituted by the Faculty of Chemistry
 - a) B.Bhavani (UG)
 - b) D.EvangelinePriyanka (PG)
- Best outgoing student
 - a) P.Preethi
 - b) V. Dafine Rebecca (PG)
- Class Toppers
 - a) S.M.Priyadarsini (II PG)
 - b) AtheebaFiradouse. T (I PG)
 - c) V.Rajeshwari (III UG)
 - d) Harini. H (II UG)
 - e) V.K.Vasumathi I (UG)



INTERESTING FACTS ABOUT CHEMISTRY

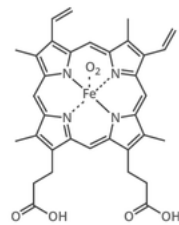
THE CHEMISTRY OF THE DIFFERENT COLOURS OF BLOOD



Red

HUMANS AND THE MAJORITY OF OTHER VERTEBRATES

HAEMOGLOBIN



HAEM B
(oxygenated form)

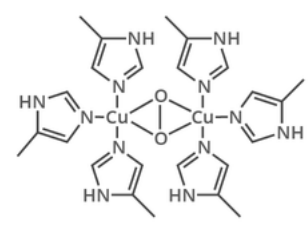
Haemoglobin is a protein found in blood, built up from subunits containing 'haems'. These haems contain iron, and their structure gives blood its red colour when oxygenated. Deoxygenated blood is a deep red colour - not blue!



Blue

SPIDERS, CRUSTACEANS, SOME MOLLUSCS, OCTOPUSES & SQUID

HAEMOCYANIN



HAEMOCYANIN
(oxygenated form)

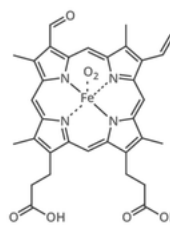
Unlike haemoglobin, which is bound to red blood cells, haemocyanin floats free in the blood. Haemocyanin contains copper instead of iron. When deoxygenated, the blood is colourless, but when oxygenated, it gives a blue colouration.



Green

SOME SEGMENTED WORMS, SOME LEECHES, & SOME MARINE WORMS

CHLOROCRUORIN



CHLOROCRUORIN
(oxygenated form)

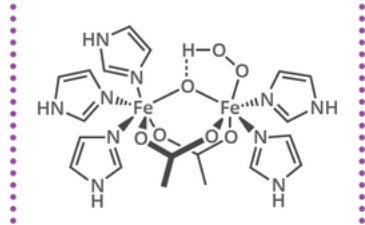
Chemically similar to haemoglobin; the blood of some species contains both haemoglobin & chlorocruorin. Light green when deoxygenated, it is green when oxygenated, although when more concentrated it appears light red.



Violet

MARINE WORMS INCLUDING PEANUT WORMS, PENIS WORMS & BRACHIOPODS

HAEMERYTHRIN



HAEMERYTHRIN
(oxygenated form)

Haemerythrin is only 1/4 as efficient at oxygen transport when compared to haemoglobin. In the deoxygenated state, haemerythrin is colourless, but it imparts a violet-pink colour when oxygenated.

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RIDDLE



A metal neither black nor red,
as heavy as man's golden greed.
What you do to stay ahead,
with friend or foe or arrow and steed.

RIDDLE



I am black when you buy me,
red when you use me.
When I turn white, you know
it's time to throw me away.
What am I?

RIDDLE



I climb higher as I get hotter.
I can never escape from
my crystal cage. What am I?

Cool Chemistry Experiments

Elevate education with these interesting chemistry experiments.



elephant toothpaste



color change chemiluminescence



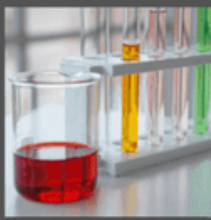
colored fire



copper and nitric acid



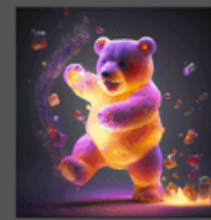
sodium in water



traffic light reaction



thermite reaction



dancing gummy bear



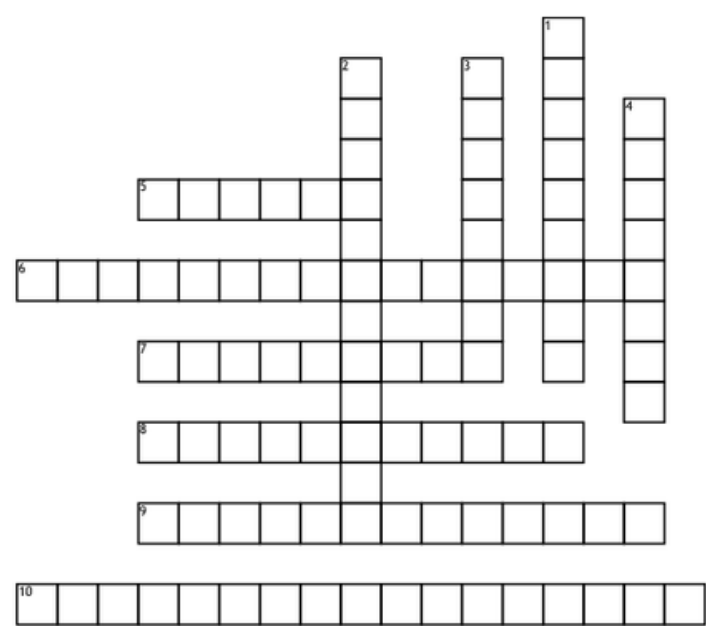
sugar and sulfuric acid



flower shop reaction

sciencenotes.org

Chemical Equations and Reactions



Across

- What does the arrow mean in a chemical equation?
- burning wood, rust, campfire are examples of a _____
- _____ are shown on the left of the arrow
- We can balance an equation by adding a _____ in front of a formula
- a tool used to determine if a chemical reaction is balanced or unbalanced
- T _____ C _____ is a sign of a chemical reaction

Down

- you may never change the _____ of a formula
- Law of _____ of mass
- _____ are shown to the right of the arrow
- when the total mass of the reactant is equal to the mass of the product the equation is _____

AROMA CHEMISTRY



THE AROMA OF BOOKS



WHAT CAUSES THE SMELL OF NEW & OLD BOOKS?

BOOKS, BOTH NEW & OLD, WILL GIVE OFF SEVERAL HUNDRED VOLATILE ORGANIC COMPOUNDS (VOCs). THESE COMPOUNDS HAVE A VARIETY OF ORIGINS - SOME ARE THE PRODUCTS OF DEGRADATION, WHILST OTHERS ARE THE RESULT OF THE TYPE OF PAPER, BINDING ADHESIVE AND PRINTING INK USED IN THE MANUFACTURE OF THE BOOK. THE EMISSION OF THESE COMPOUNDS CAN ALSO BE USED AS A TOOL TO ASSESS DEGRADATION & CONDITION OF BOOKS.

NEW BOOKS

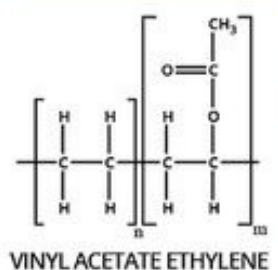
The odour of new books is contributed to by a mix of volatile chemicals which originate from the adhesive, ink, and the paper treatment methods used in the book.



OLD BOOKS

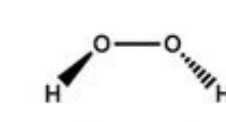
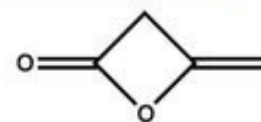
Over time, the gradual breakdown of the cellulose & lignin contained in paper leads to the production of large numbers of different organic compounds.

ADHESIVES

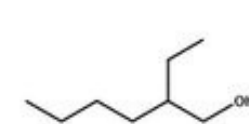
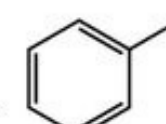
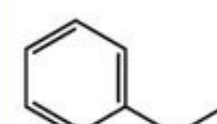
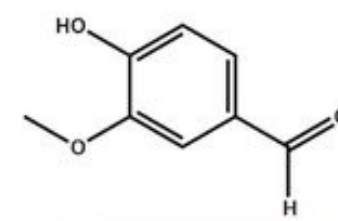
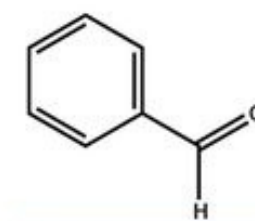


Modern day book binding adhesives are often based on 'co-polymers' such as that shown here. Some VOCs may originate from these compounds.

PAPER & INK



SELECTED COMPOUNDS & THEIR INDIVIDUAL ODOURS



In the paper-making process, the paper is treated with a variety of chemicals, to achieve desired properties. Some of these chemicals could contribute to the release of VOCs. Additionally, petrochemicals used as solvents for inks can also contribute.

IN SHORT: No single chemical causes the odour of books. It's a result of a complex mix of volatile chemicals produced by chemicals used in their manufacture, as well as the gradual degradation of the chemicals within the paper.

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MAIN SOURCE: 'IDENTIFICATION OF VOLATILE ORGANIC COMPOUNDS EMITTED BY A NATURALLY AGED BOOK', A. LATTUATI-DERIEUX ET AL. 2004, JOURNAL OF CHROMATOGRAPHY A, VOL. 1026 P9-18



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