



CECRI NEWS

(A monthly newsletter of CSIR-CECRI)
compilation of significant happenings

National Science Day Celebrations

The National Science Day - 2023 was celebrated in CSIR-Central Electrochemical Research Institute (CSIR-CECRI), Karaikudi in a grand manner on 25th February 2023 which is celebrated every year to commemorate the day of discovery of **Raman Effect** by **Sir C.V. Raman** (February 28) leading to the coveted **Nobel Prize** in 1930. The Theme of NSD-2023 was *Global Science for Global Well being*. **Dr. K.J. Sreeram**, Director, CSIR-CECRI, in his presidential address, elucidated how the Raman Effect transformed from fundamental research to applications by citing several examples. He also stated that *the country will advance only through science*. The Chief Guest, **Dr. G. Satheesh Reddy**, Scientific Adviser to Raksha Mantri, Govt. of India, in his **National Science Day** lecture, emphasized the importance of basic research and explained how unique innovations in science & technology changed the global economy.



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Aatmanirbhar Bharat
shall be led by
know-how and know-why

- **Dr. Satheesh Reddy**
 Scientific Adviser to
 Raksha Mantri, Govt. of India



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Dr. Reddy further stated that fundamental R&D plays an important role in the academic sector in India, and that there has been an increase in the number of PhDs generated in various scientific fields in recent years, as well as the number of academics who have joined for research as Research Assistants, Research Fellows, etc. He emphasised the significance of materials research especially on indigenous materials. He highlighted the Ministry of Defence's recent launch of the INS Vikrant Naval Aircraft Carrier, which was built primarily with indigenous materials.

He strongly expressed his belief that innovative applications are an indispensable part of new products that compete with the public need. Further he stated that, only science and technology can drive the country forward, and make it capable to compete with global demand. Aatmanirbhar Bharat shall be led by know-how and know-why, he remarked. He also showcased various technological achievements by different departments, including the Department of Space, DRDO, DAE, DSIR, and others.

Prof. M. Lakshmikantham, *Dr. B. P. Godrej Distinguished Professor*, Institute of Chemical Technology (ICT), Mumbai and **Prof. Sagar Mitra**, Department of Energy Science & Engineering, Indian Institute of Technology (IIT), Bombay took part in the Event as **Guests of**

Honour. Prof. Lakshmikantham talked about the sequence and significance of the discovery of Raman Effect and recalled her close association with CSIR-CECRI in the past. She fondly motivated and encouraged the scholars, especially women scholars, by remarking that she was the **First Woman Director** to head a CSIR Lab (CSIR-IICT, Hyderabad in 2013) and now CSIR is being headed by the **First Woman Director General**, Dr. N. Kalaiselvi, who also was the **First Woman Director of CSIR-CECRI, Karaikudi.**

Prof. Sagar Mitra vividly recollected his visits to CSIR-CECRI, Karaikudi in pursuit of his passion for Electrochemistry and the invaluable insights he gained every time he visited. His lecture was highly informative and interactive as he posed interesting questions in between to engrossing the attention of the participants. He also spoke about the energy demand in our country and emphasised the need for carrying out energy research in fulfilling global needs.

Prize Winners of various competitions held earlier to commemorate NSD-2023 (Essay Competition, Poster Presentation, Oral Presentation, Science Photography Competition and TED Talk) were awarded with cash prize and certificate. The programme concluded with vote of thanks by **Dr. V. Murugan**, Scientist, CSIR-CECRI, Karaikudi.



71st Meeting of the Research Council



The 71st Meeting of the Research Council of CSIR-CECRI was convened on February 25, 2023 at CSIR-CECRI, Karaikudi. The Meeting was presided over by **Dr. G. Satheesh Reddy**, Scientific Adviser to Raksha Mantri, Govt. of India and Chairman, RC, CSIR-CECRI.

Director, CSIR-CECRI welcomed the members and invitees to the meeting. The Director and the RC Members congratulated the **RC Chairman** for his elevation as the Advisor to the Raksha Mantri and the former Director CSIR-CECRI, **Dr. N. Kalaiselvi**, for her elevation as the Director General of CSIR.

The Chairman congratulated Team CECRI for the elaborative report prepared for the 71st meeting of the RC as well the detailed minutes of the 70th meeting. He praised the Institute for circulating the presentations before-hand and said that the same should become a norm hereafter. The Director, CSIR-CECRI highlighted that the institute had performed exceedingly well in the last six months.

The **Chairman** opined that the RC could guide the Institute in transforming into a global institution rather than being India-centric. The RC recommended that Institute should serve as a *benchmark organization in solving the issues pertaining to the field of Electrochemical Science & Technology, globally*.

The **Council** desired that the Institute should ensure to leverage the benefits out of its patents. Towards achieving this, it has to showcase its intellectual property to all the stakeholders including industrial sector in order to gain their confidence of investing. In today's world, all R&D activities must lead to profitable business thereby attaining sustainable development, the Council remarked.

Then, the Heads of R&D Divisions of CSIR-CECRI presented the progress made after the previous RC meeting. The presentations highlighted the on-going R&D activities and road maps for the future. Presentations on Special Project Proposals on *Carbon Capture from Ambient Air* by Dr. V. Ravi Babu and *Molten Salt Electrowinning of Rare Earth Metal and Alloys* by Dr. M. Jayakumar were also made. The presentations were well received by the Council and at the end of every presentation by the Division, the Council Members offered critical inputs and valuable suggestions towards fine-tuning the activities leading to sustainable development of the Institute.

Closed Door Session of the RC Meeting ensued and the 71st Meeting of the Research Council ended with Vote of Thanks by **Dr. N. Lakshminarasimhan**, Sr. Principal Scientist and Head, PPMG, CSIR-CECRI and Secretary, Research Council, CSIR-CECRI.

S.No	Title	Sponsor	Cost (Rs.)	Duration
1	SSP25/22: Ascertaining the present condition of spillway gates of Tungbhadra Board Dam and their remaining service life	Karantaka	26,07,800 (10.43.120)	26-12-2022 25-06-2023
2	CNP01/22: Vetting of Cathodic protection Design for an Underground sheet piles for the new dry Dock	Mumbai	6,08,880	27-07-2022 28-02-2023
3	TSP03/22: Testing of four coat paint system	Mumbai	1,77,000	30-05-2022 28-07-2022
4	TSP08/22: Bond energy of monomolecular inhibitor film, Associated chemicals, Mumbai	Mumbai	1,18,000	22-11-2022 21-12-2022
5	TSP10/22: Testing of liquid paint for M/s. Krishna Conchem Products Pvt Ltd., Navi Mumbai	Mumbai	1,77,000	17-01-2023 28-02-2023



Business Development Leads

- ❖ Online Meeting with **BHEL** on Carbon capture [Feb 6]
- ❖ Meeting with **GFL** on R&D collaboration [Feb 7, 16]
- ❖ Discussion with **ISRO** officials on R&D collaboration [Feb 8]
- ❖ Meeting with **BHEL** on R&D collaboration [Feb 8, 9]
- ❖ Meeting with **Cochin Shipyard Ltd.** on CP System in Repair and Building Docks [Feb 9]
- ❖ Meeting with **Indian Oil Corporation Ltd.**, Pipelines Division, Noida on R&D Collaboration [Feb 10]
- ❖ Meeting with **Maxmoc** on R&D Collaboration [Feb 13]
- ❖ Meeting of The **Nodal Director, Chemical Theme** with all Scientists of CSIR-CECRI [Feb 14]
- ❖ Meeting with CSIR HQ on **H2T Mission** [Feb 16]
- ❖ Meeting with **NERTC** on R&D Collaboration [Feb 16]
- ❖ Meeting with **BHEL** Officials on R&D Collaboration [Feb 22]
- ❖ Meeting on Green Hydrogen with **M/s. Black Stone Terry Eng. Co.**, Jodhpur [Feb 28]

Technology Transfer

Technology Transferred:

- ❖ *Manufacture of four coat paint schemes consisting of epoxy & polyurethane paint systems for concrete structures* to M/s. Berger Paints India Limited, Kolkata. 22 lakhs; 5 years wef 22.02.2023.



AcSIR Highlights

- ❖ Placement Drive for B.Tech. Students [Feb 8]
- ❖ CFE Faculty Meeting [Feb 8, 9]
- ❖ Meeting of Student Academic Committee [Feb 15]
- ❖ First DAC Meeting of Mr. B. Rajasekar [Feb 17]
- ❖ First DAC Meeting of Ms. Renuga [Feb 17]
- ❖ CSIR-800 Project Presentation and Review by P.Packiyalakshmi & M.K. Nikhil Chandran [Feb 23]
- ❖ Ph.D. Viva Voce Examination for Mr. G.C. Shivaraju, AcSIR Scholar (Guide: Dr. A.S. Prakash) [Feb 27]

Official Events

- ❖ Project Progress Review Meeting (GAP18/22) [Feb 3]
- ❖ Monthly Review Meeting of CSIR-AMM-HCP-030 [Feb 3]
- ❖ Monitoring Committee Meeting to review the Progress of on-going CPWD works at CSIR-CECRI campus [Feb 14-15]
- ❖ Meeting of Committee on International Women's Day Celebration [Feb 16]
- ❖ Meeting of the CECRI Ladies Forum on Competitions for International Women's Day Celebration [Feb 16]
- ❖ Meeting of APAR Normalisation Committee [Feb 23]
- ❖ Meeting of the Laboratory Strategic Group (LSG) [Feb 26]
- ❖ Meeting of the Project Proposal Review/Recommendation Committee [Feb 24]
- ❖ Meeting of the Official Language Implementation Committee [Feb 24]
- ❖ Meeting of NSD-2023 organizing committee [Feb 24]
- ❖ Meeting of the Safety Committee [Feb 28]

Honours and Awards

International Conference on Electrochemistry in Industry, Health & Environment at BARC, Mumbai (Feb 7-11, 2023)

2nd International Conference on Advanced Nanomaterials for Energy and Environmental Applications, Alagappa University, Karaikudi (Feb 9-11, 2023)



Ms. K. Nivedha
DST-INSPIRE-SRF
[Guide: Dr. B. Subramanian]
Best Paper Presentation Award



Mr. M. Lakshmi Narayana, B.Tech. Student
[Guide: Dr. P. Tamilarasan]
Best Poster Award



Ms. M. Sornambigai
DST-INSPIRE-SRF
[Guide: Dr. S. Senthil Kumar]
Young Researcher Award

International Conference on Frontier Areas In Chemical Technologies-2022, Alagappa University, Karaikudi (Feb 16-18, 2023)



Mr. A. Bebin, UGC-SRF
[Guide: Dr. M. Kathiresan]
Best Oral Presentation Award - II Prize



Mr. Anadebe C. Valentine
CSIR-TWAS Fellow
[Guide: Dr. Rakesh Barik]
Young Researcher Award



Ms. M. Kowsalya, DST-INSPIRE-SRF
[Guide: Dr. Aiswarya Bhaskar]
Best Poster Presentation Award - II Prize

- ❖ The **B.Tech. (Chemical and Electrochemical Engineering)** Course of **CSIR-CECRI** has been accredited for 6 years [upto 30.06.2028] by **National Board of Accreditation (NBA)**, New Delhi.
- ❖ The **Clinical Lab** in our **Health Centre** has achieved **Excellent/Good Ratings** for all Blood Investigation Parameters in the **External Quality Assurance Scheme Yearly Summary Report-2022** by the Department of Clinical Biochemistry, **Christian Medical College, Vellore**.
- ❖ **Dr. Subrata Kundu**, Principal Scientist, CSIR-CECRI has been selected as a **Guest Editor** for a theme collection on **Surface Engineering of Transition Metal Based 2D Layered Materials** from **Materials Advances Journal** published by RSC [<https://www.nature.com/collections/jbdajiabad/guest-editors>]:

Subrata Kundu is a Principal Scientist at CSIR-Central Electrochemical Research Institute (CECRI), Karaikudi, Tamilnadu, India. His major research interest is related to Materials Chemistry for the application in catalysis, environment and energy related applications. At present, his work mostly focused on water electrolysis for generation of sustainable green hydrogen. Dr Kundu has been an Editorial Board Member for *Scientific Reports* since 2015.



Skill Development Activities

- ❖ A four-day special tailor-made **Industrial Refresher Training Course** was conducted by CSIR-CECRI for the executives of **TVS Motors Co. Ltd., Hosur** on **Lithium-ion Battery: Material to Manufacturing** during February 1-4, 2023. 15 executives from TVS attended the Course.

Jigyasa:

- ❖ A one-day Industrial Visit was organized for the students of:
 - Bharathidasan Institute of Technology, Tiruchirappalli** in the specialised area of **Advanced Composite Materials for Energy Conversion and Storage Applications** and
 - Mangayarkarasi Arts & Science College for Women, Madurai** in the specialised area of **Electrochemical Power Sources** on 17/02/2023.

A total of 56 students and six faculty members visited

CSIR-CECRI and gained valuable insights.

- ❖ A two days Workshop on **Artificial Intelligence and Data Science** was organized on February 1-2, 2023. **Ms. K. Visalini, IQ 225 (Holder of 5 World Records, 13 International Awards)** delivered a Lecture on **The Art of Teaching a Machine** on February 1, 2023. Dr. P. Murugan, Sr. Principal Scientist, CSIR-CECRI, Prof. A. Senthilrajan, Alagappa University, Karaikudi Dr. Shekhar Hansda, Scientist, CSIR-CECRI delivered invited lectures. A total of 70 students from schools and colleges participated along with their teachers took part enthusiastically in this event on emerging field gaining huge popularity worldwide.
- ❖ An exposure visit under the **Naan Muthalvan** Scheme of Government of Tamil Nadu was organized on February 27, 2023. A total of 50 students and 10 faculty members visited CSIR-CECRI and updated themselves on the ongoing R&D activities.

Azadi Ka Amrit Mahotsav and CSIR-CECRI@75

As a part of the ongoing Lecture Series on '*Electrochemical Science and Technologies: A Path Forward to Sustainable Society*' in marking the celebrations of India's 75th Year of Independence (Azadi Ka Amrit Mahotsav) and CSIR-CECRI's 75th Foundation Year (CSIR-CECRI@75), Dr. Vigneswari Sevakumaran, Associate Professor from Institute of Marine Biotechnology, Universiti Malaysia Terengganu, Malaysia visited CSIR-CECRI, Karaikudi as part of INDO-ASEAN Collaborative R&D Project and delivered a lecture on *Polyhydroxyalkanoates: Promising Bacterial Plastic for Next Generation Biomaterial* on [Feb 8, 2023].

Her lecture gave a detailed overview on bacteria mediated biopolymer derivatives as an alternative candidate for different healthcare applications, including anti-microbial agents, wound healing patches and drug delivery carrier, in addition to the merit of biodegradable plastics.

This talk served as an eye-opener for majority of the audience comprising Scientists, Ph.D. Scholars, Project Associates at various levels and B.Tech. Students and they updated themselves with the emerging trends in this upcoming field.



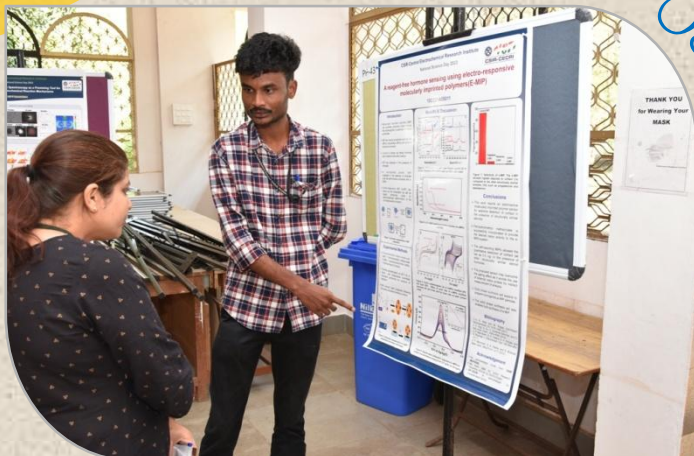
Recent Research Publications

- ❖ All-in-one microfluidic device with an integrated porous filtration membrane for on-site detection of multiple salivary biomarkers
R. Vinoth, P. Sangavi, Tatsuo Nakagawa, J. Mathiyarasu and A.M. Vinu Mohan
Sensors and Actuators B: Chemical 379 (2023) 133214; <https://doi.org/10.1016/j.snb.2022.133214>
- ❖ Bioadhesive gauze embedded with chitosan-butein bioconjugate: a redox-active pH sensor platform
K. Vinoth, V. Ananth, V. Velayutham, M. Pandiaraj and V. Murugan
Biosensors 13 (2023) 6; <https://doi.org/10.3390/bios13010006>.
- ❖ Precision nanocluster-based toroidal and supertoroidal frameworks using photocycloaddition-assisted dynamic covalent chemistry
K.M. Lakshmi, V. Rival Jose, Pakath Sreeraj, Sindhu R. Nambiar, C. Jeyabharathi, Nonappa and E.S. Shibu
Small 19 (2023) 2207119; <https://doi.org/10.1002/smll.202207119>
- ❖ Morphology tuning via linker modulation: Metal-free covalent organic nanostructures with exceptional chemical stability for electrocatalytic water splitting
S. Karak, K. Koner, Arun Karmakar, S. Mohata, Y. Nishiyama, N.T. Duong, N. Thomas, T.G. Ajithkumar, M.S. Hossain, S. Bandyopadhyay, Subrata Kundu and Rahul Banerjee
Advanced Materials (2023) 2209919; <https://doi.org/10.1002/adma.202209919>

Call for Research Articles

- ❖ Researchers working in the fields of transition metal-based 2D materials are encouraged to contribute in the form of research articles, communications, or reviews in the following categories: (i) Surface engineering techniques (novel strategical modifications) for transition metal based layered materials, (ii) Anti-corrosion applications by 2D materials including layer double hydroxides (LDHs) and (iii) Energy applications especially in supercapacitors, batteries, photo and electrochemical-water splitting for inclusion in the Theme Collection on Surface Engineering of Transition Metal Based 2D Layered Materials from Materials Advances Journal published by RSC. Last date for Submission is November 1, 2023.

Snapshots



National Science Day-2023: Poster Presentation Competition



National Science Day-2023: Essay Writing Competition



National Science Day-2023: TED Talk Competition



Refresher Training Course Participants: TVS Motors Co. Ltd., Hosur



Workshop on Artificial Intelligence and Data Science



Inauguration of ARMAGEDDON-23 - Annual Sports Meet of CFE



Industrial Visit of Students to CSIR-CECRI

- ❖ Indigenous Li-ion battery
- ❖ Indigenous Sodium Ion Battery
- ❖ Performance Improved Lead Acid Battery
- ❖ CO₂ capture under flue gas conditions
- ❖ Integrated Corrosion Monitoring Sensor Gadget accessible through a Mobile App
- ❖ Thermal Barrier Coatings for Strategic Applications
- ❖ Electrochemical Production of Sodium Hypochlorite as a Disinfectant (against COVID-19)
- ❖ Tri-layered reusable face mask with antibacterial coating
- ❖ Polymer Electrolyte Membrane (PEM) fuel cell
- ❖ Triboluminescent Coating and Smart Camera for Crack Detection in Structural Components
- ❖ Electrochemical Defluoridation of Drinking Water
- ❖ Solar Powered Proton Exchange Membrane (PEM) Based Water Electrolyser for Hydrogen Generation
- ❖ Cement-Polymer Composite Coating System for Corrosion Protection of Reinforcing and Prestressing Steels
- ❖ Solid Lubricant Coatings for Brahmos Missile Application
- ❖ Li Spheres for Torpedo Applications
- ❖ Electrowinning and Recovery of Tin from Primary Ore and Secondary Sources
- ❖ Electroplating of Gold, Copper and Nickel, Chromium, Zinc-Nickel Alloy; Anodizing of Aluminium; Electropolishing of Stainless Steel
- ❖ Electro-catalytic Conversion of CO₂ and butadiene to Adipic Acid; CO₂ to Formic Acid; CO₂ to Oxalic Acid.
- ❖ Farmer Friendly Soil Health (predictive) Analyzer
- ❖ Three Coat System for Steel Structures
- ❖ Inhibitor Cement Slurry Coating for Rebars
- ❖ Electrochemical Preparation of DL-Homocysteine Thiolactone Hydrochloride from DL- Homocystine
- ❖ Electrochemical Perfluorination of Sulfolane to Perfluoro Butane Sulfonyl Fluoride
- ❖ Electrochemical Preparation of Calcium Lactobionate and Calcium Gluconate
- ❖ Electrochemical Production of KIO₃
- ❖ Degradable Amorphous Alloy Coatings by Sputtering for Bioimplants
- ❖ Multicoat Protective Schemes for Concrete Structures and Bridges
- ❖ Moisture Compatible Coating for Cooling Towers
- ❖ Temporary Protective Coating for Maraging Steel & 15CDV6
- ❖ Corrosion Resistant Thermal Coating for Hydroclaves
- ❖ Al-Zn-In Galvanic Alloy Anode for Cathodic Protection
- ❖ Formulation of Neutral Paint Removing Jelly
- ❖ Corrosion Resistant Inhibitive Admixtures for Portland Pozzolana Cement
- ❖ Inhibitor Admixture for Concrete
- ❖ Cost Effective Metallic Coatings to Rebars Embedded in Concrete Structures
- ❖ Redox Active Polymer Encapsulated Lamellar (REL) Compound based Anticorrosive Coating for Reinforcement Bars
- ❖ Extraction of Calcium, Magnesium by Molten Salt Electrolysis
- ❖ Extraction of Zinc oxide and Metallic Zinc from Galvanizer Ash
- ❖ Extraction of Rare Earths and Alloys by Molten Salt Electrolysis

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