

# CECRI NEWS

(A monthly newsletter of CSIR-CECRI)

October 2024

Vol. 5 Iss. 10

## CSIR-CECRI's Scientists featured in the World's Top 2% Scientists

Every year, Stanford University, USA announces the World's Top 2% Scientists after a rigorous process consisting of several standard parameters. Primarily, the ranking list is based on a 2% or above percentile rank, or the top 100,000 by c-score (with and without self-citations). This prestigious list identifies the world's leading researchers, representing approximately 2% of all Scientists worldwide. It encompasses standardised data on citations, h-index, and a wide range of bibliometric indicators. Researchers are classified into 22 scientific fields and 174 sub-fields, drawing from Scopus data provided by Elsevier through ICSR Lab. Scientists and Researchers of CSIR-CECRI regularly feature in this list under various subject categories and have found a place in this year's database as well which was published by the Stanford University, USA on September 16, 2024. This recognition is a real testimony to the world-class research activities being carried out at CSIR-CECRI in all frontiers of electrochemical science & technology.



**Dr. Subrata Kundu**  
(Nanoscience & Nanotechnology)



**Dr. A. Manuel Stephan**  
(Energy)



**Dr. S. Vasudevan**  
(Chemical Engineering)



**Dr. B. Subramanian**  
(Applied Physics)



**Dr. M. Sathish**  
(Energy)



**Dr. A. Pandikumar**  
(Energy)



**Dr. Sheela Berchmans**  
(Energy)

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**CSIR-CECRI**

**CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE**

*Your Destination for Innovative Research*

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## Hindi Month 2024

As in previous years, **Hindi Month** was celebrated at CSIR-CECRI this year as well with lot of zeal and linguistic fervour. This grand celebration is a part of the continuous efforts undertaken to promote the use of Hindi among the employees, to do more and more work in Hindi and to create an engaging environment of speaking in Hindi.

This year the **Hindi Maah** was organized from **August 14 to September 14, 2024** during which the following competitions and programs were organized by the Hindi Section, CSIR-CECRI in which a large number of employees of the Institute including Administrative Staff, Scientists, Technical Staff, B.Tech. Students, Research Scholars and Contractual Staff participated enthusiastically and energetically:

### Daily Hindi Quiz Competition (Online):

The Celebrations commenced with the Daily Quiz Competition in Hindi (Online). On every working day, one question related to the official language or common language was asked through Google Forms and the correct & fastest response from the participants were evaluated for the prizes.

### Hindi Poetry Recitation Competition for Wards:

To encourage more and more usage of Hindi among the family environment, this competition was conducted under 2 categories (Poetry Recitation and Impromptu Pick & Recite) and 4 levels on August 25, 2024 (Sunday) which evinced keen participation and more than 20 prize winners were chosen for enhancing the participation.

### Section-wise Competition:

Stiff competition could be sensed among the participants in this competition conducted on August 21 & 22, 2024 for Administration, Stores & Purchase and Finance & Accounts sections. Separate question papers were issued for each section more than 30

participants bagged the prizes.

### Hindi Calligraphy Competition:

This competition on August 20, 2024 turned out to be a crowd puller drawing healthy competition across all cadres of employees. The hidden talent of the participants were brought out by this activity.

### Word Making Competition:

Most meaningful words were to be formed by combining the letters available in the cross-table in this competition held on August 27, 2024 primarily aimed at increasing the Hindi vocabulary among all.

### Poster Presentation Competition for Research Scholars:

With an objective of presenting scientific concepts in Hindi and to promote more and more usage of scientific terms, this poster presentation competition for researchscholars of CSIR-CECRI was conducted on August 28, 2024.

### Song Competition:

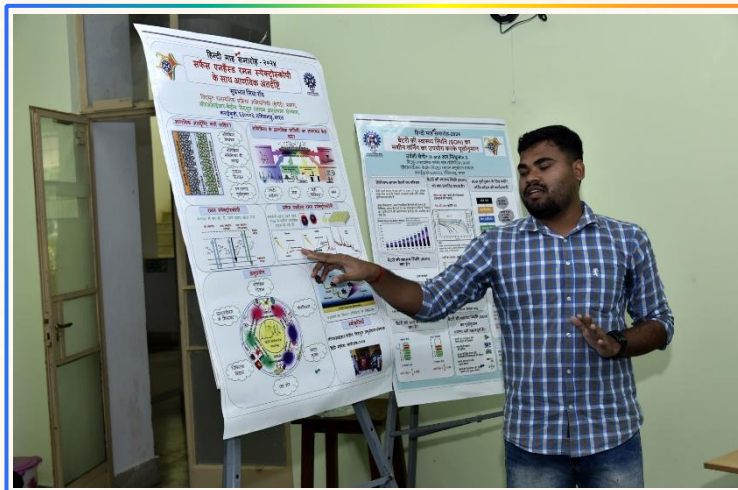
On September 4, 2024, a Hindi song singing competition was organized for the employees, research scholars and B.Tech. students of CSIR-CECRI. Many participants took part with and sang patriotic songs and songs from Hindi films with full enthusiasm and excitement. It was a melodious and memorable evening for participants and the audience.

### Quiz Competition:

Six Teams were formed among the mixed group of participants - staff, scholars, B.Tech. students, etc. in the quiz competition on September 5, 2024 which witnessed interesting questions and answers related to hindi language, general knowledge, current affairs, constitution, sports, history, epics – Ramayana, Mahabharata, etc.







### Message of The Director, CSIR-CECRI to the CSIR-CECRI Fraternity:

On the occasion of **Hindi Diwas** on September 14, 2024, an appeal towards increased and maximum use of Hindi was given by the Director to all the members of CSIR-CECRI fraternity through the Bulletin Board in the Institute's Intranet.

### Hindi Month Valediction and Prize Distribution:

The valediction and prize distribution event of Hindi Month 2024 at CSIR-CECRI was held on October 29, 2024. **Lieutenant Colonel Sushant Kumar Mishra**, Commanding Officer, 9 (TN) Battalion NCC, Karaikudi graced the occasion as the Chief Guest. **Dr. Deepak Kumar Pattanayak**, Principal Scientist, CSIR-CECRI welcomed the participants and introduced the Chief Guest.

**Dr. K. Ramesha**, Director, CSIR-CECRI, in his Presidential Address remarked that Hindi as a communication language is extremely popular and vital in our country and abroad. He appreciated the Hindi Section of CSIR-CECRI for the continuous and conscious efforts throughout the year in propagation of Hindi among the CSIR-CECRI circle and in the surrounding central government establishments through TOLIC.

The Chief Guest gave a detailed talk on the genesis of Indian languages and its relation with our culture. In order to propagate Hindi and proliferate its usage, we need to wholeheartedly accept it as our Official Language, he remarked. He urged everyone for increased use of Hindi in our official work as it would result in promotion and strengthening of the unity of our Nation as well.

Later, **Mr. KR. Kumaresh Babu**, Senior Hindi Officer, CSIR-CECRI presented a detailed report on the works undertaken related to the implementation of the official language in the institute especially through the **Official Language Implementation Committee (OLIC)** of CSIR-CECRI and the activities under the **Town Official Language Implementation Committee (TOLIC)** during 2023-'24 and a brief summary of the events organized during Hindi Month 2024.

Towards the end, prizes were distributed to the winners by the Chief Guest, Director, Chairman, Hindi Month 2024 and Administrative Officer. The **Establishment Section**, CSIR-CECRI was awarded for doing maximum work in Hindi in 2023-'24. The event ended with a vote of thanks by **Mr. P. Shyam Sundar**, Administrative Officer.

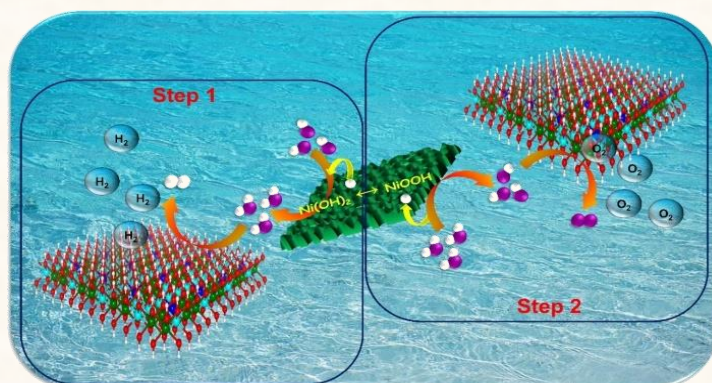




## High Impact Publications

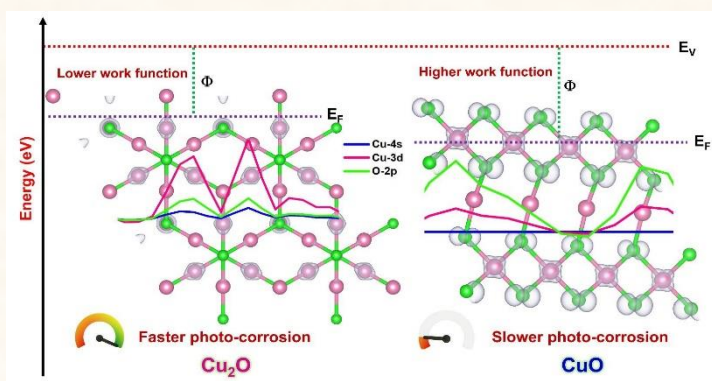
A Research Article titled *Exploring transition metal hydroxides performance in membrane-free electrolyzer based decoupled water splitting for step-wise production of hydrogen and oxygen* authored by S. Rajalekshmi, S.M. Senthil Kumar and A. Pandikumar of Electro-Organic & Material Electrochemistry Division, CSIR-CECRI got published in *Chemical Engineering Journal*, 496 (2024) 154215 (Impact Factor: 13.3).

<https://doi.org/10.1016/j.cej.2024.154215>



A Research Article titled *Assessing the stability of binary copper oxide photocathodes and augmenting CuO water reduction performance: Comprehensive experimental and theoretical study* authored by A. Soundarya Mary, C. Murugan, K. Karthick, P. Murugan and A. Pandikumar of Electro-Organic & Material Electrochemistry Division, CSIR-CECRI got published in *Chemical Engineering Journal*, 498 (2024) 155692 (Impact Factor: 13.3).

<https://doi.org/10.1016/j.cej.2024.155692>



## Special Industry Oriented Refresher Course

A special industry oriented refresher course on **Protective Coatings: Fundamentals, Inspection & Maintenance** was conducted by CSIR-CECRI at Karaikudi from October 21 to 25, 2024. This tailor-made course for delegates (33 nos.) from **Indian Oil Corporation Limited (IOCL) HQ**, Mumbai and Regional Offices of **Bharat Heavy Electricals Limited (BHEL)** comprised of theory & practical classes, lab visits & demos including 15 theory and 13 practical classes covering basic aspects of corrosion, testing & monitoring, pipeline metallurgy & failure analysis, coatings, biological corrosion, cathodic

protection (CP), design of CP, stray current, instrument & maintenance of CP systems, CP case studies, and trouble shootings in CP systems.

**Mr. R.K. Singh, General Manager (M&I), IOCL, Mumbai** graced the valedictory function as the Chief Guest and distributed the certificates to the participants. In his valedictory address, he expressed his sincere gratitude to CSIR-CECRI for organizing this unique course and taking care of the special requirements of the industries in this relevant field. He solicited continued support in this regard.





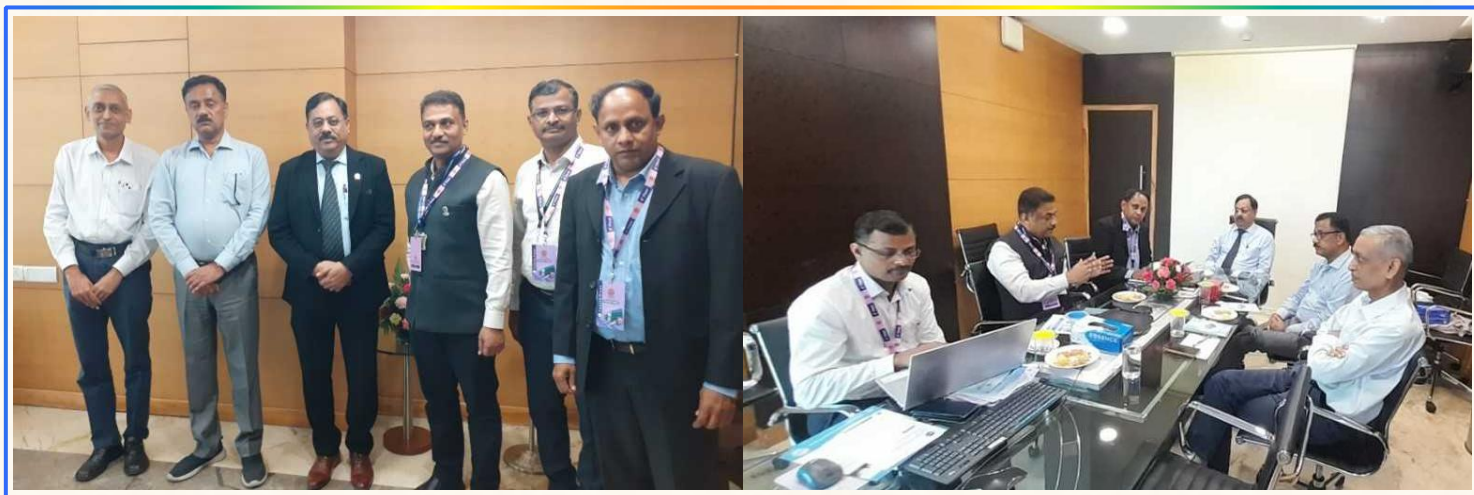
## Business Development Leads

- ❖ Meeting with Reva Electro Tech [Oct 1]
- ❖ Meeting with Allied Engineers, New Delhi [Oct 1]
- ❖ Meeting with IOCL [Oct 8, 10]
- ❖ Project Kick-off Meeting with GAIL [Oct 8]
- ❖ Meeting with HAL team [Oct 8]
- ❖ Promotional event on the Indo-Danish call on Hydrogen technologies [Oct 10]
- ❖ Meeting with officials from Bharat Forge [Oct 14]
- ❖ Discussion with WAAREE Clean Energy Solutions [Oct 16]
- ❖ H2T Project - internal review meeting [Oct 18]
- ❖ Meeting with CSIR-URDIP [Oct 21]

## Visit to IOCL, New Delhi

**Dr. K. Ramesha, Director, CSIR-CECRI** and a team of Scientists from CSIR-CECRI including Dr. M. Sathish, Head, Electrochemical Power Sources Division and Dr. Rakesh Chandra Barik, Head, Corrosion and Materials Protection Division, visited **Indian Oil Corporation Ltd., New Delhi (IOCL)** on October 7, 2024. The delegation had detailed deliberations with **Mr. Alok Sharma, Director (R&D)**, IOCL and his

team - **Dr. Umish Srivastva, Executive Director (Alternative Energy and New Energy Campus) & Mr. Rajesh M Badhe, Chief General Manager (Alternative Energy)** on potential R&D collaboration between CSIR-CECRI and IOCL, especially in the areas of Li/Na-ion Batteries, Water Electrolyser, Fuel Cells, Corrosion, Metal Recovery, and CO<sub>2</sub> Capture & Conversion.



## Invited Lecture



**Dr. K. Ramesha, Director, CSIR-CECRI** chaired the Industry Session (Cathode) in the **1<sup>st</sup> National Meeting on Sodium (-ion) Batteries at IIT-Bombay** [October 4-6, 2024]. He participated in the Panel Discussion and also launched the Website of "Battery Research Society" (of India). In his address, he highlighted the pioneering research activities undertaken by CSIR-CECRI in Batteries particularly in the area of Sodium-ion Batteries. He elucidated the emerging trends in the energy sector and emphasized on the everlasting importance of energy generation and storage especially on the significance of green and clean energy.

## Official Events

- ❖ Career Catalyst Workshop [Oct 1-4]
- ❖ Meeting with Officials of Karpagam Academy of Higher Education, Coimbatore [Oct 1]
- ❖ JRF to SRF upgradation meeting [Oct 3]
- ❖ 5<sup>th</sup> Workshop on Lab Safety Training [Oct 16]
- ❖ Patent Evaluation Committee Meeting [Oct 28]
- ❖ One-Day Brain-Storming Session on Updating Corrosion Map of India [Oct 29]



## Recent Research Projects Sanctioned

### Industry Funded:

- ❖ Consultation for Optimization of Fluid Dynamics and other Physical Parameters in the Self-Lifting Cells, M/s. Vaighai Chemical Industries Limited, Puducherry, Rs. 4.13 lakhs, 12 months wef 01-10-2024 [CNP 07/24]
- ❖ Fabrication of 50 Prototype 18650 type Cylindrical Sodium-ion Cells using the Sodium Ion Cathode and Anode Materials provided by Indi Energy, M/s. Indigenous Energy Storage Technologies Pvt. Ltd., Uttarakhand, Rs. 9.44 Lakhs, 3 months wef 24-09-2024 [TSP 08/2024]

## CFE and AcSIR Highlights

- ❖ PhD Comprehensive Examinations [Oct 1, 3]
- ❖ DAC-III Meeting for Ms. C. Jesica Anjeline (Guide: Dr. N. Lakshminarasimhan) [Oct 3]
- ❖ DAC-II Meeting for Ms. P.V. Sreya (Guide: Dr. Deepak K. Pattanayak) [Oct 4]
- ❖ Meeting on MTech Course - Corrosion Science and Engineering [Oct 4]
- ❖ PhD Viva Voce Examination for Ms. P. Mymoona, AcSIR Scholar – Thesis Title: *Designing of Atomically Precise Noble Metal Nanoclusters for Electrocatalytic Applications* (Guide: Dr. C. Jeyabharathi) [Oct 7]
- ❖ PhD Viva Voce Examination for Mr. A. Bebin, AcSIR Scholar – Thesis Title: *Synthesis, Evaluation and Electrochemical Applications of Viologen-Cucurbit(n)uril Supramolecular Complexes* (Guide: Dr. M. Kathiresan) [Oct 7]
- ❖ DAC-III meeting for Mr. K. Sanjeev Kumar (Guide: Dr. K. Giribabu) [Oct 16]
- ❖ DAC-III meeting for Mr. Nandigana Pardhasaradhi (Guide: Dr. S.K. Panda) [Oct 22]
- ❖ Placement Interview for B.Tech. Students [Oct 18]
- ❖ CFE Faculty Members Meeting [Oct 18]

## Vigilance Awareness Week-2024

**Vigilance Awareness Week-2024** at CSIR-CECRI commenced on October 28, 2024 with Dr. K. Ramesha, Director administering the Integrity Pledge to CSIR-CECRI fraternity. A series of events has been planned under VAW-2024's Theme – "**Culture of Integrity for Nation's Prosperity**".

## Fit India Swachhata Freedom Run 5.0

**Fit India Swachhata Freedom Run 5.0 - Swachhta and Swasthya** was organized at CSIR-CECRI, Karaikudi on October 28, 2024. Staff members, wards and scholars eagerly took part and completed the half-marathon run with enormous enthusiasm. The Run commenced from Alagappa Statue near the CSIR-CECRI Main gate, reached KV school via 'O' road and returned through 'S' road via Director's Bungalow and got completed at the starting point. **Dr. K. Ramesha, Director, CSIR-CECRI** flagged off and participated in the run and later distributed certificates to all the participants who completed the run successfully and energetically.



## Skill Development Activities

### Skill Development Training Programmes:

- ❖ A Skill Development Training Programme on *Electro-analytical techniques for (Electro) catalytic and (Bio) sensing applications* was organized by CSIR-CECRI during October 14-18, 2024. 39 participants undertook this training.

Under **CSIR-JIGYASA** Programme, the following events took place during October 2024:

- ❖ **One Day Scientist** Programme for school students [Oct 3]
- ❖ Onsite Experiment for Students (XII Std.) of Kendriya Vidyalaya, Karaikudi [Oct 4, 18, 25, 29]



Snapshots



Discussion with HAL Team



Project Kickoff Meeting with GAIL



Skill Development Training Programme



Career Catalyst Workshop for B.Tech. Students



Onsite Experiment for Students of KV, Karaikudi



One Day Scientist Programme for School Students



Vigilance Awareness Pledge



Special Shramdhan on Gandhi Jayanthi

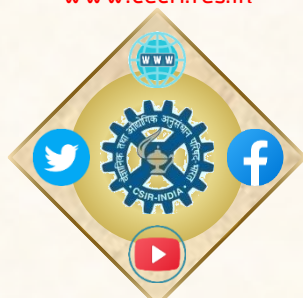


## TECHNOLOGY COMPENDIUM OF CSIR-CECRI

- ❖ Indigenous Li-ion battery
- ❖ Indigenous Sodium Ion Battery
- ❖ Performance Improved Lead Acid Battery
- ❖ CO<sub>2</sub> 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 CO<sub>2</sub> and butadiene to Adipic Acid; CO<sub>2</sub> to Formic Acid; CO<sub>2</sub> 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 Perfluro Butane Sulfonyl Fluoride
- ❖ Electrochemical Preparation of Calcium Lactobionate and Calcium Gluconate
- ❖ Electrochemical Production of KIO<sub>3</sub>
- ❖ 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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