

CECRI NEWS

(A monthly newsletter of CSIR-CECRI)

April 2024

Vol. 5 Iss. 4

World Earth Day

CSIR-Central Electrochemical Research Institute (CSIR-CECRI) celebrated the 54th World Earth Day on April 22, 2024 at Karaikudi with great enthusiasm and energy exhibited by the large number of participants. Earth Day is an annual event to demonstrate support for environmental protection and the official theme for this year is **Planet vs. Plastics**. First held on April 22, 1970, it now includes a wide range of events coordinated globally by earthday.org (formerly Earth Day Network) including 1 billion people in more than 193 countries. The proceedings at CSIR-CECRI, Karaikudi on April 22, 2024 was initiated by carrying out a mass **Plantation Drive** within the Campus. KV students, staff members, research scholars and volunteers energetically took part in this green initiative by planting saplings. Later the Installation and activation of **Global Climate Clock** (in collaboration with Energy Swaraj Foundation, India) was done as a part of creating awareness about climate change among masses and bring a sense of urgency to take action for climate correction.



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CSIR-CECRI

CSIR-CENTRAL ELECTROCHEMICAL RESEARCH INSTITUTE

Your Destination for Innovative Research

INSIDE THIS ISSUE

- World Earth Day Celebration
- Recent Research Projects
- Research in Focus
- ECS CECRI Student Chapter – Lecture Event
- Personnel News
- Honours and Awards

Recent Research Projects Sanctioned

Industry Funded:

- ❖ Testing for 2V / 80Ah, 200Ah and 500Ah Cells in PCCP container as per IRS 88/2004 Standard, M/s. Deepa Industries, Bengaluru, Rs. 0.1831 Crore, 2 years wef 13-04-2024 [TSP 02/2024]
- ❖ Consultancy for the process of Aluminium anodizing, M/s. Ankit Fasteners Pvt. Ltd., Bengaluru, Rs. 0.0674 Crore, 6 months wef 19-04-2024 [CNP 01/2024]
- ❖ Development of coating parameter and assisting in coating 100 meter electrodes for NMC Cell at CECRI facility, M/s. Crimen Tech Pvt. Ltd., Coimbatore, Rs. 0.1278 Crore, 1 year wef 26-04-2024 [SSP 01/2024]

Govt-Aided Projects (GAP):

- ❖ Fabrication of flexible conductive fibres / Fabric for wearable electronic textiles, Ministry of Textiles under National Technical Textile Mission, Rs. 1 Crore, 1.5 years wef 05-04-2024 [GAP 02/2024]

CSIR Funded:

- ❖ Industry Oriented Refresher Training, Rs. 0.177 Crore, 1 year wef 01-04-2024 [TSP 01/2024]
- ❖ Electrochemical-based eco-friendly recovery of bioactive compounds and polymers from seaweeds, Rs. 0.7776 Crore, 2 years wef 01-04-2024 [FTT 020511]
- ❖ Propylene carbonate from carbon dioxide, Rs. 1.6534 Crore, 2 years wef 01-04-2024 [FTT030501]
- ❖ Development of efficient scale-up strategies for indigenous alkaline anion exchange membranes (AAMES) for water electrolyzers, Rs. 1.964 Crore, 2 years, wef 01-04-2024 [FTT060502]
- ❖ Scale up of short side chain PFSA composite membrane for low humidity polymer electrolyte fuel cells, Rs. 1.594 Crore, 2 years wef 01-04-2024 [FTT060503]
- ❖ Fuel cell e-tractor: development of drive train, Rs. 0.4586 Crore, 2 years wef 01-04-2024 [FTT060504]
- ❖ Development of light weight Mg based AP65 and AZ31 alloys for defence and strategic applications, Rs. 1.72 Crore, 2 years wef 01-04-2024 [FTT080503]
- ❖ Light weight automotive component from indigenously developed 6063 aluminium alloy powder by additive manufacturing, Rs. 1.05 Crore, 2 years wef 01-04-2024 [FTT080504]
- ❖ Fabrication of vertically aligned graphene / ppy on carbon fibre / fabric electrodes for flexible wearable supercapacitor [FBR080302W1] and Cranio-maxillofacial devices decorated bioactive layer for enhanced osteointegration with antimicrobial properties [FBR080302W2], Rs. 0.794 Crore, 2 years wef 01-04-2024

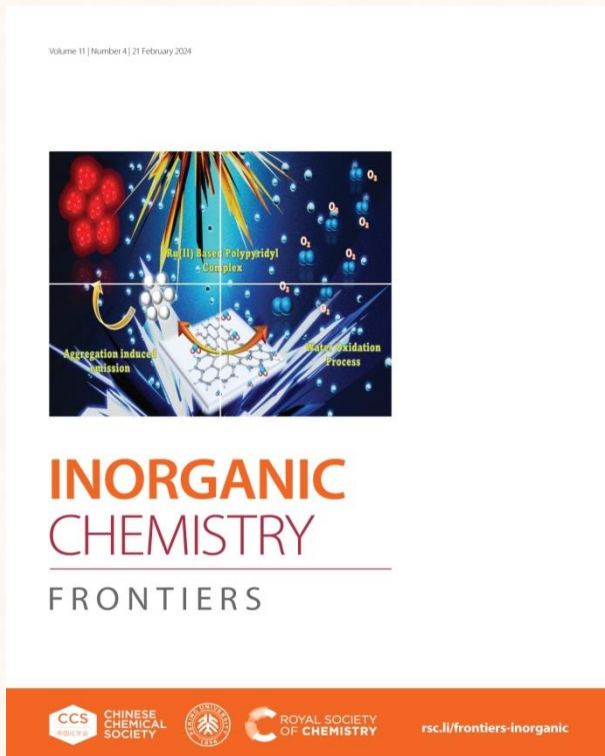
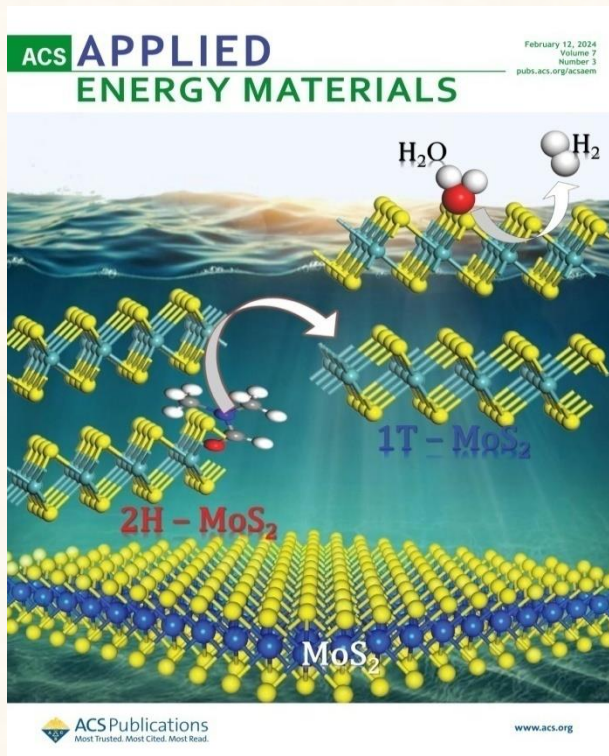
Business Development and CSIR Theme Leads

- ❖ Project Discussion with M/s. EEL, Noida [Apr 1]
- ❖ Discussion on printable photovoltaics with Powered Electron Pvt. Ltd., Kolkata [Apr 2]
- ❖ Meeting on CSIR's Mission Project on Redox Flow Battery [Apr 2, 5]
- ❖ Meeting with M/s. Tuticorin Bio Energy on Project Proposals [Apr 4]
- ❖ Project Discussion with M/s. Renergizr Industries Pvt. Ltd. [Apr 17]
- ❖ Discussion with ONGC Officials on proposed project activities [Apr 22]
- ❖ Discussion on Technology Transfer to MSME Sector [Apr 24]
- ❖ Meeting with M/s. Fast Track Construction on R&D collaboration [Apr 24]
- ❖ Meeting with M/s. Renover Technologies on Project Proposals [Apr 24]
- ❖ Meeting with Officials from Ohmium on collaborative projects [Apr 26]
- ❖ 2nd Joint Steering Committee Meeting of CSIR with OIL [Apr 29]

Official Events

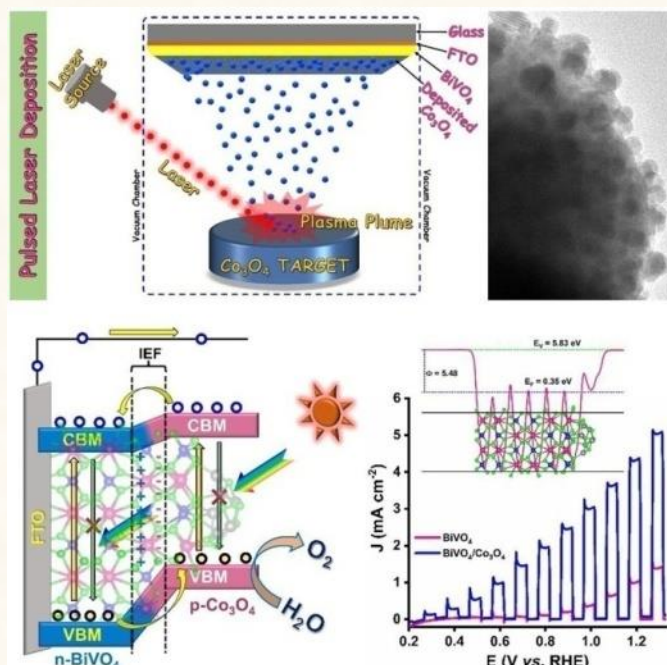
- ❖ Safety Committee Meeting [Apr 2]
- ❖ Laboratory Strategic Group Meeting [Apr 2, 18, 26]
- ❖ Works Committee Meeting [Apr 18]
- ❖ Technical Discussion on Cleanroom [Apr 25]
- ❖ Meeting of CSIR - International S&T Affairs Directorate (ISTAD) with ISTAGs of all Labs [Apr 25]

Research in Focus



Simple immersion in polar solvents induces targeted 1T phase conversion of MoS₂ for HER: a greener approach
S. Venkateshwaran, P. Devi, P. Murugan and S.M. Senthil Kumar
ACS Applied Energy Materials, 7 (2024) 1037-1050.
[decorated the Cover Page]

An efficient oxygen evolution reaction by Ru(ii) polypyridyl complex- based AIEgen
S. Khatua, M. Rabha, N. Sreenivasan, B. Sen, K. Baruah and Subrata Kundu
Inorganic Chemistry Frontiers, 11 (2024) 1048-1060.
[decorated the Front Cover Page]



An ambient process for hole transport layer-free highly stable MAPbI₃ by addition of MACl for efficient perovskite solar cells
N. Pardhasaradhi, S. Bavatharini, P. Sriram, D. Sujatha, M. Imthiaz Ahmed, R. Ram Prasanth, B. Subramanian and S.K. Panda
Energy Advances, 3 (2024) 442-450.
[decorated the Inside Front Cover Page]

Investigating the interfacial charge transfer between electrodeposited BiVO₄ and pulsed laser-deposited Co₃O₄ p-n junction photoanode in photoelectrocatalytic water splitting
C. Murugan, A. S. Mary, R. Velmurugan, B. Subramanian, P. Murugan and A. Pandikumar
Chemical Engineering Journal, 483 (2024) 149104.

Skill Development Activities

Skill Development Training Programmes:

- ❖ A Skill Development Training Programme on ***Surface coatings for value added products viz. decorative and functional applications*** was organized by CSIR-CECRI during April 1-4, 2024. 46 participants took part in this training programme.
- ❖ A Skill Development Training Programme on ***Corrosion protection technologies for construction of buildings and structures*** was organized by CSIR-CECRI during April 22-26, 2024. A total of 38 participants attended this training programme.

JIGYASA:

- ❖ 23 UG Students and 2 Faculty Members from Department of Chemistry, Velumanoharan Arts and Science College for Women, Ramanathapuram visited CSIR-CECRI, Karaikudi on April 5, 2024 and updated themselves on the ongoing R&D activities.
- ❖ A new Online Talk Series for 11th, 12th, and Undergraduate Students, ***Futuristic Fridays***, was organized on April 12, 2024. **Dr. Lipi Thukral**, CSIR-IGIB gave a talk on ***AI and Structural Biology to understand Biology***. 20 KV students took part.
- ❖ Demonstration of Do-It-Yourself (DIY) Kits [Apr 26]

ECS CECRI Student Chapter – Lecture Event

The **ECS Central Electrochemical Research Institute Student Chapter** hosted a lecture event entitled ***Evolving Energy Landscape and Electrochemistry*** on 26.04.2024 at CSIR-CECRI, Karaikudi featuring **Dr. Chockalingam (Chock) Karuppaiah**, Founder & Chairman, Vetri Labs, USA & Chief Technology Officer, Ohmium, USA and an alumnus of CSIR-CECRI's B.Tech. programme. The lecture, attended by more than 150 participants, highlighted key points such as the role of energy landscapes in electrochemical reactions, the impact of electrochemical interfaces on energy conversion, and the advancements in energy storage technologies. Dr. Chock's presentation was well-

received, prompting active exchange during the Q&A session. Participants also valued the networking session, reporting new connections and potential collaborations. Feedback included comments on the informative nature and organization of the event. Future events shall include emerging topics, inviting diverse speakers, incorporating interactive elements, and extending networking sessions. Overall, the event successfully facilitated knowledge sharing and professional networking, contributing to the vibrant community within the field of electrochemistry. The ECS Student Chapter looks forward to organizing similar events to continue supporting the growth and development of its members.



Intra-Campus Quiz Competition

The **AcSIR Science Club, CSIR-CECRI** organized an **Intra-Campus Quiz Competition** with an aim to ignite the passion for science, foster critical thinking, and promote collaboration among research scholars. This event, held on April 24, 2024, attracted enthusiastic participation from research scholars and project staff within CSIR-CECRI, Karaikudi (a total of

16 teams). After a Preliminary Round, 5 teams were shortlisted for the Final Main Round of the Competition which consisted of Five-Question Fusion Round, Buzzer Round and Rapid Fire Round. The Winners and Runner-ups were suitably rewarded at the end. The intra-campus quiz competition served as the ideal platform towards achieving the objectives.

Personnel News

Assessment Promotion Results

[A.Y.: 2022-2023]

Principal Scientist to Sr. Principal Scientist



Dr. Sundar Mayavan



Dr. A. Palaniappan



Mr. K. Manimaran

Sr. Scientist to Principal Scientist



Dr. Daniel Ronald Joseph

Scientist to Senior Scientist



Dr. P. Tamarasan



Dr. Shekhar Hansda



Ms. S. Hemavathi



Ms. R. Monika



Mr. Thipperudraswamy

Departmental Promotion:



Mr. C. Subramanian,
Assistant Section Officer (S&P) joined
his promoted post of Section Officer
(S&P) on April 5, 2024.

Resignation:



Ms. R. Priya,
Jr. Steno resigned technically from CSIR-
CECRI on account of her selection at
CSIR-CLRI, Chennai as Jr. Steno
[Date of Relief: March 12, 2024].

Superannuation

The following staff members of CSIR-CECRI superannuated on April 30, 2024 after a long illustrious service:



Dr. M. Ganesan
Chief Scientist
Electrochemical Power Sources Division



Mr. KR. Karupiah
Principal Technical Officer
Knowledge Resource Centre



Mr. V.C. Mohanakumar
Sr. Technician (2)
Engineering & Technical Services Division



Mr. P. Karupiah
Assistant Section Officer
Administration /
Knowledge Resource Centre

CFE and AcSIR Highlights

- ❖ B.Tech. Final Year Project Review [Apr 4, 30]
- ❖ Upgradation meeting for JRF to SRF - Ms. M. Aswathi, DST Inspire Fellow (Guide: Dr. Sheela Berchmans) [Apr 3]
- ❖ I DAC meeting of Ms. Aditi De, AcSIR PhD Scholar (Guide: Dr. Subrata Kundu) [Apr 3]
- ❖ I DAC meeting of Ms. A. Kasturi, AcSIR PhD Scholar (Guide: Dr. S. Senthilkumar) [Apr 8]
- ❖ PhD Viva Voce Examination for Ms. A. Soundarya Mary, AcSIR PhD Scholar (Thesis Title: *Experimental and theoretical investigation of visible light active photoelectrodes for photoelectrochemical water splitting*; Guide: Dr. A. Pandikumar) [Apr 12]
- ❖ I DAC meeting of Mr. L. Earnest Raj, AcSIR PhD Scholar (Guide: Dr. S. Senthilkumar) [Apr 22]
- ❖ PhD Viva Voce examination for Mr. S. Arunkumar, AcSIR PhD Scholar (Thesis Title: *Development of biosensing platform for the detection of various biomarkers and drugs*; Guide: Dr. Subbiah Alwarappan) [Apr 26]

Birth Anniversary of Dr. RM. Alagappa Chettiar

Dr. RM. Alagappa Chettiar was remembered with reverence and immense gratitude on his **115th Birth Anniversary** on April 6, 2024. Homage was paid by a delegation of staff members of CSIR-CECRI, Karaikudi led by **Dr. V. Saraswathy**, Chief Scientist at his Memorial. Later floral tributes were paid to the statue

of Dr. Alagappa Chettiar in CSIR-CECRI Campus and his selfless contributions to the society including his visionary thought for establishment of a premier R&D Institute solely devoted to Electrochemistry in this remote place was fondly recalled with a deep sense of respect and gratitude.

Recent Research Publications

- ❖ Superhydrophobic polyaniline-siloxane coatings with excellent barrier and active corrosion protection properties for mild steel
Jyothymol Joy, John Tizzile J. Selvarani, Abirami Sukumaran and Arunchandran Chenan
Langmuir, 40 (2024) 8205; <https://doi.org/10.1021/acs.langmuir.4c00397>
- ❖ Strategically incorporated V in rod-like Ni-MOF as an effective catalyst for the water oxidation reaction
Krishnendu Bera, Suprobhat Singha Roy, Ragunath Madhu, Aditi De, Pradeep Gudlur and Subrata Kundu
Catalysis Science & Technology, 14 (2024) 2858; <https://doi.org/10.1039/D3CY01630G>
- ❖ Atomically dispersed Ru sites on MOF-derived NC-ZnO for efficient oxygen evolution reaction in acid media
S. Varangane, R. Madhu, S. Mehmood, B. Jacksani, V. Bhasin, B.M. Abraham, A. Nagaraj, C.S. Vennapoosa, B.V. Subba Reddy, Subrata Kundu and U. Pal
Journal of Materials Chemistry A, 12 (2024) 12533; <https://doi.org/10.1039/D4TA00586D>

Honours and Awards

- ❖  **Dr. S. Vasudevan**, Chief Scientist & Head, EPE Division has been appointed as **Editorial Board Member** of *The Journal of Water Process Engineering (JWPE)* published by Elsevier.
<https://www.sciencedirect.com/journal/journal-of-water-process-engineering/about/editorial-board>
- ❖  **Dr. Subrata Kundu**, Principal Scientist, EPE Division Guest Edited a Themed Collection (12 Articles) entitled '*Surface Engineering of Transition Metal Based 2D Materials*' for **RSC Journal 'Materials Advances'**. The collection and the Editorial by Dr. Kundu has been made available online.
<https://pubs.rsc.org/en/journals/articlecollectionlanding?sercode=ma&themeid=bd04cdf6-a7c4-40a1-9573-94c35205d6ed>

Health Talk

CSIR-CECRI Health Centre organized an exclusive **Health Talk** for the benefit of Staff Members, Family Members, Pensioners and Scholars. **Dr. Saranya**, MD, Pediatrician, Karaikudi Medical Centre, Karaikudi gave a highly informative talk on *Common Pediatric Health Problem* on April 10, 2024. She delineated in detail the common day-to-day problems with real life examples.

Medical Camp

CSIR-CECRI Health Centre conducted an exclusive **Medical Camp** on Orthopedics in association with Apollo Hospitals, Managiri on April 29, 2024. **Dr. Aasai Selvan**, D.Ortho, DNB (Ortho), Orthopedic Surgeon, was the expert from Apollo Hospital, Managiri. Many Staff Members, Family Members, Pensioners and Scholars took consultation from the Expert.



Homage to Dr. R.M. Alagappa Chettiar on his 115th Birth Anniversary



Tribute to Dr. B.R. Ambedkar on his 134th Birth Anniversary



Discussion with ONGC Officials



Skill Development Training Programme



Health Talk on Common Pediatric Problems



Orthopedic Medical Camp



Intra-Campus Quiz Competition by AcSIR Science Club



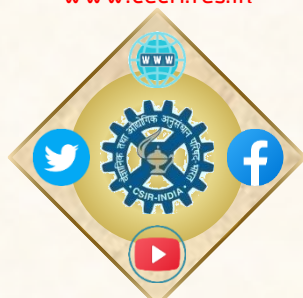
Farewell & Felicitation to Retirees

TECHNOLOGY COMPENDIUM OF 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 Perfluro 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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