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Volume 3 Issue 1



CECRI NEWS

A monthly newsletter of CSIR-CECRI

compilation of significant happenings

New Year Address by Director, CSIR-CECRI

Dr. (Mrs) N. Kalaiselvi, Director, CSIR-CECRI addressed all the members of CSIR-CECRI Family on the occasion of New Year on January 3, 2022. Owing to the pandemic restrictions, the event was conducted on virtual mode. She recollected the rapid progress made by the Institute in all aspects of electrochemical science and technology over the past year despite the hindrances posed by the COVID-19 pandemic. *New frontiers and emerging avenues were explored upon, at the same time, revisit to revitalize the core competence of CSIR-CECRI's legacy technologies are also attempted*, she said. In this regard, *CSIR-CECRI's Technology Targets for the year 2022* will be framed, she added and requested all the staff members to put their best foot forward towards realizing the same and wished all CSIR-CECRI family members a more fruitful and rewarding 2022.



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Earlier, **Dr. V. Saraswathy**, Chief Scientist and Head, Corrosion and Material Protection Division, in her welcome address, recalled the significant milestones achieved by the Institute in the recent past and requested the staff members to reorient themselves towards the goals of the Institute as per the current trends. She wished a happy and prosperous new year to all the participants. During the event, the Annual Planner, Daily Calendar and Monthly Calendar of 2022 brought out by CSIR-CECRI

Staff Club was also released. **Shri. K.M. Sridhar**, Controller of Administration, in his vote of thanks, heaped words of praise on the dynamism of the Director and the dedication of staff members of CSIR-CECRI. He assured unstinted cooperation of Administration in all the Institute's endeavours.

The Event was coordinated by **Dr. V. Ganesh**, Principal Scientist, CSIR-CECRI and Secretary, CSIR-CECRI Staff Club.

New Year Address by DG-CSIR

Dr. Shekhar C. Mande, Director General, CSIR addressed all the members of CSIR Family on the occasion of New Year on January 3, 2022. He recalled the valiant unified efforts of all CSIR Labs in solving the challenges posed by the COVID-19

pandemic and the critical contributions towards the treatment and mitigation efforts. He called for collective efforts of all CSIR Labs in emerging as **Leading Champions** in S&T arena in the coming year as well.



List of Newly Sanctioned Projects

Projects Sanctioned	Sponsor	Principal Investigator(s)	Budget (Rs. in Lakhs)	Start Date	End Date
Pt free and active sites enriched Metal - Carbon alloy Electro catalysts for Polymer Electrolyte Fuel Cells	Science & Engineering Research Board (SERB), Delhi	Dr. Vishal Mahesh Dhavale	28.41	20 Dec 2021	19 May 2022
Feasibility studies on the electrochemical preparation of potassium perchlorate	Sri Meenatchi Industries, Sivakasi	Dr. M. Jayakumar	7.54	05 Jan 2022	04 May 2022
Nanostructured Materials for Next-generation Energy Conversion and Storage Devices	DST, Delhi	Dr. A.S. Prakash	16.80	01 Jan 2022	31 Dec 2026
Testing of Liquid paint/ Coal tar Epoxy	Freyssinet Prestressed Concrete Co. Ltd, Mumbai	Dr. D. Sherwood	1.77	27 Jan 2022	26 Feb 2022
Inducing Internal Vacancies in Transition Metal based LDHs via Surface Engineering as Chalcogenides and Ions Modifications for Water Electrolysis	Science & Engineering Research Board (SERB), Delhi	Dr. Subrata Kundu	29.99	21 Jan 2022	20 Jan 2025

Business Development Leads

- ❖ Meeting with M/s. Gujarat Fluorochemicals Ltd. on the Project Proposal - *Polymer Electrolyte Membrane suitable for GH_2 and Fuel Cell Applications* [Jan 04, 31]
- ❖ Signing of MoU / Project Documents with Sri Meenatchi Industries, Sivakasi on *Feasibility Studies on the Electrochemical Preparation of Potassium Perchlorate from Potassium Chloride & Potassium Chlorate* [Jan 06]
- ❖ Online Discussion with CSIR-TMD, New Delhi on finalising NDA with Blue Ashva Capital [Jan 06]
- ❖ Review Meeting on *Organic Radical Energy Devices* [Jan 06]
- ❖ Online Discussion with M/s. Neogen Chemicals Ltd. on R&D Collaboration [Jan 07]
- ❖ Meeting with M/s. Ashok Leyland Ltd., Chennai on *CO_2 Adsorption Technology* and other R&D Collaboration [Jan 10]
- ❖ Demonstration of the *Coating Process on Soft and Hard Armor Panels* to Mr. Vaidheeswaran, Ordnance Clothing Factory, Avadi [Jan 10]
- ❖ Meeting and preliminary discussion with L&T Power, Gujarat on R&D Collaboration in the field of Li-Ion Batteries [Jan 12]
- ❖ Online Discussion with DG-CSIR on potential collaborations with industry in *Lithium-ion Battery Manufacturing and Recycling* [Jan 18]
- ❖ Discussion with Dr. Anilkumar of Nagarjuna Fertilizers [Jan 18]
- ❖ Meeting with M/s. Aurore Life Sciences Pvt. Ltd., Hyderabad on R&D Collaboration [Jan 19]
- ❖ Meeting with officials from Tungabhadra Board, TB Dam on *Ascertaining the condition of spillway Gates of TB Dam and their balance Life* [Jan 19]
- ❖ Meeting with Kirloskar Pneumatic Co. Ltd., Pune on developing *H_2 Compressor* and other R&D Collaboration [Jan 24]
- ❖ Discussion on Testing of *Advanced Cell Chemistry Cells* under Production Linked Incentive organized by NITI Aayog, New Delhi [Jan 27]
- ❖ Discussion with M/s. Fertis India Pvt. Ltd., Hyderabad on *Green Ammonia* [Jan 27]
- ❖ Meeting with M/s. Ashok Leyland Ltd., Chennai on *Fuel Cell Technology* and other R&D Collaboration [Jan 28]

Updates on CSIR-ICeNGESS, Mission, Theme and Major Projects

- ❖ CSIR-ICeNGESS:
 - 1) Meeting of Technical Bid Evaluation Committee [Jan 28]
 - 2) Meeting with Blue Ashva Capital / GODI India Pvt. Ltd. on finalizing MoU in the presence of Dr. V.K Saraswat, Hon'ble Member, NITI Aayog [Jan 31]
- ❖ Review of FTT/FTC Projects under AEISS Theme by CSIR HQ [Jan 05]
- ❖ Monthly Review - CSIR-AMM Project [HCP-030] - *Conducting polymer based nanocomposites for the next generation of flexible electrochromic display devices* [Jan 05]
- ❖ Internal discussion on 4th Tranche of FTT/FTC Project Proposals [Jan 10, 12, 20, 25, 28]
- ❖ Meeting of Energy Theme Sub-vertical Leaders/Coordinators [Jan 19]
- ❖ Monitoring Committee Meeting for on-going FTT/FTC Projects under Energy Theme [Jan 21]
- ❖ Meeting between CSIR-CECRI, CSIR-IMMT and TCL to formulate FTT Project on *Recycling of spent Lithium Batteries*, leading to CoE on LIB Recycling [Jan 21]
- ❖ Discussion with Director, CSIR-NML on the FTT proposal planned on *Recycling of LIBs*, leading to CoE on second life cathodes [Jan 24]

Technology Transferred /Agreements/MoUs Signed

- ❖ MoU Signed:

between CSIR and M/s. TATA Steel Ltd. [Jan 31]
Title: *Collaborative Research Programmes*
- ❖ Technology Transfer: [Jan 21]
M/s. Jayaraj Enterprises, Mumbai
Title: *Calcium Gluconate*
- ❖ Renewal of License (Know-how):
 1. Fosroc Chemicals (P) Ltd., Bangalore [Jan 12]
 2. Krishna Conchem Products, Mumbai [Jan 21]

Title: *Manufacture of four coat paint schemes consisting of Epoxy Polyurethane paint systems for concrete systems.*

MoU - Production of Potassium Perchlorate for Fireworks and Strategic Applications

Agreement and Project Documents on "Process for the Production of Potassium Perchlorate for Fireworks and Strategic Applications" was signed between CSIR-CECRI, Karaikudi and Sri Meenatchi Industries, Sivakasi on January 06, 2022 at a cost of Rs.7.5 lakh and duration of 4 months.

CSIR-CECRI had developed Electrochemical process for potassium perchlorate in 1970s and production was subsequently commissioned at ISRO, Alwaye / Bharathi Inds. Coop. Perchlorate Factory Ltd., Kundrakudi. It is proposed to regain the techno-knowledge base in the production of potassium perchlorate at a scale of 10 kg/day using potassium chloride/potassium chlorate as raw material.



Fast-track Construction of Low Cost Toilet Unit using CSIR-CECRI's Technology

Towards achieving the aims of Swachh Bharat Mission proposed by the Government of India, CSIR-CECRI has developed a technology for the construction of low cost toilet units. Using the funds sponsored by Indian Bank, Alagappapuram Branch, Karaikudi under Corporate Social Responsibility (CSR) Scheme, CSIR-CECRI, Karaikudi has constructed 8 numbers of low cost toilet units in two Panchayat Union Middle Schools namely Panampatti and Pethachi Kudiyiruppu of Sakkottai Panchayat Union, Sivaganga District. Each toilet unit was constructed at a cost of Rs. 12,500/- which is nearly 40% lesser than that of conventional toilets. Precast reinforced concrete thin panels with interlocking mechanism were used in the technology. Scientists of CSIR-CECRI explained that the developed technology would enable fast-track

construction and could be easily modified to suit different geometric dimensions.

This facility was opened for the use of Teachers and Students on January 7, 2022 by Dr. N. Kalaiselvi, Director, CSIR-CECRI, Dr. V. Saraswathy, Head, Corrosion and Materials Protection Division and Mr. P.V. Balachandran, Zonal Manager, Indian Bank, Karaikudi. The inventors Dr. J. Daniel Ronald Joseph & Dr. M. Ashok, Scientists, CSIR-CECRI, Dr. Jonas Davidson, Head, Technology Transfer and Business Development Division, CSIR-CECRI, Mr. Ramesh Kumar Marko, Manager, Indian Bank, Alagappapuram Branch, Karaikudi, Sirugapatti Panchayat President Mr. Karuppiyah, Ward Member Mr. Vidiyal Udaiappan, Head Masters and Teachers participated in the programme.



Centre for Education and AcSIR Highlights

AcSIR:

- ❖ DAC Meeting of Ms. V. Jeyasudha (Guide: Dr. M. Pandiaraj) [Jan 07]
- ❖ DAC Meeting of Mrs. P. Kanagavalli, CSIR-SRF (Guide: Dr. V. Murugan) [Jan 10]
- ❖ Synopsis Submission of Mr. K. Krishnamoorthy, (Guide: Dr. R. Thangamuthu) [Jan 11]

- ❖ Training Programme for Students on Article Publication in CSIR / Other Journals [Jan 12]
- ❖ Meeting with Scholars on Societal Program [Jan 20]

Centre for Education:

- ❖ Placement Interview for B.Tech. Students [Jan 05]
- ❖ Meeting of Management Affairs Committee of Centre for Education [Jan 04, 07]

Official Events

- ❖ International Conference on *Energy Materials and Devices* by Banaras Hindu University, Varanasi: Director, CSIR-CECRI delivered Inaugural Address as the Chief Guest (Online) [Jan 11]
- ❖ Online Programme on ISO/IEC-17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories organized by CSIR-HRDC: Participation of Dr. Sundar Mayavan and Er. Arumugasamy [Jan 17-21, 2022]
- ❖ Session on *Ethics in Project Management and Governance* organized by SEC, CSIR HQ [Jan 24]
- ❖ Online Meeting of DG-CSIR with all CSIR Lab Directors [Jan 24]
- ❖ **Indo-German Virtual Workshop** on Waste to Wealth and Sustainable Packaging organised by Indo-GSTC, Gurgaon [Jan 27]
- ❖ Interview to *Down to Earth* Magazine by Director, CSIR-CECRI on *Beyond Lithium Batteries* [Jan 28]
- ❖ Meeting of Selection Committee for the post of Security Officer [Jan 28]
- ❖ CSIR CECRI Club: Felicitation and Farewell to Retirees [Jan 31]

Personnel News

- ❖ Mrs. Mary Suneetha William, Stores & Purchase Officer, CSIR-CECRI got promoted as Controller of Stores & Purchase [posted to CSIR-CFTRI, Mysuru]
- ❖ Mr. S. Ramakrishnan, Asst. Section Officer (F&A), CSIR-CECRI got promoted as Section Officer (F&A) [posted at CSIR-CECRI]
- ❖ Mr. K. Sivaraman, Asst. Section Officer (Gen), CSIR-CECRI got promoted as Section Officer (Gen) [posted at CSIR-CECRI]
- ❖ Mr. K. Venkatesan, Asst. Section Officer (F&A), CSIR-CECRI got promoted as Section Officer (Gen) [posted at CSIR-CECRI]
- ❖ Mrs. R.M. Vijayalakshmi, Sr. Steno, CSIR-CECRI got promoted as Section Officer (Gen) [posted at CSIR-CECRI]
- ❖ Ms. M. Latha, Sr. Steno, CSIR-CECRI got promoted as Private Secretary [posted at CSIR-CECRI]
- ❖ Ms. M. Indudevi @ Deivanai, Sr. Steno, CSIR-CECRI got promoted as Private Secretary [posted at CSIR-CECRI]
- ❖ Mr. N.S. Radhakrishnan, Sr. Steno, CSIR-CECRI got promoted as Private Secretary [posted to CSIR Madras Complex, Chennai]
- ❖ Mrs. A. Vijayalakshmi, Sr. Secretariat Assistant (Gen), CSIR-CECRI got promoted as Asst. Section Officer (Gen) [posted at CSIR-CECRI]
- ❖ Mr. M. Esakimuthu, Sr. Secretariat Assistant (F&A), CSIR-CECRI got promoted as Asst. Section Officer (F&A) [posted to CSIR-CLRI, Chennai]
- ❖ Ms. S.K. Hamritha, Jr. Steno, CSIR-CLRI, Chennai got promoted as Asst. Section Officer (Gen) [posted to CSIR-CECRI, Karaikudi]

Honours and Awards



Dr. S. Senthilkumar, Principal Scientist, Electrodeics & Electrocatalysis Division and Dr. P. Ragupathy, Principal Scientist, Electrochemical Power Sources Division of CSIR-CECRI have been nominated as a **Member of the Senate of Alagappa University, Karaikudi** for a period of three years by the Hon'ble Governor of Tamil Nadu.

Superannuation

❖



Dr. D. Vasudevan
Principal Scientist
Electrodeics & Electrocatalysis
Division superannuated on
January 31, 2022 after a long
illustrious service

❖



Mr. V. Muthumani
Principal Technical Officer
Electrochemical Power Sources
Division superannuated
(VRS wef 4.2.2022) after a long
illustrious service

Skill Development Activities

CSIR-JIGYASA:

Connect with Scientists Webinar Series:

The following lectures were arranged as a part of on-going Webinar Series:

1. *Portable Fuel Cells for Electronic Applications* by Dr. D. Kalpana [Jan 03]
2. *Self-Assembly of Nanoparticles* by Dr. A. Palaniappan [Jan 06]
3. *Microbiologically Influenced Corrosion: Tiny bugs, big problems* by Dr. Poonam Singh [Jan 12]
4. *Electrochemical Science and Technology for Societal Welfare* by Dr. V. Ganesh [Jan 20]

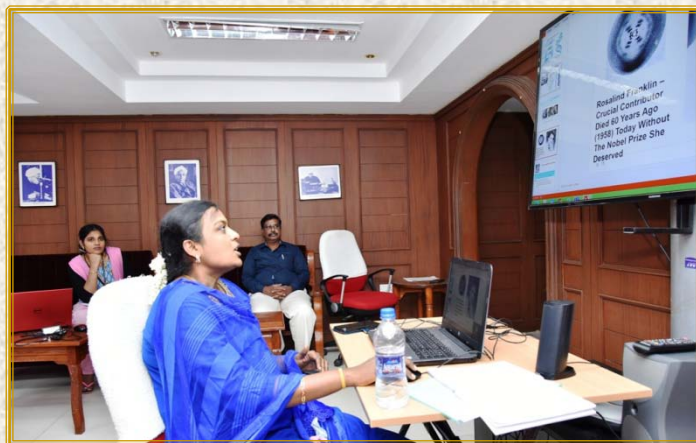
Vigyan Jyoti is an initiative of DST to ensure gender parity in STEM (Science Technology Engineering Mathematics) fields especially empowering girls in underrepresented areas of STEM. Under this banner, CSIR-CECRI organized an Interactive Session with Jawahar Navodaya Vidyalaya, Mahe on 27 Jan 2022. Dr. N. Kalaiselvi, Director, CSIR-CECRI, in her presidential address, emphasized the need for nurturing the future generation of our nation especially girl students in the STEM areas particularly green energy and environment. Dr. K.O. Rathnakaran, Principal, JNV, Mahe highlighted the importance of STEM based learning and its implementation at NVS. Dr. J. Chitra, Head, Department of Biotechnology, Dr. Umayal Ramanathan College for Women, Karaikudi delivered a guest lecture on "Recombinant DNA

- ❖ Webinar for ATL adopted Schools: Powering the World by Sunlight by Dr. A. Pandikumar [Jan 22]

Skill Development:

- ❖ One Week Online Skill Development Programme was organized by CSIR-CECRI on *Basics of High-Resolution Imaging Techniques and their Applications in Science & Technology* [Jan 17-21]
- ❖ Faculty Development Programme: One Week Online Programme on *Tools and Techniques in Characterization of Compounds* was organized by CSIR-CECRI and Dr. Umayal Ramanathan College for Women, Karaikudi [Jan 17-21]

technology and future of transgenic organisms". This programme also formed a part of part of Azadi Ka Amrit Mahotsav & National Girl Child Day-2022.



Recent Research Publications

- ❖ *Turning UV Light-Active BiOF into Visible Light-Active BiOF by Forming a Heterojunction with $g\text{-C}_3\text{N}_4$ and Its Photoelectrochemical Water Splitting Performance in Reverse Osmosis-Rejected Wastewater*
S. Vinoth and A. Pandikumar
The Journal of Physical Chemistry C, 126 (2022) 79
<https://doi.org/10.1021/acs.jpcc.1c09201>
- ❖ *Ruthenium-Doping-Induced Amorphization of VS₄ Nanostructures with a Rich Sulfur Vacancy for Enhanced Hydrogen Evolution Reaction in a Neutral Electrolyte Medium*
A. Karmakar, S. Sam Sankar, K. Sangeetha, M. Ragunath, K.H. Mahmoud, Z.M. El-Bahy and Subrata Kundu
Inorganic Chemistry, 61 (2022) 1685
<https://doi.org/10.1021/acs.inorgchem.1c03533>
- ❖ *Account of Structural, Theoretical, and Photovoltaic Properties of ABO₃ Oxide Perovskites Photoanode-Based Dye-Sensitized Solar Cells*
K.B. Bhojanana, A. Soundarya Mary, K.S. Shalini Devi, N. Pavithra and A. Pandikumar
Solar RRL (2021) 2100792
<https://doi.org/10.1002/solr.202100792>
- ❖ *Stabilization of Ruthenium Nanoparticles over NiV-LDH Surface for Enhanced Electrochemical Water Splitting: An Oxygen Vacancy Approach*
Arun Karmakar, K. Karthick, S. Sam Sankar, K. Sangeetha, M. Ragunath, Krishnendu Bera, H.N. Dhandapani, S. Nagappan, P. Murugan and Subrata Kundu
Journal of Materials Chemistry A (2022) [in press]
<https://doi.org/10.1039/D1TA09627C>

Snapshots



Republic Day Address by Director, CSIR-CECRI



Meeting on Signing MoU with GODI Energy Pvt. Ltd.



Faculty Development Programme on Tools and Techniques in Characterization of Compounds



Skill Development Programme on Basics of High-Resolution Imaging Techniques



Firefighting Demonstration and Briefing on other Safety Protocols to Staff Members and Scholars



Demonstration on Potassium Perchlorate for Fireworks and Strategic Applications



Pledge Taking on National Voter's Day 2022

TECHNOLOGY COMPENDIUM OF CSIR-CECRI

- ❖ Indigenous Li-ion battery
- ❖ Indigenous Sodium Ion Battery
- ❖ Performance Improved Lead Acid Battery
- ❖ 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 (ICSC) for Rebars
- ❖ Electrochemical Preparation of DL-Homocysteine Thiolactone Hydrochloride from DL-Homocysteine
- ❖ 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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