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# CECRI NEWS

A monthly newsletter of CSIR-CECRI

compilation of significant happenings

## National Science Day Celebrations

CSIR-Central Electrochemical Research Institute (CSIR-CECRI) celebrated the National Science Day (NSD) with a variety of scientific events spread across February and March 2022 culminating in the National Science Day Lecture on March 22, 2022 by Dr. Kannan Srinivasan, Director, CSIR-Central Salt And Marine Chemicals Research Institute (CSIR-CSMCRI), Bhavnagar. Prof. R. Kothandaraman, Department of Chemistry, Indian Institute of Technology-Madras, Chennai graced the occasion as the Guest of Honour. The Lecture proved to be a fitting finale for the multitude of events organized in commemoration and the enthusiastic & energetic participation in large numbers by research scholars, B.Tech. students, school students, project staff and staff members of CSIR-CECRI.



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*Integrated Approach in  
Science and Technology  
for Sustainable Future*

- Theme of  
National Science Day 2022

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The programme on March 22, 2022 commenced with a Welcome Address by Dr. Rakesh Chandra Barik, Senior Scientist, CSIR-CECRI. He profusely thanked the guests for accepting the invitation and taking part in the event, especially Director of CSIR-CSMCRI who travelled all the way from Bhavnagar to Karaikudi to be amongst the gathering.

Dr. N. Kalaiselvi, Director, CSIR-CECRI, Karaikudi in her Presidential Address provided a glimpse of CSIR-CECRI's R&D activities along the lines of the Theme of NSD-2022 - *Integrated Approach in Science and Technology for Sustainable Future* particularly the effluent treatment, electro-bioremediation and CO<sub>2</sub> capture, storage & conversion to value added products. She called for integrated S&T approaches with both academia and industry. She also appreciated the societal contributions of CSIR-CSMCRI specially for the provision of potable water during natural disasters.

The Chief Guest, Dr. Kannan Srinivasan, in his address expressed that events like NSD are occasions to retrospect and make attempts to improve upon. He was of the opinion that the Theme of NSD-2022 would be everlasting and our efforts towards improvement should also remain so. Events like these should also be utilized by the Research Scholars, the future Scientists, to

showcase their talents, he added. Dr. Kannan Srinivasan also delivered an illustrative lecture stressing on the significance of two keywords for sustainable future - *global benchmarking and collaboration*. He gave suitable examples from various ventures of CSIR-CSMCRI, validating the Theme of NSD-2022.

Prof. Kothandaraman fondly recalled his association with CSIR-CECRI which is still growing stronger with the passage of time. He gave an informative lecture from an academia angle, augmenting the concept of integrated S&T approaches. He also suggested ways towards sustainable future through this network of knowledge. Select TED Talks by research scholars of CSIR-CECRI ensued.

At the end of the programme, prize winners in the following competitions organized to commemorate NSD-2022 were felicitated: 1. Essay Competition (for School Students); 2. Poster Presentation (for AcSIR Scholars, Project Staff and B.Tech. Students); 3. Oral Presentation (for Research Scholars); 4. Science Photography Competition (for all CECRIans); 5. TED Talk (for Research Scholars) and 6. TWAS Fellows Talk (for TWAS Fellows). The event ended with a vote of thanks by Dr. C. Arunchandran, Scientist, CSIR-CECRI.



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

### ❖ CSIR-ICeNGESS:

- NIT Pre-bid Conference on Phase I [Mar 14]
- Meeting with Dr. V.K. Saraswat, Hon'ble Member, NITI Aayog on Updates in Phase I and Phase II Activities [Mar 22]
- Meeting of the Committee for the Tender Opening (Technical Bid) for Phase I [Mar 23]
- 3<sup>rd</sup> Monitoring Committee Meeting under the Chairmanship of Dr. R. Chidambaram [Mar 25]
- Meeting of the Technical Bid Evaluation Committee [Mar 28]

### ❖ Energy Theme of CSIR: Meeting on Shortlisting FTT/FTC Project Proposals (4<sup>th</sup> Tranche) [Mar 14]

### ❖ 4M Theme: Review Meeting for FBR projects under 4M Theme of CSIR [Mar 23]

### ❖ Meeting on Vision and Strategy for Energy Theme of CSIR chaired by DG, CSIR: Director, CSIR-CECRI presented the Thematic Vision Document [Mar 29]

### ❖ Review Meeting of FTT Project on Aerogel based thermal protection systems for nozzle surfaces in space and aerospace applications [Mar 30]

## List of Newly Sanctioned Projects

Projects Sanctioned	Sponsor	Principal Investigator(s)	Budget (Rs. in Lakhs)	Start Date	End Date
Automation and AI/ML-Assisted Development of Solid State Battery Technology	DST, New Delhi	Dr. K. Ramesha	108.99	14 Feb 2022	13 Feb 2025
Electrochemical POC Device for Devices for Detection of Vitamin B <sub>12</sub> and Vitamin A	DST, New Delhi	Dr. C. Suresh	10.00	22 Feb 2022	21 Feb 2025
Feasibility Studies on the Development of Electrodes for electrically rechargeable Aluminum Air Batteries - Phase I	NALCO	Dr. S.T. Nishanthi	120.58	28 Feb 2022	27 Jun 2023
Testing of MEAs for LT-PEMFC	DRE Motors Pvt. Ltd., Hyderabad	Dr. Harshal Agarwal	2.95	09 Mar 2022	08 Jun 2022
Optimization of Impinger Design for Efficient Collection of Particulates from Breath samples	Stanwix Forbes LLC, USA	Dr. P. Tamilarasan	8.85	09 Mar 2022	09 Mar 2023
Construction of a New Building for Housing Li-ion Battery Testing Equipment [CSR Scheme]	Tata Chemicals Society for Rural Development	Dr. K. Ramesha	200.00	11 Mar 2022	10 Mar 2023
Type test of VRLA 1500 Ah cells as per IEC 60896 - 21& 22	Exide Industries Ltd., Kolkata	Dr. Sundar Mayavan	23.60	15 Mar 2022	14 Sep 2024
Testing for 2V 80AH Cells in PCCP Container as per IRS: S: 88/2004	United Leadoxide Products Pvt. Ltd., Goa	Dr. Sundar Mayavan	6.78	15 Mar 2022	14 Mar 2024
Development of Piezoelectric Dynamic Pressure Sensor	ISRO Propulsion Complex, Tirunelveli	Dr. G. Sreedhar	42.00	16 Mar 2022	15 Sep 2023
Lithium salts as leachable corrosion inhibitors & potential replacement for hexavalent chromium in hybrid sol-gel coatings for active corrosion protection of Mg alloys	DST-SERB, New Delhi	Dr. C. Arunchandran	26.71	17 Mar 2022	16 Mar 2025
Estimation of the Stress Corrosion Cracking Resistance of Aluminium Alloy 7085	Siddaganga Instt. of Technology, Karnataka	Dr. S.M. Ganesan	4.04	25 Mar 2022	24 May 2022
Evaluation of Electrochemical capacity of Zinc Sacrificial anode for Cathodic Protection	Constro Chem India Pvt. Ltd., Maharashtra	Dr. Rakesh Chandra Barik	1.18	28 Mar 2022	27 Apr 2022

## Technology Transferred /Agreements/MoUs Signed

- ❖ **Know-how Transfer:** Sunanda Speciality Coatings Pvt. Ltd., Mumbai on *High-Performance Moisture Compatible Corrosion Resistant Protective Coating Systems* (Rs.12 lakhs; 5 years) [Mar 28]

## Honours and Awards



Ms. M. Sornambigai, AcSIR PhD Scholar (Guide: Dr. S. Senthilkumar) has won the **First Prize in the Poster Presentation** at the **International Conference on "Advances in Chemistry with Specific reference to catalysis, sensors, drug delivery energy materials, and anti-cancer studies"** organised by the School of Chemical Sciences, University of Madras in collaboration with Royal Society of Chemistry, RUSA 2.0, Tamilnadu State Council for Higher Education & SPSI, Chennai Chapter during 28-29 March 2022.

## Business Development Leads

- ❖ Meeting with Schneider Electric, Mumbai on development of Electrolyser for generating Green Hydrogen [Mar 02]
- ❖ Meeting with VS Tooling, Coimbatore on R&D Collaboration [Mar 04]
- ❖ Meeting with L&T Green Energy, Mumbai on development of Electrolyzer under H<sub>2</sub> Mission Programme [Mar 07]
- ❖ Visit of Officials from National Institute of Ocean Technology, Chennai: *Discussion on Generation of Hydrogen using OTEC power* [Mar 07]
- ❖ Online Meeting with Tata Consultancy Services on Quantum Capabilities [Mar 09]
- ❖ Meeting with Solara Active Pharma Sciences Ltd., Chennai on collaborative R&D [Mar 10]
- ❖ Visit of officials from Mahaa Rana-Green Energy and Smart Infrastructure Solutions Pvt. Ltd., Vijayawada for discussion on Fuel Cell, Green Hydrogen, LIB Cell Making & Packaging and Development of Supercapacitor & Ni/MH Battery
- ❖ Technical Interactions with Tata Steel Ltd. on Carbon Capture, Utilisation & Storage [Mar 14]
- ❖ Project Review Meeting with Titantech Engineering [Mar 18]
- ❖ Lab Visit by Director, CSIR-CSMCRI, Bhavnagar - Discussion on Silicon Mission Projects [Mar 21]
- ❖ Meeting with Lucas TVS Ltd., Chennai on R&D Collaboration [Mar 23]
- ❖ Discussion with Blue Ashva Innolabs Pvt. Ltd., Mumbai on R&D Collaboration [Mar 24]

## International Women's Day Celebrations

International Women's Day Celebrations was organized at CSIR-CECRI on 17<sup>th</sup> March 2022 by CECRI Ladies Forum (CLF) through hybrid mode (Chief Guest, Guest of Honor, Director and EC Members of CLF attended in person and all other participants attended online).

Dr. N. Anandavalli, Director, CSIR-Structural Engineering Research Centre (CSIR-SERC), Chennai, was the Chief Guest and Dr. G.S. Vijayalakshmi, Retired Professor of Manonmaniam Sundaranar University, Tirunelveli was the Guest of Honour.

Dr. Poonam Singh, Principal Scientist, CSIR-CECRI and President, CLF welcomed the gathering including representatives from participant schools.

In her Presidential Address, Dr. N. Kalaiselvi, Director, CSIR-CECRI highlighted the experiences of some real-life women role models, their struggles and successes on their path of glory.

Dr. R. Sindhuja, Senior Scientist, CSIR-CECRI introduced the Chief Guest and Guest of Honour. Dr. Anandavalli talked about gender equality and highlighted the active role of women in all achievements happening around the world. She gave a special mention on the women activists involved in climate change and the women leaders steering reputed international organizations.

Dr. Vijayalakshmi shared her own life experiences, particularly her pursuing of Doctorate Degree in the 70's overcoming all possible hurdles. She also talked about various challenges women had to face before finally succeeding in all forms of life.

Later, Prizes to Winners in various competitions conducted by CLF (through online mode) were distributed to the students of the rural schools which were collected by the representative teachers. Dr. Aiswarya Bhaskar, Scientist, CSIR-CECRI and Secretary, CLF proposed vote of thanks.



## National Safety Day Celebrations

National Safety Day (*jointly organised by CSIR-CECRI & CSIR-Central Leather Research Institute (CLRI)*) was celebrated on March 4, 2022 with an illuminating lecture by Dr. M. Surianarayanan, Sr. Prin. Scientist and Head, Cell for Industrial Safety and Risk Analysis (CISRA), CSIR-CLRI on "*Best Lab Safety Practices*".

Dr. James Joseph, Sr. Prin. Scientist and Chairman, Safety Committee, CSIR-CECRI in his welcome address highlighted the significance of the day and the role of safety in our day to day lives. In her Presidential Address, Dr. N. Kalaiselvi, Director, CSIR-CECRI expressed her delight on the joining of hands of two CSIR towards celebrating this event of utmost importance. She cited a simple example of indiscriminate usage of using Acetone as nail polish

remover which in fact is highly hazardous and carcinogenic. She also stressed on the need of diligence to be observed by all in a R&D Institute environment.

Dr. Surianarayanan briefed on the Theme for 2022 (*Nurture Young Minds - Develop Safety Culture*) and the pivotal role played by the National Safety Council of India in propagating safety culture. He detailed on essential awareness primarily on material safety data sheets, proper dressing & appropriate behaviour and signage.

The Event ended with a vote of thanks by Dr. V. Subramanian, Outstanding Scientist, CSIR-CLRI. It was an eye-opener for the large number of participants from CSIR-CECRI and CSIR-CLRI.

## Centre for Education and AcSIR Highlights

### AcSIR:

- ❖ First DAC Meeting of Mr. Krishendu Bera (Guide: Dr. Subrata Kundu) [Mar 16]
- ❖ Ph.D. Viva-Voce examination for Mr. V. Mullaivananathan, University Research Scholar (Guide: Dr. N. Kalaiselvi) [Mar 22]

- ❖ PhD Viva Voce Examination for Mr. A. Lakshman Kumar (Guide: Dr. S. Vengatesan) [Mar 30]
- ❖ Synopsis Presentation of Mr. D. Velu, UGC-SRF (Guide: Dr. S.M. Senthil Kumar) [Mar 30]

## Official Events

- ❖ Online Interview for engagement of Project Personnel [Mar 01, 16, 17]
- ❖ Post Budget Webinar on Technology-enabled Development: Director, CSIR-CECRI took part as the Rapporteur for the session *Next-Generation Mobility, Battery Swapping and EV Policies* under the theme *Science & Technology towards a Circular Economy* [Mar 02]
- ❖ National Webinar on International Women's Day (*Women Innovators - The Changemakers*) jointly Organized by The Electrochemical Society of India, Bengaluru & Poornima College of Engineering, Jaipur: Director, CSIR-CECRI delivered Inaugural Address and a Lecture on *Electrochemistry for Green Energy* [Mar 08]
- ❖ EC Meeting of the National Corrosion Council of India on *Corrosion Awareness Day-2022* [Mar 14]
- ❖ 71<sup>st</sup> Meeting of the Management Council, CSIR-CECRI [Mar 17]
- ❖ Workshop on *Promotion of Research Infrastructure and Entrepreneurship in Science & Technology* at Indian Institute of Technology-Patna: Director, CSIR-CECRI delivered Plenary Talk and Keynote Lecture. [Mar 15]
- ❖ Online Hindi Workshop to commemorate **World Hindi Diwas**: *Invited Lecture* by Prof. Sridevi, Dept. of Hindi, St. Joseph College, Trichy [Mar 11] and by Prof. Manoj Kumar Dwivedi, Dept. of Hindi, Sri Vaishnav College, Chennai [Mar 23]
- ❖ DG-CSIR's Meeting with Lab Directors [Mar 22]
- ❖ First Meeting of the Sub-Committee on **Green Initiatives in Marine Sector** (Sub-Group: Battery) organised by Cochin Shipyard Ltd. - Participation of Director, CSIR-CECRI as a Member [Mar 28]
- ❖ EC Meeting of SAEST, Karaikudi [Mar 24]
- ❖ Governing Council Meeting of SAEST [Mar 30]
- ❖ Meeting of the Official Language Implementation Committee [Mar 30]

## Superannuation

❖



**Shri. C. Kumarasamy**

Sr. Technician (2), PPMG Section

superannuated on March 31, 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. *Biointerface coatings* by Dr. B. Subramanian [Mar 03]
2. *How does the metal gets eaten away?* by Dr. Rakesh Chandra Barik [Mar 10]
3. *Throwing some light on light emitting materials* by Dr. N. Lakshminarasimhan [Mar 17]
4. *Importance of fuel cells for energy conversion: its fundamental to technology advances* by Dr. Santhoshkumar D. Bhat [Mar 24]

5. *Electrochemical strategies: A bright future for water treatment* by Dr. S. Vasudevan [Mar 31]

#### ❖ Webinar for ATL adopted Schools:

*Electrochemical (bio) sensors for healthcare diagnostics: a step towards home-based healthcare devices* by Dr. V. Ganesh [Feb 19]

#### Skill Development:

- ❖ A One-week Skill Development Training Programme (Online) on *Paints and Coatings for Corrosion Protection* was organized by CSIR-CECRI during 07-11 Mar 2022. A total of 130 candidates registered and took part in the event.

## Commemoration of National Science Day 2022

CSIR-CECRI in conjunction with the Tamil Nadu State Council for Science & Technology (TNSCT) organized National Science Day Celebrations on 04/03/2022. Dr. S. Angappan, Sr. Principal Scientist and Nodal-JIGYASA, CSIR-CECRI welcomed the gathering. Dr. N. Kalaiselvi, Director, CSIR-CECRI, Karaikudi, in her Presidential Address, highlighted the contributions of Nobel Laureate Sir C.V. Raman to science and society. She also applauded the collaborative effort of TNSCT this year and wished that it would continue to prosper in the future as well. Dr. R. Srinivasan, Member Secretary, TNSCT graced the occasion as the Chief Guest and in his address, he

highlighted TNSCT's efforts to popularize the Geographical Index (GI) concept. He added that many initiatives have been undertaken in the area of Science Communication Programmes. Dr. V. Ganesh, Principal Scientist, CSIR-CECRI, Karaikudi proposed vote of thanks. Subsequently, an Exclusive **Online Experimental Demonstration Session** was conducted by Scientists of CSIR-CECRI (*on Green Fuel by Dr. S. Ravichandran and on Biosensors by Dr. K. Giribabu*) which turned out to be immensely beneficial for the students. A **Science Quiz** was also conducted (using Google forms) in which more than 500 students throughout the country participated.

## Recent Research Publications

- ❖ *Hoisting the photovoltaic performance by photocharging and plasmonic effect via aminosilane protected silver/barium titanate for dye-sensitized solar cells*  
K. Shalini Devi, K.B. Bhojanaa, N. Pavithra and A. Pandikumar  
International Journal of Energy Research (2022) 1; <https://doi.org/10.1002/er.7840>
- ❖ *Butynediol's role beyond brightening additive during electrodeposition of cobalt*  
M. Kiruba, N. Lakshminarasimhan and C. Jeyabharathi  
Journal of the Electrochemical Society 169 (2022) 032507; <https://doi.org/10.1149/1945-7111/ac5a1d>
- ❖ *Lyophilized tin-doped MoS<sub>2</sub> as an efficient photocatalyst for overall degradation of Rhodamine B dye*  
Pardhasaradhi Nandigana, Sanchayan Mahato, Manjubashini Dhandapani, Basudev Pradhan, B. Subramanian and Subhendu K. Panda  
Journal of Alloys and Compounds 907 (2022) 164470; <https://doi.org/10.1016/j.apsusc.2022.152424>
- ❖ *Electrochemical behavior of Sm(III) and electrodeposition of samarium from 1-butyl-1-methylpyrrolidinium dicyanamide ionic liquid*  
Chrysanthus Andrew, Chandran Murugesan and Mani Jayakumar  
Journal of the Electrochemical Society 169 (2022) 022503; <https://doi.org/10.1149/1945-7111/ac4f76>
- ❖ *Electro- and electroless deposition of rhenium from reline deep eutectic solvent*  
Mani Jayakumar, Chandran Murugesan, Chrysanthus Andrew, Keerthi Natarajan and Ramachandran Sekar  
Journal of the Electrochemical Society 169 (2022) 032510; <https://doi.org/10.1149/1945-7111/ac5cf3>
- ❖ *Enhanced electrochromism from non-stoichiometric electrodeposited tungsten oxide thin films*  
A. Chithambararaj, Pardhasaradhi Nandigana, M. Kaleesh Kumar, A.S. Prakash and Subhendu K. Panda  
Applied Surface Science 582 (2022) 152424; <https://doi.org/10.1016/j.apsusc.2022.152424>
- ❖ *Amending charge separation and migration in TiO<sub>2</sub> nanosheet via Au nanoparticles ensemble and its synergy in photoelectrocatalytic methanol oxidation*  
R. Praveen, C. Murugan, A. Pandikumar and R. Ramaraj  
International Journal of Hydrogen Energy (2022) in press; <https://doi.org/10.1016/j.ijhydene.2022.02.195>

## Snapshots



Know-how Transfer on CO<sub>2</sub> to Value-Added Products with Blue Ashva Innolabs Pvt Ltd, Mumbai



71<sup>st</sup> Meeting of the Management Council, CSIR-CECRI



Commemoration of National Science Day 2022 in collaboration with TNSCST



Discussion with Director, CSIR-CSMCRl on CSIR's Silicon Mission



National Safety Day Celebrations



Skill Development Training Programme on Paints and Coatings for Corrosion Protection



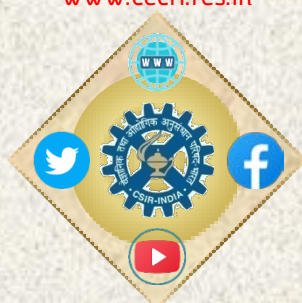
Farewell and Felicitation to Retiree

## 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 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 (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 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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