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CECRI NEWS

A monthly newsletter of CSIR-CECRI

compilation of significant happenings

75th Foundation Day Celebration of CSIR-CECRI

CSIR-Central Electrochemical Research Institute celebrated its 75th Foundation Day (CECRI@75) on 25th July, 2022 in a dazzling manner. Dr. V. Saraswathy, Chief Scientist, CSIR-CECRI, in her welcome address, revived pages from the past on the origin of CSIR-CECRI and narrated its crucial contributions in various sectors, particularly Industrial R&D. Dr. N. Kalaiselvi, Director, CSIR-CECRI, in her presidential address, proudly mentioned the coincidence of the 100th Birthday of Prof. John Bannister Goodenough, *Nobel Laureate* known for his development of lithium-ion batteries. She recalled with reverence the remarkable contributions to Electrochemical Science & Technology made by all visionary leaders of CSIR-CECRI starting from Dr. A. Jogarao in 1949 and the realistic impacts it created in the Industrial & Societal sectors.



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CSIR-CECRI is a beehive of Electrochemistry and a launching pad for a multitude of technologies in Electrochemical Science and Technology

- Prof. K.I. Vasu
CECRI@75

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She also re-emphasized the significance of CSIR's commitment to be the Nodal Agency and the Model Lab towards Global excellence. Our Hon'ble PM's Mission to achieve 'Net-Zero' emission by 2070 is an ample example in this regard and we all should pursue this as our primary goal, she said.

Dr. Kalaiselvi presented a glimpse of R&D activities being carried out at CSIR-CECRI in all major Themes identified by CSIR especially on Energy, Chemicals, Strategic and Healthcare & Nutrition. She was also optimistic of developing and transferring more number of technologies identified under the CECRI@75 banner within a year's time.

Padma Vibhushan Dr. R. Chidambaram, DAE-Homi Bhabha Professor in BARC, Former Chairman, Atomic Energy Commission of India and Former Principal Scientific Adviser to the Government of India was the Chief Guest of the Event and he virtually inaugurated the CECRI@75 Celebrations - a series of activities throughout the year commemorating 75 years of excellence. He highlighted the expertise skill sets of CSIR-CECRI and some key achievements in critical and strategic areas in all aspects of electrochemical science and technology.

Shri. U.K. Bhattacharya, Director (Projects), NTPC, New Delhi and Prof. K.I. Vasu, Former Director,

CSIR-CECRI & Founder President, Vijnana Bharati graced the occasion as the Guests of Honour.

Shri. Bhattacharya briefed the audience on the association of CSIR with NTPC in several large-scale projects and the invaluable inputs received by NTPC from CSIR in solving many issues of varying magnitude. He expressed extreme confidence on working together with CSIR-CECRI based on the impressive technology portfolio of CSIR-CECRI in many matching fields of interest.

Prof. Vasu (94 years old) mesmerized the audience by bringing forth many memorable moments from the magnificent past of CSIR-CECRI. He recalled the remarkable contributions of former Directors of CECRI especially Dr. HVK Udupa in industrial electrochemistry, Prof. KSG Doss revolutionising in electrochemical education and Dr. K.S. Rajagopalan in corrosion science and engineering.

He claimed that CSIR-CECRI with all conceivable infrastructures contain conducive environment for carrying out world-class research. He praised that the campus is a beehive of electrochemistry. He wished CSIR-CECRI all success in all its future endeavours and advised all staff members to contribute their might & march with pride towards *Centennial Celebrations*.



Dr. K.J. Sreeram, Director, CSIR-Central Leather Research Institute, Chennai and Dr. N. Anandavalli, Director, CSIR-Structural Engineering Research Centre, Chennai offered felicitations and called for more combined efforts in common R&D and institutional activities.

Shri. R.P. Singh, Head, Innovation Management Directorate, CSIR HQ, New Delhi envisioned the exclusive role to be played by CSIR-CECRI in almost all leads towards 'Net Zero' by 2070.

Several industrial partners, especially those who acquired technological process from CSIR-CECRI recently, offered felicitations and expressed their gratitude for timely scientific interventions. All of them unanimously solicited continued collaboration in future as well for mutually rewarding experience.

On this occasion, a commemorative logo to mark CECRI@75 was unveiled by Prof. K.I. Vasu and he also presented a merit certificate & cash prize to Ms. K.M. Lakshmi, Research Scholar, CSIR-CECRI, who designed the Logo.

He also released a **Book on Electroplating in Tamil (*Vaazhvin Aatharam Electroplating*)** authored by Dr. P. Veeramani, Former Chief Scientist, CSIR-CECRI. The event concluded with vote of thanks by Shri. K.M. Sridhar, Controller of Administration, CSIR-CECRI.

Subsequently, a demonstration of battery-supercapacitor hybrid e-rickshaw was carried out. As part of the event, the carbon capture demo plant, outcome of CSIR-CECRI's CCUS initiatives, was also inaugurated.

Technology Transferred / Agreements / MoUs Signed

❖ Technology Transfer:

High Performance Moisture Compatible Corrosion Resistant Protective Coating System to M/s. Synorganic Paints Pvt. Ltd., Chhattisgarh; Rs.12.74 lakhs; 5 years [July 26]

❖ Non-Disclosure Agreement (NDA):

M/s. GODI Energy Pvt. Limited, Mumbai on *Operations Know-how for LIB cell making* [July 15]

Business Development Leads

- ❖ Internal Discussion on Development of Electrolyzer Technology [Jul 1]
- ❖ Meeting with Eastern Electrolyser Ltd., New Delhi on electrolyser technology of CSIR-CECRI [Jul 5]
- ❖ Discussion on management of shorted casings using gel based vapour phased corrosion inhibitor with GAIL, Noida [Jul 7]
- ❖ Discussion with Scientists from Central Institute of Brackishwater Aquaculture (ICAR) on

collaborative R&D [Jul 7]

- ❖ Meeting with Indian Rare Earths Ltd., Manavalakurichi on R&D Collaboration [Jul 25]
- ❖ Meeting with TATA Steel Ltd. on R&D Collaboration [Jul 26]
- ❖ Meeting with Hydrogen on R&D Collaboration [Jul 27]
- ❖ Meeting with Adani Group, Ahmedabad on potential R&D Collaboration [Jul 29]

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

❖ CSIR-ICeNGESS:

- Internal Discussion on CSIR-ICeNGESS [Jul 4,5]
- Maiden visit of Dr. Shekhar Mande, former DG-CSIR to CSIR-ICeNGESS Facility at CSIR Madras Complex [Jul 15]. He congratulated the team for the successful achievement and the investment it could attract within a short span of time. He was confident of scaling this success on a mega scale.
- ❖ Monthly Review Meeting of CSIR-AMM project HCP-30 (*Conducting polymer based nano-composites for the next generation flexible electrochromic display devices*) [Jul 13]



Centre for Education and AcSIR Highlights

❖ B.Tech. (2018-2022 Batch) - Placement Details:

Name of the Student	Company
Eunice Evangeline B	BEL, Pune
Gayatri Devi M L	BEL, Pune
Soumya Raj	BEL, Pune
Pavitra S	Shell, Bengaluru
Ajeev J P	Tatva Chintan, Baroda
Niranjana R	Tatva Chintan, Baroda
Manibharathi K	Lakshmi Machine Works, Coimbatore
Chandru S	Lucas TVS, Chennai
Gnana Sangeetha R	BGR, Chennai
Mahalakshmi S	Taqanal, Bengaluru
Dilip Kumar L C	TAFE, Madurai
Vijay V	TAFE, Madurai

AcSIR:

- ❖ Public Viva Voce Examination for Mr. S. Vinoth; Thesis Title - *Graphitic carbon nitride supported bismuth oxyhalide based hybrid catalytic materials for photoelectrochemical generation of solar fuels* (Guide: Dr. A. Pandikumar) [Jul 15]
- ❖ Public Viva Voce Examination for Mrs. Deepa Elizabeth Mathew; Thesis Title - *Nanostructured anode and polymeric membranes for Li-S batteries* (Guide: Dr. A. Manuel Stephan) [Jul 22]
- ❖ Synopsis Submission by Mr. R. Velmurugan; Thesis Title - *Transition metal oxides/sulphides based thin film electrodes by pulsed laser ablation for flexible supercapacitor devices* (Guide: Dr. B. Subramanian) [Jul 28]

❖ B.Tech. (2018-2022 Batch) - Higher Studies Details:

Name of the Student	Institute/Course
Karthik Kumaran S	University of Southampton, UK MSc Electrochemistry & Battery Technologies
Mayuresh Janpandit	University of Southampton, UK MSc Electrochemistry & Battery Technologies
Snehith Reddy M	University of Illinois, USA MS Energy Systems
Vennala Niharika	University of Uppsala, Sweden MSc Battery Technologies & Energy Storage
Paranjothi M	Politecnico di Milano, Italy MS Nanotechnology & Material Science
Moghitha P	University of Pittsburgh, USA PhD in Chemistry
Roshni T S	Michigan state University, USA PhD in Chemical engineering
Manish Varun M	NCKU, Taiwan MSc Material Science & Engineering
Yogapriya V	University of Calgary, Canada MSc Energy & Environment Engineering
Javith Mohammed J	Simon Fraser University, Canada MS Sustainable Engineering
Mahalakshmi T	University of Kansas, USA PhD in Chemistry
Dhilip Kanna A	Northern Illinois University, USA MS Chemistry
Muthucharan G	Erasmus Mundus Programme, Europe MS Materials for Energy Storage & Conversion

Skill Development Activities

- ❖ A one-week Skill Development Training Programme was organized by CSIR-CECRI on *Basics of high-resolution imaging techniques and their applications to Science & Technology* during 4-8 July 2022. A total of 33 registered candidates got trained.
- ❖ A one-week Skill Development Training Programme was organized by CSIR-CECRI on *Operation & Maintenance of Analytical Instruments* during 18-22 July 2022. A total of 52 registered candidates got trained.
- ❖ A two-week International Special Refresher Training Programme for The Projects Development Institute (PRODA), Nigeria on *'International Special Practical Hands-on Training on Lithium Ion Battery Manufacturing: The R&D Perspective'* is being organized by CSIR-CECRI during 25.07.2022-05.08.2022.
- ❖ Valediction of DST-SERB sponsored Karyashala [High-end Workshop] (*under Mission ABHYAAS of Accelerate Vigyan Scheme*) [Jul 2]
- ❖ Valediction of DST-SERB sponsored Vritika Programme (*under Mission ABHYAAS of Accelerate Vigyan Scheme*) on *Training for Expertise in Fabrication and Testing of Photoelectrochemical Device for Hydrogen Production* [Jul 27]

World Youth Skills Day

CSIR-CECRI and Atal Innovation Mission jointly celebrated the World Youth Skills Day on 15th July 2022 under the banner of CSIR JIGYASA. A visit by students belonging to adopted ATL Schools was arranged with a special focus on equipping young people with skills for employment/ entrepreneurship.

Dr. V. Murugan, Dr. V. Ravibabu and Dr A. Pandikumar coordinated their respective lab visits and explained in detail on the R&D facilities available to carry out cutting edge research work. Later, 3 Do It Yourself (DIY) demonstrations on *Solar based power bank & Rechargeable torch light* by Dr. S. Hemavathi, Scientist, CSIR-CECRI

Chennai Unit and *Electronic gadget* by Mr. SP. Thipperudrasamy, Scientist, CIF Division, CSIR-CECRI were conducted.

A total of 40 students and 12 ATL lab in-charge teachers took part enthusiastically in the event. At the concluding session, 3 students from SPIC Nagar Matriculation Higher Secondary School, Thoothukudi nominated by AIM shared their winning stories of **National Level ATL Marathon 2021**.

All the participants were excited to take part in this inspiring initiative and shared their positive feedback with a request for more such awareness events in the future.



CECRI@75 - Science Rally

A Science Rally under the banner of CSIR JIGYASA was organized at Karaikudi on the evening of 21st July 2022 to create awareness on importance of Science among students, parents and public. This rally was envisaged to enable a platform to showcase CSIR-CECRI's contribution to Science and Society during the past 7 decades commemorating CECRI@75.

Shri. P. Madhusudhan Reddy, I.A.S., Collector, Sivaganga District flagged off the rally in the

presence of Dr. N. Kalaiselvi, Director, CSIR-CECRI and local public administration authorities. Around 100 school students took part in the rally from Karaikudi New Bus Stand area to Main Entrance of CSIR-CECRI holding placards portraying inspiring slogans/ messages about Science and CSIR-CECRI's achievements/accomplishments.

As a prelude to the event, a Quiz Competition was conducted earlier in the day in which more than 100 schools students eagerly participated.



Honours and Awards



Ms. A. Soundarya Mary, DST-INSPIRE-SRF & AcSIR Scholar (Guide: Dr. A. Pandikumar) has won the Best Poster Presentation Award from *ACS Sustainable Chemistry & Engineering* in the 29th-CRSI National Symposium in Chemistry & CRSI-ACS Symposium in Chemistry for the work entitled "*Fabrication of Mn-NiOOH/BiVO₄ Photoanode for Efficient Photoelectrocatalytic Water Oxidation*" held at IISER, Mohali during July 07-09, 2022.



Ms. K.M. Lakshmi, Research Scholar, CSIR-CECRI emerged as Winner in the CECRI@75 Logo Designing Competition held at CSIR-CECRI during July 2022 in connection with the 75th Foundation Day Celebrations of CSIR-CECRI. The logo was unveiled during the Foundation Day Event on July 25, 2022 and Ms. Lakshmi was awarded with a Merit Certificate and a cash prize of Rs.5,000/-.



Recent Research Publications

- ❖ Electrochemically activated copper nitroprusside as a catalyst for sensing of carcinogenic acetaldehyde in red wine
A. Esokkiya, N.K. Murugasenapathi, Sanjeev Kumar, S. Sudalaimani, B. Santhosh, P. Tamilarasan, C. Sivakumar and K. Giribabu
Sensors and Actuators B: Chemical 363 (2022) 131798
<https://doi.org/10.1016/j.snb.2022.131798>
- ❖ Boosting of overall water splitting activity by regulating electron distribution over active site of Ce doped NiCo-LDH and atomic level understanding of the catalyst by DFT study
H.N. Dhandapani, D. Mahendiran, Arun Karmakar, P. Devi, S. Nagappan, M. Ragunath, Krishnendu Bera, P. Murugan, B. Ramesh Babu and Subrata Kundu
Journal of Materials Chemistry A {in press}
<https://doi.org/10.1039/D2TA04647D>

Official Events

- ❖ Online Meeting with CSIR-ISTAD on its core activities [Jul 5]
- ❖ Discussion/Review on ongoing infrastructure activities with CPWD Officials and ESD, CSIR HQ [Jul 7]
- ❖ Meeting of the Organizing Committee of the forthcoming National Women's Science Congress [Jul 9]
- ❖ Hindi Training Classes(Online) [Jul 7,12,14,19,26]
- ❖ Walk-in Interview for selection of Apprentice Trainees [Jul 11-13]
- ❖ Discussion on Instrumentation Training for PhD Students [Jul 14]
- ❖ Meeting on Health Insurance Policy Schemes proposed for Staff Members [Jul 14,19]
- ❖ Meeting of the Patent Review Committee [Jul 18]
- ❖ PMS Evaluation Committee Meeting [Jul 18]
- ❖ Meeting of the Empowered Committee for PMS Evaluation [Jul 19]
- ❖ First Meeting of CII National Mission / Committee on Technology, Innovation & Research organised by Confederation of Indian Industry, New Delhi: Participation of Director, CSIR-CECRI as a Member [Jul 28]
- ❖ Internal Review Meeting of CECRI@75 Projects [Jul 28]
- ❖ Felicitation and Farewell Function for Retiree [Jul 29]

Snapshots



Unveiling of CECRI@75 Logo



Special Refresher Course for PRODA, Nigeria



Organizing Committee Meeting - National Women's Science Congress



CECRI@75 - Quiz Competition



District Collector Addressing the Science Rally Participants



Science Rally Underway



Plantation under Aroma Mission of CSIR



Farewell & Felicitations to the Retiree

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 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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