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CECRI NEWS

A monthly newsletter of CSIR-CECRI

compilation of significant happenings

National Workshop on Corrosion Science and Corrosion Control

National Corrosion Council of India (NCCI), a non-profit organization functioning under the aegis of CSIR-Central Electrochemical Research Institute (CSIR-CECRI), Karaikudi, serving as a forum for effective dissemination of knowledge on corrosion and its control, organized a **National Workshop on Corrosion Science and Corrosion Control** on December 21, 2022 at Arasu College of Arts and Science for Women, Karur, Tamil Nadu. NCCI, functioning in CSIR-CECRI premises since 1990, also collaborates with other focal bodies on R&D in the field of Corrosion Science and Engineering in the country. NCCI also organizes National Conference on Corrosion Control periodically covering all aspects of Corrosion Science & Engineering for enlightening and increasing the awareness on corrosion of metals & its remedial measures.



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“

Reorient and Revitalize the organization to emerge as Global Centers of Innovations in the Amrit Kaal

- Dr. Jitendra Singh
Hon'ble Minister
of Science & Technology, GOI and
Vice-President, CSIR

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Arasu College of Arts & Science for Women, Karur joined hands with NCCI, Karaikudi in organizing this informative event to inspire the scientific interests among its students and to update them with emerging trends in this field thereby validating their institutional motto of *Knowledge is Power*. It was a part of their continuous endeavour to prepare the students to face the challenges imposed by the industry and society and to be equipped with viable solutions by pursuing perseverant research.

During the Inauguration of the Workshop, **Mr. N. Kannan**, Secretary, Arasu Group of Institutions delivered the Welcome Address. **Dr. K.J. Sreeram**, Director, CSIR-CECRI and Patron, NCCI delivered the inaugural address in which he highlighted the importance of corrosion and its mitigation. He gave a glimpse of the adverse impacts of corrosion in global economy and briefed on the various crucial R&D activities of Corrosion and Materials Protection Division of CSIR-CECRI in many critical areas including oil & gas industries, defence and other strategic sectors.

Mr. S.V.R. Krishnan, Executive Director (Operations) Tamil Nadu Newsprint and Papers Ltd. (TNPL), Karur delivered the Presidential Address and released the Workshop Manual. He profusely thanked NCCI and CSIR-CECRI for organizing this event of utmost importance at this juncture of the careers of students and faculties. Meanwhile, **Mr. K. Kalaiselven**, General Manager (Human Resources), TNPL and **Dr. P. Natesan**, Vice Chancellor

(in-Charge), Tamil Nadu Teacher Education University offered their felicitations.

Dr. V. Saraswathy, Chairman, NCCI and Head, Corrosion and Materials Protection Division, CSIR-CECRI highlighted the invaluable contributions of CSIR-CECRI in the area of Corrosion Science and Engineering and the seminal contributions of NCCI in disseminating them among all the global stakeholders. **Dr. T. Shanthi**, Head, Department of Chemistry, Arasu College of Arts & Science for Women, Karur explained about the genesis of the Workshop and briefed about various sessions to be held. **Dr. Rakesh Barik**, Secretary, NCCI and Principal Scientist, CSIR-CECRI offered vote of thanks.

More than 250 participants from 10 institutions registered and actively took part in all the sessions of this Workshop. **Special Lectures** were delivered by Scientists of CSIR-CECRI and **12 Hands-on Demonstrations** were conducted on electrochemical techniques viz. fundamentals of corrosion phenomena, corrosion monitoring techniques and mitigation methodology such as inhibitors, coatings, cathodic protection by a team of experts from CSIR-CECRI (scientists/engineers/research scholars/project assistants).

Oral and Poster Presentation Competitions were arranged for students and the Best Presentations were awarded with **Certificates** and **Prizes** during the Valedictory Function.



Release of New Logo of CSIR

- ❖ Hon'ble Minister of Science and Technology, **Dr. Jitendra Singh**, released the **New Logo with Tagline for CSIR** during the 200th Governing Body Meeting of CSIR [Dec 17]. Keeping in tune with the transformations happening in CSIR, the Minister of Science and Technology released the new tagline, **CSIR-The Innovation Engine of India**.
- ❖ Dr Jitendra Singh called upon a pool of over 4,500 CSIR scientists to reorient and revitalize the organization to emerge as Global Centers of Innovations in the Amrit Kaal. He said, they must focus on emerging innovations in areas like Hydrogen in the energy transition, Carbon capture and storage, Accessible solar power, Plastic recycling and Cheap energy storage.



Business Development Leads

- ❖ Review Meeting **DAE-BRNS** Project [Dec 1]
- ❖ Review Meeting on **CSIR-AMM** project HCP-030 [Dec 2]
- ❖ Meeting with **M/s. JBM Group** on prospective R&D [Dec 6]
- ❖ Discussion with **Lithion Power** on prospective R&D Projects [Dec 7]
- ❖ Discussion with **Windia Chemicals** on prospective projects [Dec 8]
- ❖ Review Meeting on **H2T Mission Mode Project** [Dec 10]
- ❖ Discussion on project activities with **TATA Steel, Jamshedpur (SSP 13/22)** [Dec 12]
- ❖ Meeting with **M/s. Berger Paints India Ltd.** on collaborative R&D [Dec 12]
- ❖ Meeting with **M/s. Mesha Tech** on R&D Collaboration [Dec 13]
- ❖ Project Discussion with **Gateway Cetus Pvt. Ltd.** [Dec 16]
- ❖ Discussion on **CO₂ Capture & Metal Waste to Wealth** [Dec 16]
- ❖ Review Meeting of **DST-BDTD Project** [Dec 17]
- ❖ Meeting with **M/s. Volvo** on collaborative R&D [Dec 19]
- ❖ Discussion on collaborative R&D with **M/s. GAIL** [Dec 21]
- ❖ Project Discussion with **M/s. Godrej & Boyce (P) Ltd., Mumbai** [Dec 27]
- ❖ Technology Transfer Discussion with **M/s. Monotech Systems Ltd., Chennai** [Dec 27]
- ❖ Meeting on **Green Hydrogen Proposals** to MNRE [Dec 28]
- ❖ **ICeNGESS Meeting** [Dec 30]

Technologies Developed

- ❖ Electrochemical Preparation of 4-Aminophenol
- ❖ UV Protective Polymer composite Material
- ❖ 3D printable filament fabrication by melt extrusion
- ❖ Graphene coated polymer material

AcSIR Highlights

- ❖ PhD Comprehensive Examination [Dec 8]
- ❖ **AcSIR Special Lecture** on the 125th Birth Anniversary of Sir K.S. Krishnan, FRS [Dec 12]
- ❖ DAC Meeting for Ms. A. Tamil Elakkiya, AcSIR Scholar (Guide: Dr. M. Pandiaraj) [Dec 13]
- ❖ DAC Meeting for Mr. M. Siva Ananth, AcSIR Scholar (Guide: Dr. M. Pandiaraj) [Dec 13]
- ❖ DAC Meeting for Mr. Anup Kuchipudi, AcSIR Scholar (Guide: Dr. G. Sreedhar) [Dec 13]
- ❖ DAC Meeting for Mr. R.S. Prasanna Kumar, AcSIR Scholar (Guide: Dr. G. Sreedhar) [Dec 13]
- ❖ DAC Meeting for AcSIR Scholar M. Aswathi (Guide: Dr. Sheela Berchmans) [Dec 15]
- ❖ DAC Meeting for Mr. S. Jamal Mohamed, AcSIR Scholar (Guide: Dr. P. Tamilarasan) [Dec 15]
- ❖ DAC Meeting for Mr. A. Jerom Samraj (Guide: Dr. N. Rajasekaran) [Dec 16]
- ❖ DAC meeting for Mr. A. Vijayaprabakaran (Guide: Dr. M. Kathiresan)
- ❖ DAC Meeting for Mr. Martin Muthui, AcSIR Scholar (Guide: Dr. J. Mathiyarasu) [Dec 20]
- ❖ DAC Meeting for Mr. S. Gokulnath, AcSIR Scholar (Guide: Dr. M. Sathish) [Dec 20]
- ❖ DAC Meeting for Ms. K. Ramya, DST-INSPIRE Fellow (Guide: Dr. V. Murugan) [Dec 21]
- ❖ DAC Meeting for Mr. P. Sriram, AcSIR Scholar (Guide: Dr. S.K. Panda) [Dec 21]
- ❖ DAC meeting for Mr. S. Jamal Mohamed, AcSIR Scholar [Dec 22]
- ❖ PhD Viva voce examination for Ms. M. Sandhiya, AcSIR Scholar (Guide: Dr. M. Sathish) [Dec 26]

Nobel Day 2022

As in previous years, **Nobel Day** was celebrated at CSIR-CECRI, Karaikudi in a grand manner on December 12, 2022. **Dr. N. Lakshminarasimhan**, Sr. Pri. Scientist and Head, PPMG, CSIR-CECRI welcomed the gathering and highlighted the importance and purpose of Nobel Day Celebrations. **Dr. K.J. Sreeram**, Director, CSIR-CECRI in his Presidential Address emphasized how Nobel winning works make an impact on society. He also remarked that Nobel Laureates always remain as a source of inspiration and motivation for the scholars and scientists. The inauguration was followed by invited lectures on the six Nobel Prize Awardees by Eminent Speakers from nearby institutions. All the Events of this year's celebrations were coordinated by the Skill Development Group (Jigyasa), CSIR-CECRI.

Prof. M. Senthilvelan, Head, Department of Nonlinear Dynamics, Bharathidasan University, Trichy gave a wonderful oration on the **Nobel Prize in Physics**. The Nobel Prize 2022 in Physics is shared by **Alain Aspect, John Clauser and Anton Zeilinger** for experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science. Prof. Senthilvelan elaborated the principles of quantum mechanics and novelty in the award winning work.

Prof. M. Jeganmohan, Department of Chemistry, IIT, Madras delivered an informative lecture on The **Nobel Prize 2022 in Chemistry** which is shared by **Carolyn Bertozzi, Morten Meldal and K. Barry Sharpless** for the development of click chemistry and biorthogonal chemistry. He highlighted on how molecules are coupled together - click chemistry - a straightforward route, which is widely utilized in the development of pharmaceuticals for mapping DNA and creating materials. He briefed on the significance of the incredible work of the awardees.

Prof. Shalini Velappan, Finance and Accounting, Indian Institute of Management, Trichy talked about this year's Nobel Prize winning work in **Economic Sciences** shared by **Ben Bernanke, Douglas Diamond and Philip Dybvig** for their research on banks and financial crises. Prof. Shalini accentuated on our abilities to identify nuances in order to avoid

both serious crises and expensive bailouts. Her talk was a real eye-opener to many among the audience.

Prof. K. Pandima Devi, Department of Biotechnology, Alagappa University, Karaikudi elucidated on the Nobel Prize 2022 rewarding work in **Physiology or Medicine** by **Svante Paabo** on his discoveries concerning the genomes of extinct hominins and human evolution. She enthralled the listeners by explaining enthusiastically on the genesis of a new scientific discipline - paleogenomics - as a result of the above research.

Prof. Vinod Balakrishnan, Department of Humanities & Social Sciences, National Institute of Technology, Trichy left the audience spell-bound with his mesmerizing talk on The Nobel Prize 2022 winning work in **Literature** awarded to **Annie Ernaux**. A majority in the audience were in awe by the energetic presentation by Prof. Vinod Balakrishnan on the acumen with which the awardee uncovers the roots, estrangements and collective restraints of personal memory. He depicted the autobiography in such a way that it brought before the eyes of the audience the life of the Nobel Laureate and made them relive the moments of her voice for freedom of women and forgotten figures of the century.

Prof. Y. Srinivasa Rao, Department of History, Bharathidasan University, Trichy spoke on The Nobel Prize 2022 winning working in **Peace** shared by **Ales Bialiatski**, the Russian Human Rights Organization Memorial and the Ukrainian Human Rights Organization Center for Civil Liberties. Prof. Rao shed light on the invaluable work by the three outstanding champions of human rights, democracy and peaceful co-existence in the neighbour countries - Belarus, Russia and Ukraine.

In addition to the Staff Members and Scholars of CSIR-CECRI, more than 100 students from various schools and colleges attended the event. Prize winners in the quiz competition held earlier on the day were honoured at the end. **Dr. S. Angappan**, Sr. Pri. Scientist and Coordinator, Jigyasa, CSIR-CECRI thanked the guests and coordinators.



Skill Development Activities

Skill Development Training Programmes:

- ❖ Skill Development Training Programme on *Biosensor: Design and application* was organized by CSIR-CECRI during December 19-22, 2022. A total of 51 participants got trained.
- ❖ Skill Development Training Programme on *Advanced Materials for Energy Conversion and Storage: Fundamentals to Device Fabrication* was organized by CSIR-CECRI during December 19-21, 2022. A total of 36 participants took part in this training programme.
- ❖ Industrial Refresher Course on *Surface Coatings for Value Added Products viz. Decorative and Functional Applications* was

organized by CSIR-CECRI during November 21-25, 2022. A total of 9 participants got trained.

JIGYASA:

- ❖ More than 20 students and 2 lecturers from Thiruvalluvar College of Engineering and Technology, Vandavasi visited Electrochemical Chemical Power Sources Division of CSIR-CECRI on December 9, 2022 and gained valuable insights on e-mobility perspective
- ❖ More than 110 students and 4 teachers from Jeevana School, Madurai visited CSIR-CECRI on December 9, 2022 and learnt a lot on the ongoing R&D activities.

Awareness Programme

On behalf of The Complaints Committee for Prevention of Sexual Harassment of Women at Work Places, an Awareness Session was arranged on the topic of “*Prevention of Sexual Harassment at Workplace*” on December 9, 2022. Mrs. Poornachandrabharathi, Sub-Inspector of Police, Karaikudi conducted this informative event which covered all the relevant topics - what constitutes harassment, what are the ways to prevent it and what are some of the options available for the victims of harassment. She also gave detailed reply to the queries raised by the audience after the lecture.



Official Events

- ❖ Monitoring Committee Meeting to review ongoing EAC approved civil works in our campus [Dec 1]
- ❖ Tender Opening for disposal of scraps and condemned vehicles and other items [Dec 6]
- ❖ Patent Evaluation Committee Meeting [Dec 8]
- ❖ Annual Meeting of the Internal Complaints Committee for Prevention of Sexual Harassment of Women at Work Places [Dec 9]
- ❖ Monitoring Committee Meeting (ESD CSIR HQ, CSIR-CECRI, CPWD) on ongoing works [Dec 13]
- ❖ Meeting on ISTAD Activities [Dec 15]
- ❖ Meeting on Facility Creation [Dec 16]
- ❖ Management Review Committee Meeting on CSIR-Battery Performance Testing and Evaluation Centre (BPTEC) [Dec 19]
- ❖ Selection Committee Meeting for Recruitment of Project Associate I under HCP 0101 [Dec 19]
- ❖ Discussion on GST [Dec 20]
- ❖ Laboratory Strategic Group Meeting [Dec 26]
- ❖ Recruitment of Technician - Competitive Written Examination [Dec 26]
- ❖ Recruitment of Technical Assistant Competitive Written Examination [Dec 28]

Recent Research Publication

- ❖ Modulating the surface electronic structure of active Ni sites by engineering hierarchical NiFe-LDH/CuS over Cu foam as efficient electrocatalyst for water splitting
H.N. Dhandapani, Arun Karmakar, S. Sam Sankar, K. Sangeetha, N. Sreenivasan, M. Ragunath, B. Ramesh Babu, Subrata Kundu
Inorganic Chemistry 61 (2022) 21055
<https://pubs.acs.org/doi/10.1021/acs.inorgchem.2c03589>

Inspection & Review of Thiruvalluvar Statue, Kanyakumari

The Expert Committee comprising of Scientists from Corrosion and Materials Protection Division, CSIR-CECRI, TTDC, Chennai, State & Central Archeologists visited the site on October 16, 2022 and December 17, 2022 and reviewed the progress of the protective coating work suggested by CSIR-CECRI being carried out. Critical suggestions were given by our Team considering the magnitude of the dimensions of the structure (height of 133 feet (25th tallest statue in India) weighing around 7000 tonnes) and the aggressive environment in which the Statue is situated (head of the statue stands at a height of 200 feet above the sea level).







Azadi Ka Amrit Mahotsav and CSIR-CECRI@75

Prof. Joseph Ajay Pathakamuri from Department of Biology, Franciscan University of Steubenville, OH, USA visited CSIR-CECRI, Karaikudi on December 16, 2022 and delivered a lecture on "Insights into Corona Virus Biology" as a part of the Lecture Series on 'Electrochemical Science and Technologies: A Path Forward to Sustainable Society' in marking the celebrations of India's 75th Independence (Azadi

ka Amrit Mahotsav) and CSIR-CECRI's 75th Foundation Year (CSIR-CECRI@75). The lecture was highly informative and interactive and provided elaborate information on genomic characteristics of SARS-CoV, multi variant evolution and effect of vaccination. Prof. Joseph also shared his personal research experience and good laboratory practices with Ph.D., Scholars of CECRI, Karaikudi.

Honours and Awards

- ❖  **Ms. C. Jesica Anjeline**, AcSIR PhD Scholar working under the guidance of Dr. N. Lakshminarasimhan has won the **Best Poster Award** for her work titled *NiFe₂O₄-LaFeO₃ Spinel-Perovskite Nanocomposite: Space Charge Effects on High Dielectric Constant and Interfacial Proton Conduction* in the International Union of Materials Research Societies - International Conference in Asia (IUMRS-ICA 2022) held during December 19-23, 2022 at Jodhpur.
- ❖  **Mr. N.K. Murugasenapathi**, AcSIR PhD Scholar (Guide: Dr. P. Tamilarasan) has won the **Best Poster Award** for his Presentation on *In-situ Electrochemical Shell-isolated Nanoparticle Enhanced Raman Spectroscopy (EC-SHINERS): A Powerful Tool for Probing Electrochemical Reactions* in the 9th International Conference on Perspectives in Vibrational Spectroscopy (ICOPVS-2022) held during December 13-17, 2022 at Indore.
- ❖  **Mrs. Nasrin Kabeer**, AcSIR PhD scholar working under the guidance of Dr. M. Sathish has been selected by the DST (9 students selected to represent India) to attend the **14th HOPE Nobel Laureate Meeting** to be organized by the Japan Society for the Promotion of Science in Tsukuba, Japan from 27/02/23 to 03/02/23. HOPE Meetings provide an opportunity for excellent graduate students and young researchers to engage in interdisciplinary discussions with Nobel laureates.
- ❖  **Mr. S. Gokulnath**, AcSIR PhD Scholar, pursuing research under the guidance of Dr. M. Sathish, has been selected for **Prime Minister's Fellowship for Doctoral Research**, with Indian Oil Corporation Ltd. R&D Center as Industry partner. This is a unique scholarship Scheme being implemented jointly by Science & Engineering Research Board and the Confederation of Indian Industry. Mr. Gokulnath will avail this fellowship for 4 years from 7th Dec 2022.

Snapshots



200th Meeting of the Governing Council of CSIR



Meeting of the Management Review Committee -
CSIR BPTEL



FDP on Advanced Materials for Energy Conversion and Storage: Fundamentals to Device Fabrication



Skill Development Training Programme on Biosensor Design and Application



Azadi Ka Amrit Mahotsav and CSIR-CECRI@75 Lecture
Series: Lecture by Prof. J.A. Pathakamuri



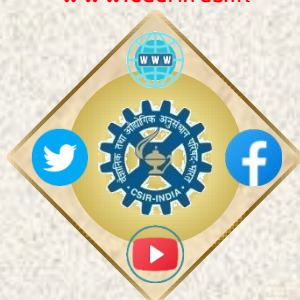
Visit of School Students to CSIR-CECRI, Karaikudi
under CSIR-Jigyasa Initiative

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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