CECRI NEWS

October 2021
Volume 2 Issue 10

A monthly newsletter of CSIR-CECRI
—compilation of significant happenings—

152nd Birth Anniversary of Mahatma Gandhi

CSIR-Central Electrochemical Research Institute (CSIR-CECRI), Karaikudi paid homage to **The Father of the Nation Mahatma Gandhi** on his **152nd Birth Anniversary** on 02nd October, 2021 with patriotic fervour. Every year his valiant struggles are fondly recalled through a voluntary **Shramdhan** by members of CSIR-CECRI Family. This year it was complemented with a mega plantation under the banner of **Aroma Mission of CSIR** wherein the objective is to protect and nurture plants and trees having aromatic values thereby attracting farmers interest to this field and augment their income. A large number of volunteers including staff and their family members, pensioners, research scholars, B.Tech. students, project staff and apprentices took part enthusiastically in this invigorating initiative.

"The CSIR Aroma Mission is envisaged to bring transformative change in the aroma sector through desired interventions in the areas of agriculture, processing and product development for fuelling the growth of aroma industry and rural employment."

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Business Development Leads

- Meeting with **Blue Ashva Capital**, Mumbai on R&D Collaboration [Oct 01]
- Meeting with **Hindustan Unilever Ltd., Chennai & CSIR-NEERI, Nagpur** on *Removal of Mercury Pollutant from Soil* [Oct 01]
- Meeting with **HAL, Bengaluru** on Thermal Barrier Coatings [Oct 05]
- Meeting with **M/s. QMax, Chennai** on R&D Collaboration [Oct 05]
- Discussion with the Vice President of **Tata Steel Ltd.** [Oct 07]
- Meeting with **IEC FABCHEM Ltd.** on R&D Collaborations [Oct 08]
- Meeting with **Amity University, Noida** on Technical Expertise in *Upscaling the Electrode for Water Purification and Generation of Electricity from Waste Water* [Oct 11]
- Internal Discussion on **Redox Flow Battery System** [Oct 11]
- Meeting with **Agency for New and Renewable Energy Research and Technology (ANERT)**, Govt. of Kerala on *CSIR-CECRI's Water Electrolyser Technology* [Oct 12]
- Project Review Meeting with **M/s. Sudarshan Farm Chemicals Ltd., Mumbai** [Oct 12]
- Online Discussion with **BEL Optronic Devices Ltd., Pune** on R&D Collaboration [Oct 13]
- Online Meeting with **Gujarat Fluorochemicals Ltd., Noida** on development of *Nafion Equivalent Product* [Oct 18]
- Review Meeting of CSG: COVID-19 CSIR Projects under *Vertical Hospital Assistive Devices* [Oct 18]
- Meeting with **JSW Steel**, Bellary and Demonstration by CECRI Team on *Production of Metallic Iron from Ferrous Sulphate Solution through Electrowinning* [Oct 18]
- Online Meeting with M/s. Tatva Chintan Pharma Chem Ltd., Baroda on R&D Collaboration [Oct 26]
- Online Meeting with **BEL Optronic Devices Ltd., Pune** on *Indigenous Development of Phosphors for Image Intensifier Tubes* [Oct 27]
- Online Meeting with **Gujarat Fluorochemicals Ltd.** on Collaboration Opportunities between CSIR and GFL [Oct 27]
- Online Meeting with **CDAC, Thiruvananthapuram** on the Project Proposal *Development and Demonstration of Digital Twin* [Oct 27]
- Online Meeting with **JSW Steel, Bellary** on R&D Collaboration [Oct 28]
- Online Meeting with **Technip India Ltd**. on R&D Collaboration [Oct 28]
- Internal Discussion on Emerging Technologies for Commercialization for the upcoming meeting with **Hira Power & Steels Ltd.**, Raipur [Oct 29]

List of Newly Sanctioned Projects

Projects Sanctioned	Sponsor	Principal Investigator(s)	Budget (Rs. in Lakhs)	Start Date	End Date
Printed electrochemical sensor, sensor design, development and qualification on 2D Surface and flexible fabric material	HCL Technologies Ltd., Chennai	Dr. M. Pandiaraj	8.85	29 Sep 2021	28 Jun 2022
Development of advanced magnesium alloys for energy applications	High Energy Batteries, Pudukottai	Dr. C. Naveen Kumar	25.0	30 Sep 2021	29 Dec 2022
Corrosion protection strategies for the bottom plates of petroleum storage tanks (T001, T008 and T018) at Kandla Terminal, Gujarat	Indian Oil Corporation Ltd.	Dr. Rakesh Barik	7.94	21 Oct 2021	20 Jan 2022

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

- **ICeNGESS**:
  - Pre-Bid Conference for Phase **2 Capacity Building on LIB Assembly Line** [Oct 20-22]
  - Meeting to finalize **EOI** of Phase I & II [Oct 28]
- **CSIR-AMM** Project (*Conducting Polymer based Flexible Electrochromic Display Devices)* - Monthly Review Meeting [Oct 06]
- **Silicon Mission**: Online Presentation on FTT Projects [Oct 27]

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Special Cleanliness Drive

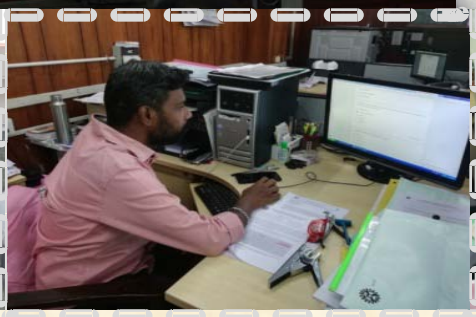
Activities under **Swachh Bharat Mission** are a part of routine at CSIR-CECRI. In addition, a ***Special Cleanliness Drive*** was launched during 18 – 20 October 2021 under directives from CSIR HQ. Various parts of our campus were made sparkling clean with the help of workers in HLS and Garden Sections. A large number of Volunteers comprising of Staff and their Family Members, Scholars, B.Tech. Students, etc. also earnestly took part in this initiative. Similar special drives have been planned in the future also. A detailed report along with photographs of the Special Drive was submitted to Shri. R.P. Singh, Chief Scientist, CSIR HQ and Nodal Officer, **Swachhta Pakhwada 2021**.

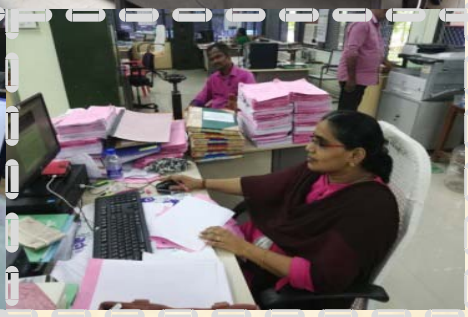
Hindi Month-2021

As in previous years, **Hindi Month** was celebrated during September 1-30, 2021 in a grand manner. A variety of events/competitions were organized by the Hindi Section of CSIR-CECRI in which more number of Staff Members, Wards, B.Tech. Students and Scholar took active participation. The following events decorated this year's celebrations:

- Daily Hindi Quiz
- Hindi Kavita Recitation Competition for Wards
- Section-wise Competitions
- World Building Competition for all Staff Members
- Translation Workshop
- Poster Presentation
- Official Language Implementation Committee (OLIC) Meeting
- Pick & Speak Competition (TOLIC Member Offices)
- TOLIC/CECRI - Joint Online Hindi Workshop
- Hindi Songs Competition (open to all CECRIans)
- Town Official Language Implementation Committee (TOLIC) Meeting

The valedictory event was held on September 30, 2021 in which the prize winners of the competitions were felicitated.





Talks Delivered by Scientists of CSIR-CECRI

Dr. K. Giribabu, Scientist, Electrodics and Electrocatalysis Division, recipient of the **CSIR Young Scientist Award 2021 - Chemical Sciences** delivered a Talk on ***Unconventional Strategies for Electrochemical Sensing Route to Extirpate the Bottlenecks*** on October 12, 2021 [Online]. He introduced an idea of electrochemical sensing in an unconventional way (using two immiscible electrolyte solutions (ITIES)) which is based on ion-transfer of analytes across the immiscible solutions where the ion-transfer could be facilitated using a chelating ligand or by tuning the interface size/area (i.e., µm-nm regime). He presented his strategy for developing ITIES using glass micropipette with an interface size of ~5 µm. He also briefed on his success story of deployment of the developed micrometer sized pipette for electrochemical differentiation of putrescine and cadaverine using a chelating ligand. He concluded his lecture by listing the various advancements and potential opportunities available in ITIES electrochemistry.

Dr. V. Ravibabu, Scientist, Electrochemical Process Engineering Division, CSIR-CECRI delivered a talk on ***Additive Manufacturing Technology*** at Kendriya Vidyalaya, Karaikudi on October 8, 2021 as a part of CSIR-JIGYASA activities. He grabbed the attention of students towards this attractive area of manufacturing that is grabbing attention across the globe. He gave intrinsic clarifications on the intuitive inquiries raised by the students. All the participants gained valuable insights from the talk.

Dr. Deepak Kumar Pattanayak, Principal Scientist, Electrochemical Process Engineering Division gave an Online Lecture on ***Can human bone be 3D printed?*** for the students of adopted Atal Tinkering Lab (ATL) Schools under CSIR-JIGYASA on October 23, 2021. He briefed on the human skeleton system and basic understanding of bone biology. Subsequently, he discussed the necessity of artificial implants that can replace parts of the human skeleton system. He shed light on the recent advancements in science and technology especially additive manufacturing or 3D printing technology and its usefulness for developing patient-specific bone implants. Besides, he narrated various nanotechnology concepts that have been introduced in the area of patient-specific bone implants which paves way for improved and enduring implant fixation in our human body.

Visit of Chief Engineer, CSIR, New Delhi

Er. A.K. Goel, Chief Engineer, CSIR made a visit to CSIR-CECRI, Karaikudi on 4th October 2021 and reviewed the progress of the ongoing construction activities. He was accompanied by Mr. R.K. Behera, Sr. Architect, ESD, CSIR HQ. The following works were extensively examined in the presence of Civil & Electrical Engineers of CSIR-CECRI and the Officials of CPWD, Madurai

a) Construction of Over Head Tanks [3 lakh litres capacity: 2 Nos. – Institute & Staff Colony]
b) Construction of 90 Rooms Scholars Hostel [G+2]
c) Augmentation of Power Supply Facility at CSIR-CECRI - Providing 2 nos. of Sub-Stations and Augmentation of LT Distribution.
d) On-going Civil & Electrical works with CSIR funding support.

Vigilance Awareness Week 2021

In connection with the observance **Vigilance Awareness Week 2021** (*26 Oct to 01 Nov 2021*) **Integrity Pledge** was administered to all the staff members of CSIR-CECRI on Oct 26, 2021 in their respective divisions. Various Events have been envisaged under this year's Theme **स्वतंत्र भारत @ 75: सत्यानिष्ठ से आत्मनिर्भरता** [**Independent India @ 75: Self Reliance with Integrity**]. A detailed report will be submitted to the Chief Vigilance Officer, CSIR Head Quarters in due course.

Centre for Education and AcSIR Highlights

AcSIR:

- DAC Meeting of Mr. M. Ragunath (Guide: Dr. Subrata Kundu) [Oct 06]
- Synopsis Submission by Ms. Deepa Elizabeth Mathew, UGC JRF (Guide: Dr. Manuel Stephen) [Oct 18]
- Synopsis Submission by Ms. M. Nagalakshmi, UGC SRF (Guide: Dr. N. Kalaiselvi) [Oct 26]
- DAC Meeting of Mr. S. Sudalaimani (Guide: Dr. K. Giribabu) [Oct 26]
- DAC Meeting of Mr. P. Sampath Kumar (Guide: Dr. C. Suresh) [Oct 27]

Centre for Education:

- Online Counselling for Admission to B.Tech. Course (Chemical and Electrochemical Engineering) under Other State Quota [Oct 06]

Recent Research Publications

- *Metallic Gold-Incorporated $Ni(OH)_2$ for Enhanced Water Oxidation in an Alkaline Medium: A Simple Wet-Chemical Approach*
  M. Ragunath, A. Karmakar, K. Karthick, S. Sam Sankar, K. Sangeetha, K. Bera and Subrata Kundu
  Inorganic Chemistry, 60, 15818 (2021); https://doi.org/10.1021/acs.inorgchem.1c02571
- *Iminium–Enaminium-Functionalized Silica Nanostructures: An Efficient Oxygen Reduction Electrocatalyst in a Nonaqueous Electrolyte via the $2e^-$ Transfer Mechanism*
  N. Mohanapriya, S. Vengatesan and Naveen Chandrasekaran
  ACS Applied Energy Materials, 4, 7767 (2021); https://doi.org/10.1021/acsaem.1c01147
- *Molecularly Engineered Oxygen-deficient Magnetite Decorated Carbon as Electrocatalysts for Oxygen Reduction Reaction*
  R.V. Adith, K. Madasamy, J. Ebenezer, N. Mohanapriya, S. Kosame, B.K. Ramesh, M. Kathiresan, S. Senthil Kumar, Naveen Chandrasekaran
  Molecular Catalysis, 514, 111837 (2021); https://doi.org/10.1016/j.mcat.2021.111837
- *Inter-lamellar Nanostructures-by-design for High-performance Dual-Photoelectrode Photofuel Cell based Genosensor*
  Y. Sun, F. Li, X. Liu, T. Qin, T. Li, H .Zheng, S. Alwarappan and K. Ostrikov
  Sensors and Actuators B (Chemical), 350, 130838 (2022); https://doi.org/10.1016/j.snb.2021.130838
- *Ultrasensitive PEC Aptasensor based on One Dimensional Hierarchical SnS_2|oxygen vacancy-WO_3 co-sensitized by formation of a cascade structure for signal amplification*
  S. Zhang, H. Zhang, R. Jiang, J. Yuan, Y. Fen, T. Qin, S. Arunkumar, X. Liu, S. Alwarappan
  Sensors and Actuators B (Chemical), 351, 130966 (2022); https://doi.org/10.1016/j.snb.2021.130966
- *Current Progressions in Transition Metal based Hydroxides as Bi-functional Catalysts towards Electrocatalytic Total Water Splitting*
  K. Sangeetha, K. Karthick, S. Sam Sankar, A. Karmakar, M. Ragunath, K. Bera and Subrata Kundu
  Sustainable Energy & Fuels (*in press*); https://doi.org/10.1039/D1SE01193F
- Aiding Time-Dependent Laser Ablation to Direct 1T-MoS_2 for an Improved Hydrogen Evolution Reaction
  M. Mathankumar, K. Karthick, A.K. Nanda Kumar, Subrata Kundu and B. Subramanian
  ACS Sustainable Chemistry & Engineering, 9, 14744 (2021); https://doi.org/10.1021/acssuschemeng.1c04106
- *High Dielectric Constant of $NiFe_2O_4$-$LaFeO_3$ Nanocomposite: Interfacial Conduction and Dielectric Loss*
  C. Jesica Anjeline, D.P. Mali and N. Lakshminarasimhan
  Ceramics International, 47, 34278 (2021); http://doi.org/10.1016/j.ceramint.2021.08.338
- **Book Published**:
  Wearable Energy Storage Devices by A.M. Vinu Mohan (Publisher: De Gruyter 2021)
  https://doi.org/10.1515/9781501521287

Honours and Awards

The following Scientists of CSIR-CECRI have been recognized as **WORLD'S TOP 2% SCIENTISTS-2021** in a recent database released by Stanford University, USA:


Dr.S.Vasudevan (Chemical Engineering)


Dr.B.Subramanian (Applied Physics)


Dr.A.Manuel Stephen (Energy)


Dr. A.S. Prakash (Materials)


Dr.Subrata Kundu (Chemical Physics)


Dr.Deepak Pattanayak (Biomedical Engineering)


Dr.A.K.Sahu (Energy)


Dr.M.Sathish (Energy)


Dr.A.Pandikumar (Organic Chemistry)

Dr. S. Vasudevan, Senior Principal Scientist and Head, Electrochemical Process Engineering Division has been nominated for **Professor U C Pant Memorial Endowment Award (2020)** in recognition of his scholastic contribution in the field of Chemical Sciences by The Indian Chemical Society, Kolkata

Skill Development Activities

Skill Development:

- One Week Online Skill Development Training Programmes Organized by CSIR-CECRI on *Chromatography and Thermal Analysis* [Oct 4-8]

JIGYASA:

- Workshop on Pedagogy Development for **Virtual Lab** organized by CSIR-NCL & IIT-Bombay [Oct 05]
- JIGYASA 2.0 – Internal Discussion on Topicwise Integration and Implementation of Virtual Lab [Oct 07]
- Review Meeting on Pedagogy Development organized by CSIR, HQ and IIT-Bombay [Oct 22]
- Online Task Force Committee Meeting on Virtual Lab Project [Oct 25]
- **Prize Distribution** to the Winners of Online Quiz Competition under JIGYASA in connection with 80th CSIR Foundation Day Celebration [Oct 28]

***Connect with Scientists* Webinar Series:**

The following lectures were arranged as a part of on-going Webinar Series (**CSIR-JIGYASA**):

1. *CO_2 Conversion to Value Added Products – Waste to Wealth* by Dr.M.Anbu Kulandainathan [Oct 07]
2. *Electrochemical Sensors for Bio & Environmental Analysis* by Dr. Sindhu R Nambiar [Oct 21]
3. *Electrochemical Sensors for Environmental monitoring"* by Dr.J. Mathiyarasu [Oct 28]

- **CSIR-JIGYASA - ATL School Webinar:** Dr. Deepak Kumar Pattanayak, Principal Scientist on *"Can Human Bone be 3D Printed*? for students of CSIR-CECRI adopted ATL schools [Oct 23]
- **Orientation Seminar on Vocational Education**: Dr. V. Ravibabu, Scientist delivered a Talk on *Additive Manufacturing Technology* at Kendriya Vidyalaya, Karaikudi [Oct 08]

Official Events

- Screening and Selection for the Post of **Security Assistant** [Oct 01]
- CECRI Ladies Forum - **Farewell Function to Retirees** [Oct 01]
- Visit of **Chief Engineer, CSIR-ESD**, New Delhi and **CPWD** officials from Trichy & Madurai to review the progress in Construction of OHTs, Construction of Scholars Hostel and Creation of Power Augmentation Facility [Oct 04]
- First Meeting of Sub-Group on Industry-Academia Collaborations (Online): **CII National Committee** on Tech. R&D and Innovation - Participation of Director, CSIR-CECRI as Co-Chair [Oct 06]
- Video Conference with **CVO, CSIR HQ** regarding Vigilance Awareness Week-2021 [Oct 07]
- Research Council Meeting of CSIR-CMERI, Durgapur - Participation of Director CSIR-CECRI as a Member [Oct 08]
- Online Talk on *Unconventional Strategies for Electrochemical Sensing : Route to Extirpate the Bottlenecks* by Dr. K. Giribabu, Scientist (CSIR Young Scientist Award 2021 Recipient) [Oct 12]
- Progress Review Meeting (GAP 35/19) [Oct 12]
- Online Meeting with Department for Promotion of Industry and Internal Trade on Minimizing Compliance Burden on Industry / Business and on Citizens [Oct 21]
- Assessment Committee Meeting (upto the level of Principal Scientist) [Online] in the area of "S&T Management and Policy Studies" [Oct 21]
- **DG, CSIR's** Online Meeting with Directors of all CSIR Labs [Oct 25]
- Participation of Director, CSIR-CECRI in the Online Round Table Discussion on Comprehensive Energy Storage Policy of Ministry of Power - organized by India Energy Storage Alliance (IESA), Pune [Oct 25]
- Online **Joint Meeting of CSIR-CECRI and VOC Port Trust**, Thoothukudi [Oct 28]
- Online Project Review Meeting - Materials for Energy Storage (**MES-2k17**) [Oct 29]
- 2nd Second Advisory Committee Meeting (Online) of ICAR-NASF Project *Development of Electrochemical Sensor Tools for Soil Health Analysis* [Oct 29]
- India Energy Storage Alliance (**IESA**) – Online Meeting of Members Committee [Oct 29]
- **Online Lecture** on the occasion of **Vigilance Awareness Week 2021** [Oct 29]
- Observance of **Rashtriya Ekta Diwas** (National Unity Day) - Pledge taking by all Staff Members of CSIR-CECRI [Oct 29]

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Snapshots

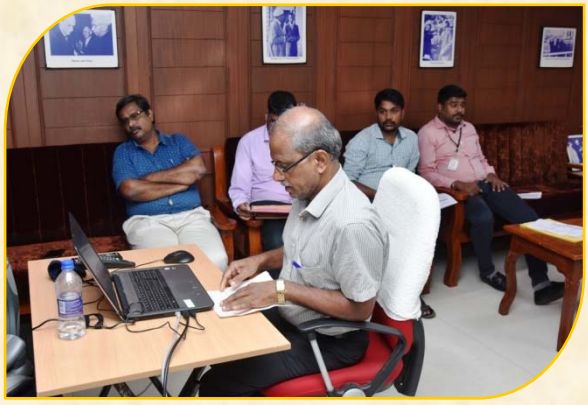
Talk by CSIR Young Scientist Awardee

Live Webinar for adopted ATL Schools

Inspection of Ongoing Construction Activities by Chief Engineer, CSIR

Vigilance Pledge taking by Staff Members in Administration

Prize Distribution – Jigyasa Competition Winners



Skill Development Training Programme – *Chromatography & Thermal Analysis*

Aroma Mission Plantation on Gandhi Jayanthi

CECRI Ladies Forum - Farewell to Retirees

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_2 and butadiene to Adipic Acid; CO_2 to Formic Acid; CO_2 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- Homocystine
- Electrochemical Perfluorination of Sulfolane to Perfluro Butane Sulfonyl Fluoride
- Electrochemical Preparation of Calcium Lactobionate and Calcium Gluconate
- Electrochemical Production of KIO_3
- 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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