



November 2020  
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A monthly newsletter of CSIR-CECRI  
—compilation of significant happenings—

## Indo-Australian Collaboration in Vanadium Redox Flow Batteries

A Meeting of the Principal Scientific Adviser to the Govt. of India with a Delegation of Scientists of Australia on Indo-Australia Collaboration in Vanadium Redox Flow Batteries was held on Nov 4, 2020. As it was on one of the emerging areas of research in which CSIR-CECRI has achieved promising results, CECRI took the lead role in the discussion through which internationally supported collaborative attempts are anticipated in the near future.

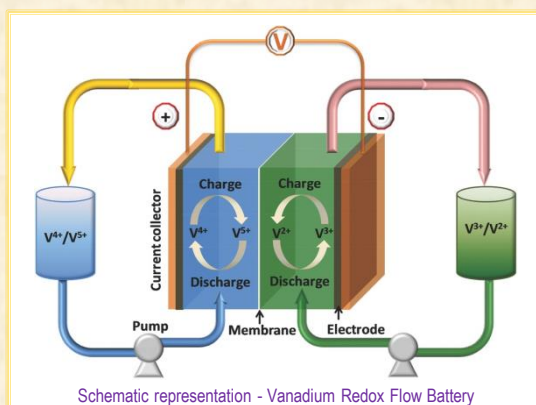


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## JIGYASA: Online Workshop for Science Teachers of KVS, NVS, Govt./Govt. Aided Schools

A three day Workshop for Science Teachers of KVS, NVS, Govt./Govt. Aided Schools [Online] was organized at CSIR-CECRI, Karaikudi during November 18-20, 2020.

In this III Batch of the Series, around 350 PGTs participated from all over the Country and were enlightened by the illuminating lectures of the Scientists of CSIR-CECRI. They obtained invaluable information on the emerging trends of research and avenues for future R&D.

All the teachers expressed immense satisfaction in the feedback as updating themselves will help them in shaping the scientific career of their students.

Dr. N. Kalaiselvi, Director, CSIR-CECRI gave an inspiring talk during the valedictory function of the event and cited many real life examples of extraordinary leaders in science and serving the humanity through science. The event was coordinated by the Skill Development Group of CSIR-CECRI.





CSIR-CECRI observed **Vigilance Awareness Week** with a series of events during 27 Oct to 02 Nov 2020 in order to sensitize the employees with this sensitive and serious issue of remaining vigilant throughout the service revolving around this year's Theme: **“सतर्क भारत, समृद्ध भारत - Vigilant India, Prosperous India”**.

An awareness lecture by Shri. N. Krishnamurthy, IPS, Superintendent of Police, Central Bureau of Investigation, Anti-corruption Branch, Madurai was arranged on 02 Nov 2020 [Online]. Dr. N. Kalaiselvi,

Director, CSIR-CECRI delivered the presidential address and Shri. C. Shyam Sunder, Administrative Officer, CSIR-CECRI welcomed the participants and introduced the Chief Guest. Shri. Krishnamurthy, in his **VAW-2020 Lecture**, suggested ways and means to eradicate corruption at grass root level. He also emphasized that it can be eradicated only through the coordinated efforts of all citizens. His speech was very informative as well as interesting and was well received by the audience. The lecture ended with the vote of thanks by Shri. A.R. Kumaran, Private Secretary & Section Officer (Vigilance).





## Business Development Leads

- ❖ Online Presentation by Neogen Chemicals Ltd regarding R&D on electrolytes & Li salts [03 Nov]
- ❖ Online Meeting with Epsilon Advanced Material Pvt Ltd on Lithium-ion Battery [03 Nov]
- ❖ Online Discussion with MEPCO Engineering College, Sivakasi on 3D Metal Printing [06 Nov]
- ❖ Discussion with BGR Energy Systems on collaborative R&D [11 Nov]
- ❖ Discussion with MSMEs on Electrolyser [12 Nov]
- ❖ Online Meeting with Nuclear Power Corporation of India Ltd on R&D Collaboration [17 Nov]
- ❖ Meeting with Panacea Medical Tech Ltd [17 Nov]
- ❖ Online Meeting with Indian Rare Earths Limited on collaborative R&D [20 Nov]
- ❖ Online Meeting with LUCAS TVS to tap Business Opportunities [26 Nov]
- ❖ Discussion with Green Energy & Smart Infra Solutions on collaborative R&D [27 Nov]

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

- ❖ Internal Review Meeting on CSIR-ICeNGESS Project [05 Nov]
- ❖ 2<sup>nd</sup> Meeting of the Industry Committee of CSIR-ICeNGESS Project [09 Nov]
- ❖ Meeting with Hindalco Industries, Mumbai on supply chain for CSIR-ICeNGESS Project [24 Nov]
- ❖ Online Meeting with IIT-Delhi on **Unnath Bharat Abhiyan** on Lead Acid Battery powered Solar Street Lights program [24 Nov]
- ❖ 1<sup>st</sup> MC Meeting of the CSIR-NMITLI Project: "Design & Development of Portable Personal Air Purifying Respiratory Device" (Online) [27 Nov]

## Official Events

- ❖ Online Programme on *Managing Technology Value Chain* sponsored by DST and organized by ASCI, Hyderabad [02 to 06 Nov 2020]
- ❖ Online National Programme for Scientists and Technologists on *Enhancing Accountability & Responsiveness in Scientific Organizations* sponsored by DST [02 to 06 Nov 2020] and organized by IPE, India
- ❖ JIGYASA: Task Force Committee Meeting on **CSIR Virtual Lab Pilot Project** (Online) [03 Nov]
- ❖ Internal Meeting on Vigilance Matters [03 Nov]
- ❖ Inauguration of CSIR-designed & developed Makeshift Hospital by Dr. Harsh Vardhan, Hon'ble Minister of S&T (Online) [04 Nov]
- ❖ Administrative Collegium (Online) [04 Nov]
- ❖ Project Proposal Recommendation/Review Committee Meeting [04 Nov]
- ❖ Assessment Promotion Committee Meeting for Technical Staff in Gr. III [04 Nov]
- ❖ **India Energy Storage Week** Organized by India Energy Storage Alliance [2-6 Nov 2020] - Session on Advancement of Battery Technologies and Recycling [06 Nov]
- ❖ Shopping Complex Committee (Online) [09 Nov]
- ❖ Review Meeting of In-House Projects [09 Nov]
- ❖ JIGYASA: Task Force Committee Meeting with CSIR HQ and IIT-Bombay on CSIR Virtual Lab Project [11 Nov]
- ❖ Internal Review Meeting of FTT/FBR/Mission Mode/SIP Projects [11 Nov]
- ❖ Curtain Raiser Ceremony - **6<sup>th</sup> India International Science Festival 2020** (Online) [17 Nov]
- ❖ Inaugural Ceremony of the CSIR-CIMFR Platinum Jubilee Celebrations (Online) [17 Nov]
- ❖ Internal Meeting to review financial aspects of analysis related to Lead Acid Battery [20 Nov]
- ❖ Meeting of DG-CSIR with all CSIR Lab Directors (Online) [23 Nov]
- ❖ Webinar on Industrial Application in Metal Printing Technology [23 Nov]
- ❖ Online Interview for Project Assistants in various On-going Projects [23-24 Nov]
- ❖ Online Inauguration of the **Global Renewable Energy Investors Meet and Expo** (3<sup>rd</sup> RE-INVEST) by the Hon'ble Prime Minister of India [26 Nov]
- ❖ Celebration of **Constitution Day** - Reading the Preamble of the Constitution of India [26 Nov]

## Collaborations/Agreements/MoUs Signed

**Contract Research Agreement:**  
Indian Ordnance Factories, Chennai  
on *Polymer based coatings to improve the performance of ballistic materials*

## Recent Research Publications

- ❖ Observation of inhomogeneous plasmonic field distribution in a nanocavity  
Chao-Yu Li, Sai Duan, Bao-Ying Wen, Song-Bo Li, Murugavel Kathiresan, Li-Qiang Xie, Shu Chen, Jason R. Anema, Bing-Wei Mao, Yi Luo, Zhong-Qun Tian & Jian-Feng Li  
Nature Nanotechnology, 2020, 15, 922-926 [IF: 28.28]  
<https://doi.org/10.1038/s41565-020-0753-y>
- ❖ Vast Exploration on Improvising Synthetic Strategies in Enhancing OER Kinetics of LDH Structures: a Review  
Arun Karmakar, K. Karthick, S. Sam Sankar, K. Sangeetha, M. Ragunath and Subrata Kundu  
Journal of Materials Chemistry A (IF: 11.32)  
Available Online: 14 Nov 2020  
<https://doi.org/10.1039/D0TA09788H>
- ❖ Investigation on Nanostructured Cu Based Electrocatalysts for Improvising Water Splitting: a Review  
K. Karthick, K. Sangeetha, S. Sam Sankar, A. Karmakar, M. Ragunath and Subrata Kundu  
Inorganic Chemistry Frontiers (IF: 5.95)  
Available Online: 28 Oct 2020  
<https://doi.org/10.1039/D0QI01060J>  
*Highlighted in the blog: [https://blogs.rsc.org/qi/2020/10/30/investigation-on-nanostructured-cu-based-electrocatalysts-for-improvising-water-splitting-a-review/?doing\\_wp\\_cron=1605604442.4354939460754394531250](https://blogs.rsc.org/qi/2020/10/30/investigation-on-nanostructured-cu-based-electrocatalysts-for-improvising-water-splitting-a-review/?doing_wp_cron=1605604442.4354939460754394531250)*
- ❖ Precast Concrete Sandwich Panels for Mass Housing Systems: Plan and Design Strength Requirements  
J. Daniel Ronald Joseph  
Journal of The Institution of Engineers (India): Series A  
Available Online: 26 Oct 2020  
<https://doi.org/10.1007/s40030-020-00486-w>
- ❖ Cubic Nano-Structures of Nickel Cobalt Carbonate Hydroxide Hydrate as High Performance OER Electrocatalyst in Alkaline and Near-Neutral Media  
K. Karthick, S. Subhashini, K. Rishabh, S.M. Sridhar; M. Muthuteepikha, Subrata Kundu  
Inorganic Chemistry, 2020, 59, 16690. (IF: 4.85)  
Publication Date: 26 Oct 2020  
<https://doi.org/10.1021/acs.inorgchem.0c02680>
- ❖ “The Fe Effect”: A Review Unveiling the Critical Roles of Fe in Enhancing OER Activity of Ni and Co Based Catalysts  
S. Anantharaj, Subrata Kundu, S. Noda  
Nano Energy, 2021, 80, 105514. (IF: 16.60)  
Available Online: 17 Oct 2020  
<https://doi.org/10.1016/j.nanoen.2020.105514>
- ❖ A Simple Route for the Synthesis of Cobalt Phosphate Nanoparticles for Electrocatalytic Water Oxidation in Alkaline Medium  
S. Sam Sankar, A. Rathishkumar, K. Geetha, Subrata Kundu  
Energy & Fuel, 2020, 34, 12891 (IF: 3.42)  
Published Online: 29 Sep 2020  
<https://pubs.acs.org/doi/10.1021/acs.energyfuels.0c02809>



## Celebration of Constitution Day

**Constitution Day** was celebrated with patriotic fervour on 26 Nov 2020. The 'Constitution of India' was adopted by the 'Constituent Assembly' on 26 Nov 1949 and came into force on 26 Jan 1950. It is the longest constitution of any sovereign country in the world written under the chairmanship of Dr. B.R. Ambedkar. The original English version of the 'Constitution of India' was calligraphed by Prem Behari Narain Raizada, which weighs ~13 kg and consists of 221 calligraphed sheets of hand-made parchment paper of size 45.7 cm × 58.4 cm size.

The calligraphed sheets were decorated and illuminated by Nand Lal Bose, depicting a journey from the Mohen-jo-Daro and Vedic periods to the Indian freedom movement. The Hindi version comprising of 252 calligraphed sheets and weighing about 14 kg was calligraphed by Basantrao Vaidya. Both documents have been bound in first-class Morocco leather embossed in gold. Both the original calligraphed copies are with the Parliament Library, and have great autographic and historical value as they contain the signatures of the Founding Fathers of the Constitution.

**Reading of the Preamble of our Constitution** was carried out at prominent locations in the Institute on 20 Nov 2020 in small groups, considering the pandemic restrictions.

With a sense of immense pride, all the staff members read the Preamble as they were reminded of the pivotal role played by **CSIR** in preserving the



Dr. Ambedkar presenting the final draft of the Indian Constitution to Dr. Rajendra Prasad (25 Nov 1949)



The Original Calligraphed Constitution of India preserved at the Parliament Library

Original Constitution of India. CSIR-NPL developed the concept of '*hermetically sealed glass cases*' for displaying and storing these documents under inert-gas atmospheres, in order to prevent them from oxidation, microbiological deterioration and air-pollution damages. A team of experts from CSIR-NPL conducts a special inspection annually to validate the preservation.



## Centre for Education and AcSIR Highlights

- ❖ B.Tech. Orientation Programme (Online) [11 Nov]
- ❖ PhD Comprehensive Examinations [02 to 04 Nov]
- ❖ Online Spot Counselling for Admission to B.Tech. (lapsed seats under TN Govt. Quota) [24 Nov]



# Snapshots



Online Meeting with Indian Rare Earths Limited on Collaborative R&D



Task Force Committee Meeting with CSIR HQ and IIT-Bombay on CSIR Virtual Lab Project



Celebration of Constitution Day - Reading the Preamble of the Constitution of India



Online Orientation Programme for B.Tech. Freshers



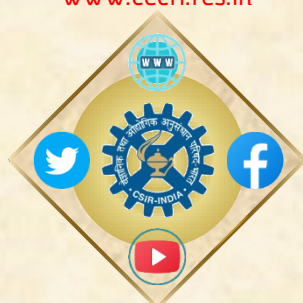


## TECHNOLOGY COMPENDIUM OF CSIR-CECRI

- ❖ 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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