



CECRI NEWS

(A monthly newsletter of CSIR-CECRI)
compilation of significant happenings

India on Moon

Hail India on Moon! Hail ISRO! exclaimed Dr. Jitendra Singh, Hon'ble Minister of Science & Technology, Govt. of India and Vice-President, CSIR, who is also Minister of State (Incharge), Space, soon after the successful soft landing of Chandrayaan-3 on the surface of Moon in the South Pole area in the evening of August 23, 2023. He witnessed the historic moment live at CSIR HQ, New Delhi along with a group of eminent personalities including, Dr. N. Kalaiselvi, Director General, CSIR and Secretary, DSIR, Dr. A. K. Sood, Principal Scientific Advisor, Govt. of India, school students among others. Simultaneously, in a tweet, Dr. Jitendra Singh said, *While others fantasize Moon, we have felt the Moon. While others stuck in flight of dreams, Chandrayaan-3 has actualised the dream. Tricolour flies high in lunar skies affirming India's resolve*, as articulated by our Hon'ble Prime Minister Shri. Narendra Modi, *Sky is not the limit*.



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“ *Tricolour flies high in lunar skies affirming India's resolve, as articulated by our Hon'ble Prime Minister Shri. Narendra Modi, "Sky is not the limit"*

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

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Dr. Jitendra Singh said, "India has reaffirmed its position as a world's frontline leading nation in the Space sector having placed our national pride on the Moon in the virgin terrain of South Polar area, not accessed by any other space mission so far". He gave full credit to **Prime Minister Shri. Narendra Modi** for enabling India's Space scientists to vindicate the dream of their founding father Vikram Sarabhai by "unlocking" India's Space sector and providing a milieu in which India's huge potential and talent could find an outlet and prove itself to the rest of the world.

Dr. Singh said: the primary objectives of Chandrayaan-3 mission are threefold, a) to demonstrate Safe and Soft Landing on Lunar Surface; b) to demonstrate Rover roving on the moon, and c) to conduct *in-situ* scientific experiments.

On the Lander, the Hon'ble Minister informed that the instruments in operation include **CHASTE** (Chandra's Surface Thermo-Physical Experiment) to carry out the measurements of thermal properties of the lunar surface near the polar region, **LRA** (Laser Retroreflector Array), **RAMBHA-LP** (a Langmuir Probe to measure surface plasma density) a laser reflector mounted on the corner of Vikram for accurate positioning measurement of Lander on the Lunar surface by future orbiters, **ILSA** (Instrument for Lunar Seismic Activity) to measure seismicity around the landing site and to understand the structure of the lunar crust and mantle, **LIBS** (Laser Induced Breakdown Spectroscopy) to determine the

elemental composition [Mg, Al, Si, K, Ca, Ti, Fe] of Lunar soil and rocks around the lunar landing site, **APXS** (Alpha Particle X-Ray Spectrometer) to measure the chemical composition and mineralogical composition to further enhance our understanding of Lunar-surface and **SHAPE** (Spectro-polarimetry of HAbitable Planet Earth) to study the spectro-polarimetric signatures of the habitable planet Earth in the near-infrared (NIR) wavelength range (1 - 1.7 μm).

It is a matter of immense pride that the main launch vehicle (Mark III or LVM3) that carried the Chandrayaan-3 module underwent more than 3,000 wind tunnel tests at **CSIR-National Aerospace Laboratories, Bengaluru (1.2 m Trisonic Wind Tunnel Facility – the workhorse for all national aerospace programmes since 1967)**. The wind tunnel tests were carried out to characterise the LVM3 vehicle and that these included force measurements, steady and unsteady pressure measurements, booster-load measurements, booster misalignment studies, aero-elastic and nozzle load studies apart from surface and off-surface flow visualisation studies.

CSIR-CECRI has also played a crucial role in many missions of ISRO in the past, especially in the area of electroplating of satellite components and production of perchlorate through electrochemical route. At present, a collaborative project with ISRO is underway at CSIR-CECRI, Karaikudi outcome of which will play a part in ISRO's **Gaganyaan Mission**.



77th Independence Day Celebrations

CSIR-CECRI, Karaikudi celebrated the 77th Independence Day on 15th August 2023 with grandeur, gaiety, fervor and enthusiasm. Dr. K. Ramesha, Director, CSIR-CECRI hoisted the National Flag and addressed the gathering. In his address, he called for unified efforts in fulfilling the aspirations of our Nation.

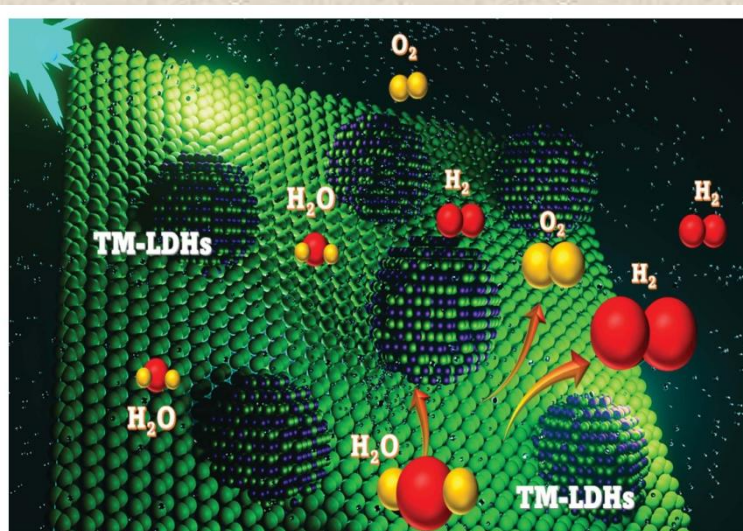
As part of the Celebrations, as per the directive from Ministry of Culture, Govt. of India, all the staff members were encouraged to hoist the National Flag in their premises and put their selfies with Tiranga on the website www.harghartiranga.com during the Independence Week 13th – 15th August 2023. Staff members, Family members, Research Scholars and B.Tech. Students took part in this campaign enthusiastically and uploaded their selfies with tiranga at the website with immense pride.



Recent Research Publication

- ❖ Decoration of Au nanoparticles over LaFeO₃: a high performance electrocatalyst for total water splitting
Anup Kuchipudi, M. Ragunath, P. Arunmuthukumar, S. Sundarravalli, G. Sreedhar and Subrata Kundu
Inorganic Chemistry 62 (2023) 14448; <https://doi.org/10.1021/acs.inorgchem.3c02407>

Research in Focus

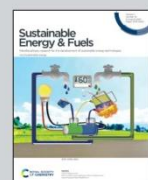


Showing research from Dr. Subrata Kundu's laboratory, CSIR-Central Electrochemical Research Institute (CECRI), Karaikudi, Tamilnadu, India.

A review on consequences of flexible layered double hydroxide-based electrodes: fabrication and water splitting application

This work highlights the pioneering strategies for the fabrication of layered double hydroxide-based nanostructures and their role in water electrolysis applications. Various modifications, such as exfoliation and vacancy creations with tuning of their structure, have been discussed to enhance the overall cell performance of the water electrolyzer. Furthermore, this report also stressed the basis of water electrolysis, mechanisms of OER and HER and their evolution parameters towards water splitting reactions.

As featured in:



See Subrata Kundu, Rajkumar Patel et al., Sustainable Energy Fuels, 2023, 7, 3741.

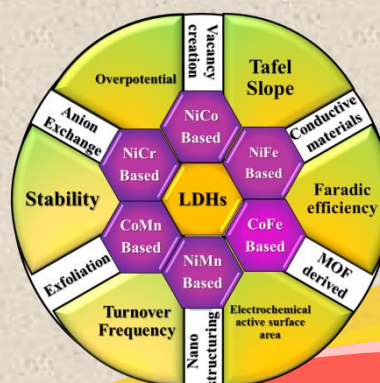
A review on consequences of flexible layered double hydroxide-based electrodes: fabrication and water splitting application

N. Sreenivasan, Seungmin Yang, Arindam Adhikari, Rajkumar Patel and Subrata Kundu

Sustainable Energy Fuels 7 (2023) 3741

DOI: 10.1039/d3se00573a

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Business Development Leads

- ❖ Meeting on Green Hydrogen with BHEL [Aug 2]
- ❖ Meeting on Green Hydrogen with Gujarat Fluorochemicals Ltd. [Aug 2]
- ❖ Technology Evaluation Committee Meeting [Aug 3]
- ❖ Meeting on h-BN Preparation Technology [Aug 7]
- ❖ Meeting with Aarjay International [Aug 10]
- ❖ Review on Redox Flow Batteries [Aug 17, 23]
- ❖ Meeting with Maitri Company [Aug 18]
- ❖ Discussion on AI Mission [Aug 18]
- ❖ Patent Evaluation Committee Meeting [Aug 21]
- ❖ Green Hydrogen Meeting with Technology Empereal-KGDS Renewable Energy Pvt. Ltd. [Aug 22]
- ❖ Meeting with ReNew Power on Green Hydrogen Generation [Aug 31]

CFE and AcSIR Highlights

Centre for Education:

- ❖ CFE Faculty Meeting [Aug 8]
- ❖ CFE Meeting with newly joined Group III Staff Members [Aug 9]
- ❖ Screening of Applications for Admission to B.Tech. - Other State Quota [Aug 10]
- ❖ Online Counselling for Selection of Candidates for Admission to B.Tech. - Other State Quota [Aug 16]

AcSIR:

- ❖ Synopsis Submission of Ms. M. Sornambigai, DST Inspire SRF (Guide: Dr. S. Senthilkumar) [Aug 1]
- ❖ III DAC meeting of Mr. A. Bebin (Guide: Dr. M. Kathiresan) [Aug 2]
- ❖ III DAC Meeting of Ms. Mymoona Paloli (Guide: Dr. C. Jeyabharathi) [Aug 3]
- ❖ Synopsis Submission of Mr. Anup Kuchipudi, CSIR SRF (Guide: Dr. G. Sreedhar) [Aug 4]
- ❖ Synopsis Submission of Ms. P. Aarthi, AcSIR Scholar (Guide: Dr. S. Ravichandran) [Aug 4]
- ❖ III DAC Meeting of Mr. V. Saravana Kumar (Guide: Dr. V. Suryanarayanan) [Aug 7]

- ❖ III DAC Meeting of Ms. K.M. Lakshmi (Guide: Dr. C. Jeyabharathi) [Aug 10]
- ❖ Faculty Meeting for August 2023 Session Courses of AcSIR [Aug 10]
- ❖ II DAC Meeting of Ms. J. Jyothy Mol (Guide: Dr. C. Arunchandran) [Aug 14]
- ❖ PhD Viva Voce Examination for Ms. Nasrin Kabeer, DST Inspire SRF (Guide: Dr. M. Sathish) [Aug 21]
- ❖ I DAC meeting of Mr. S.P. Thipperudraswamy, AcSIR Scholar (Guide: Dr. R. Sindhuja) [Aug 22]
- ❖ I DAC Meeting of Mr. V. Prabu, AcSIR Scholar (Guide: Dr. S.M. Senthil Kumar) [Aug 28]
- ❖ I DAC Meeting of Mr. P. Murali, AcSIR Scholar (Guide: Dr. M. Kathiresan) [Aug 28]
- ❖ III DAC Meeting of Ms. Aswathi, AcSIR Scholar (Guide: Dr. Aiswarya Bhaskar) [Aug 28]
- ❖ I DAC meeting of K. Ranjithkumar, AcSIR Scholar (Guide: Dr. S.M. Senthil Kumar) [Aug 29]
- ❖ I DAC meeting of Mr. S. Gomathinayagam, AcSIR Scholar (Guide: Dr. S. Senthilkumar) [Aug 30]
- ❖ Comprehensive Exams for IDDP Scholars [Aug 30]

Awards and Honours



- ❖ **Dr. S. Anantharaj**, Alumnus of CSIR-CECRI, Karaikudi has got selected as **Assistant Professor** at **Department of Chemistry, Indian Institute of Technology, Kanpur**.
- ❖ He was a CSIR-Junior Research Fellow in 2014 and CSIR-Senior Research Fellow in 2016 at CSIR-CECRI.
- ❖ He carried out his Ph.D. work under the guidance of Dr. Subrata Kundu, Principal Scientist, CSIR-CECRI on the topic: *Transition Metals-Based Nanostructured Materials for Electrocatalytic Water Splitting*.
- ❖ He emerged as the Winner of the inaugural **ECS India Section S.K. Rangarajan Graduate Student Award** in 2017.
- ❖ He was awarded with the prestigious **JSPS Postdoctoral Fellowship** by the Japan Society for the Promotion of Science and Engineering which he availed during January 2019 - March 2021 at Waseda University, Tokyo, Japan.

72nd Meeting of the Research Council (August 25, 2023)



- ❖ At the outset, Dr. K. Ramesha, Director, CSIR-CECRI welcomed the Chairman, Members & Invitees to the Meeting.
- ❖ The staff of CSIR-CECRI and the RC Members congratulated Dr. Ramesha for his elevation as the Director of CSIR-CECRI.
- ❖ Dr. Satheesh Reddy, RC Chairman congratulated the Team CECRI for the elaborative report prepared for the 72nd Meeting as well the detailed minutes of the 71st Meeting.
- ❖ The Chairman opined that the country is earnestly expecting viable solutions to the technological challenges faced by its people. Each and every Scientist must fulfill this aspiration in their respective field, he added.
- ❖ He further added that the RC could pave way to elevate the Institute to a global level rather than being India-centric to provide solutions to the global challenges.
- ❖ The RC recommended that the Institute should serve as the Benchmark Organization for solution to any global issues pertaining to Electrochemical Science & Technology and should emerge as a global giant in this area.



ENT Medical Camp

CSIR-CECRI in association with Apollo Hospitals, Managiri, Karaikudi organized a speciality Medical Camp on ENT for the benefit of CSIR-CECRI Staff, Pensioners and their Family Members on August 9, 2023.

Dr. I. Chakkravarthi, MS (ENT), Apollo Hospitals, Managiri, Karaikudi was the Chief Consultant. A large number of patients including pensioners and family members consulted the expert and got treated for various ENT related ailments. The consultant cleared their doubts on ENT and advised best health practices in this regard. Health Care Committee of CSIR-CECRI coordinated the necessary arrangements for the camp.



Skill Development Activities

Skill Development Training Programmes:

- ❖ A Skill Development Training Programme on **Operation and Maintenance of Analytical Instruments** was organized by CSIR-CECRI during Aug 1-4, 2023. A total of 48 participants took part in this event.

CSIR-JIGYASA

- ❖ **AI-based Activities:** CSIR-CECRI organized a two day event on Artificial Intelligence based Activities with a focus on educating school (IX-XII Stds.) and college students on *For and against use of generative tools for teaching and learning and Data based Mini Research Project activity* for College Students during August 29-30, 2023. **Padma Shri Prof. Sankar K Pal**, National Science Chair, Govt. of India, and President, Indian Statistical Institute (ISI) was the Chief Guest for this event and he delivered a talk on *Machine Intelligence: Why and How?*. More than 100 School and College students along with their teachers took part.



- ❖ **Vigyana Vindhai:** The following talk was delivered during August 2023 in the Alagappa University Community Radio: Mr. K. Balamurugan, CSIR-SRF, CSIR-CECRI on *Thin film based high efficiency capacitors and their applications* [Aug 1].

Assessment Promotion Results

SN	Name	ID No.	From	To	AY
1)	Mr. S. Sivakumar	30128	Senior Technical Officer (3)	Principal Technical Officer	2022-2023
2)	Mr. A. Rathishkumar	30163	Senior Technical Officer (3)	Principal Technical Officer	2022-2023
3)	Mr. N. Karunanithi (Retd.)	30150	Senior Technical Officer (3)	Principal Technical Officer	2022-2023
4)	Mr. S. Gunasekaran	30151	Senior Technical Officer (3)	Principal Technical Officer	2022-2023
5)	Mr. C.T. Subramanian	30172	Superintending Engineer	Senior Superintending Engineer	2022-2023
6)	Mr. T. Ashok Balamurugan	30159	Senior Technical Officer (2)	Senior Technical Officer (3)	2022-2023
7)	Mr. G. Karthikeyan	30164	Assistant Executive Engineer	Executive Engineer	2022-2023
8)	Mr. A. Ganesan	20192	Senior Technician (2)	Senior Technician (3)	2017-2018
9)	Mr. A. Kasi	20191	Senior Technician (2)	Senior Technician (3)	2017-2018
10)	Mr. P. Murugesan	20194	Senior Technician (2)	Senior Technician (3)	2017-2018
11)	Mr. V.C. Mohana Kumar	20203	Senior Technician (2)	Senior Technician (3)	2017-2018
12)	Mr. P. Manikandan	20228	Senior Technician (2)	Senior Technician (3)	2020-2021
13)	Mr. S.T. James	20221	Senior Technician (1)	Senior Technician (2)	2022-2023
14)	Ms. S. Bagyalakshmi	20223	Senior Technician (1)	Senior Technician (2)	2022-2023
15)	Ms. G. Bharathi Priya	20231	Technician (2)	Senior Technician (1)	2022-2023
16)	Mr. M. Pradeeban	20234	Technician (1)	Technician (2)	2022-2023
17)	Mr. J. Marimuthu	20235	Technician (1)	Technician (2)	2022-2023
18)	Mr. A.N. Elangovan (Retd.)	20114	Senior Technician (2)	Senior Technician (3)	2012-2013
19)	Mr. P. Chandrasekaran (Retd.)	20159	Senior Technician (2)	Senior Technician (3)	2012-2013
20)	Mr. E. Dakshinamoorthy (Retd.)	20161	Senior Technician (2)	Senior Technician (3)	2012-2013
21)	Mr. C. Sivam (Retd.)	20163	Senior Technician (2)	Senior Technician (3)	2013-2014
22)	Mr. R. Rajendran (Retd.)	20198	Senior Technician (2)	Senior Technician (3)	2017-2018

Snapshots



77th Independence Day Celebrations



Skill Development Training Programme on Operation and Maintenance of Analytical Instruments



ENT Medical Camp

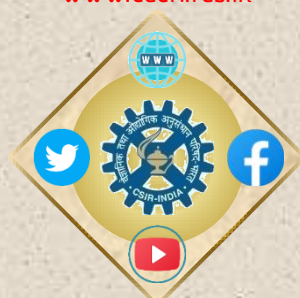


Prize Distribution to Independence Day Sports Events Winners

- ❖ 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 Perfluro 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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