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

80th Foundation Day of CSIR

CSIR-Central Electrochemical Research Institute (CSIR-CECRI), Karaikudi celebrated the 80th Foundation Day of Council of Scientific and Industrial Research (CSIR) on 26th September, 2021 through virtual mode owing to the pandemic situation. In her welcome address, **Dr. V. Saraswathy**, Chief Scientist, CSIR-CECRI while welcoming the Chief Guests, elucidated the audience on the genesis of CSIR, its glorious past and the promising present. She felt extremely confident of a fruitful future for CSIR based on its rapid progress. **Dr. N. Kalaiselvi**, Director, CSIR-CECRI, in her presidential address quoted a recent article in *Nature* which claims Artificial Intelligence (AI) & Machine Intelligence (MI) are going to rule the entire world encompassing every aspect of Science & Technology which will also strengthen our self-reliance mantra for sure.



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“ I am optimistic that
**CSIR-CECRI will emerge as a
major technology provider to
ISRO in all its critical missions
in the near future** ”

Dr. K. Sivan
Chairman, ISRO and
Secretary, Department of Space, GOI
(while delivering the
80th Foundation Day Lecture of CSIR)

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She also highlighted on the **Flagship Programmes of CSIR for Farmers** - Floriculture Mission, Aroma Mission, etc. enabling augmented income from agriculture. She explicitly cited the technologies developed by CSIR-CECRI in the past with regard to strategic sector: the production of ammonium perchlorate which was used as fuel in rockets and electroplating on thrust chambers of cryogenic rocket engines.

She fondly recalled the past visits of **Stalwarts of ISRO to CSIR-CECRI, Karaikudi** for scientific and technical interventions in their strategic projects and hoped that this relationship would continue to flourish in the upcoming years as well. She also appreciated the efforts of ISRO which is always thinking one step beyond the earth to excel in their space missions and remarked that *ISRO is the first name which comes to everyone's mind whenever there is a discussion on innovation, engineering excellence, patriotic fervour, etc..*

Dr. K. Sivan, Chairman, Indian Space Research Organisation (ISRO) and Secretary, Department of Space, Bengaluru was the **Chief Guest** of the Event and delivered the **80th CSIR Foundation Day Lecture**. He delivered an inspiring speech sharing his own journey in ISRO.

He vividly recalled the training and guidance received from the **Pioneers in Space Sector** like Dr. Vikram Sarabhai, Dr. Satish Dhawan, Dr. UR Rao, Dr. MGK Menon, Dr. Srinivasan, Dr. Kasturirangan, Dr. Radhakrishnan, Dr. Madhavan Nair and Dr. Kiran Kumar and how it moulded and helped him to overcome many obstacles in transforming many failures to success, particularly the challenging **GSLV Project**.

Dr. Sivan cited many success stories including **SITARA** - 6D trajectory simulation software which is the backbone of real-time and non-real-time trajectory simulations of all ISRO launch vehicles and the invention of “**day-of launch wind biasing strategy**”, which the whole world is trying to emulate now.

He further stated that ISRO with its existing visions, is also transforming its activities with industries in line with the Government of India's **Gaganyaan Mission**, which would develop space industry ecosystem resulting in higher revenue generation. He was optimistic that *CSIR-CECRI will emerge as a major technology provider to ISRO in all its critical missions.*

Er. Vipin Sondhi, Managing Director & CEO, Ashok Leyland Limited, Chennai graced the occasion as a Guest of Honour. He claimed that CSIR-CECRI and Ashok Leyland have common passionate goals towards technological innovation. He talked on the future trends shaping the automotive industry and called for more industry-research-academia partnerships emphasizing the concept of **Create in India; Create for the World**.

He noted that the future of automobile industries would depend on green energy technologies, and that the CSIR-CECRI's role would be vital in the development of renewable energy sources especially in lithium ion batteries.

On this occasion, the **Annual Report (2020-21) of CSIR-CECRI** was also released by the Chief Guest. The event concluded with vote of thanks by **Shri. K.M. Sridhar**, Controller of Administration, CSIR-CECRI.



Release of Annual Report 2020-21 of CSIR-CECRI during the 80th Foundation Day of CSIR Celebration Event

Flipbook and PDF Version of the above available at:

<https://cecri.res.in/AnnualReport.aspx>

Webinar on CSIR-CECRI's CPCC Technology

As a part of the ongoing Azadi Ka Amrit Mahotsav and **80 Years of CSIR - 80 Success Stories Series**, a Webinar on CSIR-CECRI's **Cement Polymer Composite Coating (CPCC) System** [Coating Technology to Mitigate Corrosion of Rebars in Concrete Structures: A CSIR Success Story] was organized by the Science Communication and Dissemination Directorate (SCDD) of CSIR Headquarters, New Delhi at 2 PM on September 30, 2021.

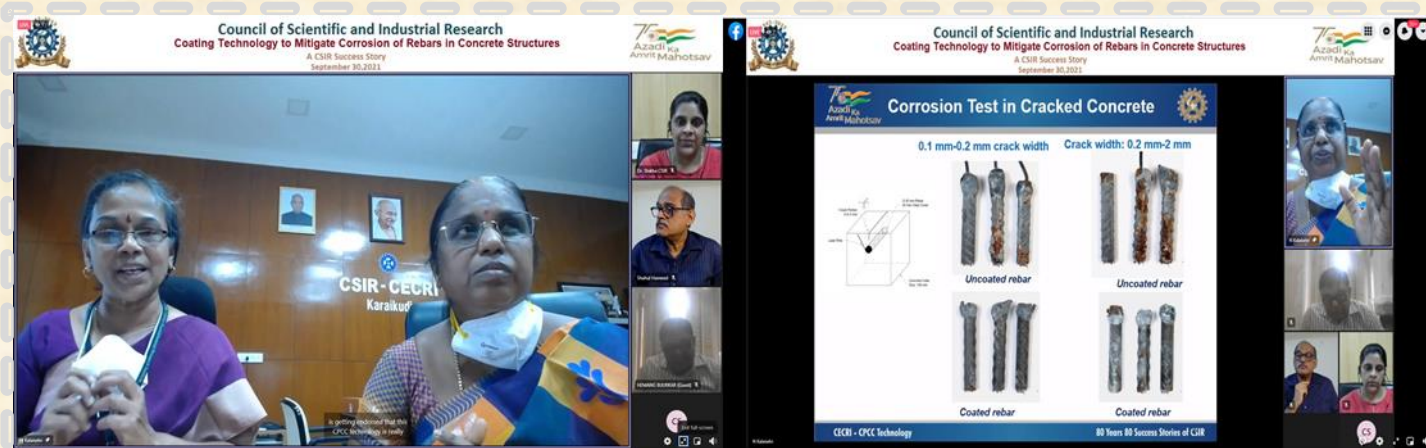
Dr. Shikha, Scientist, SCDD, CSIR and Moderator of the Event welcomed the Speakers of the Event and briefed on the ongoing Series of Webinars. She remarked that out of the numerous technologies of CSIR, 80 technologies have been shortlisted for this Success Stories Series based on its significant impact - societal, economical, criticality and indigenous factors.

Dr. N. Kalaiselvi, Director, CSIR-CECRI in her opening remarks gave a glimpse of the ongoing R&D activities in the area of corrosion and materials protection. She also cited various examples of the actual implementation sites of CPCC technology and the positive impacts realized.

Dr. R. Vedalakshmi, Sr. Principal Scientist, CSIR-CECRI made a detailed presentation on CPCC Technology. She explained the process with all intrinsic details including the process of application and points to ponder during the project implementation.

Shri. Hemang Bijurkar, Proprietor, Gaur Trading Company, Mumbai and **Shri. S. Shahul Hameed**, Proprietor, Protektol Anticorrosives, Chennai took part in the event as industrial partners and as a Licensee of CPCC for many years. They highly appreciated this technology and thanked Team CSIR-CECRI for this efficient and effective process. Photographs of various projects and sites where CPCC has been utilized were also projected to the participants.

This Event was an eye-opener for a majority of the Audience and they all got immensely benefited. Towards the end of the Event a **Q&A Session** was also conducted to clarify the doubts of the audience. A short **writeup on the technology** and video recording of the webinar shall be made available on the **webpage and social media accounts of CSIR**.



List of Newly Sanctioned Projects

Projects Sanctioned	Sponsor	Principal Investigator(s)	Budget (Rs. in Lakhs)	Start Date	End Date
Electrochemical Preparation of Perchloric Acid from Hydrochloric Acid	Prasol Chemical Pvt. Ltd., Mumbai	Dr. T. Raju	7.67	06 Sep 2021	05 Aug 2022
Performance Evaluation of Corrosion Inhibitor	Laal Chemicals, Chennai	Er. K. Saravanan	5.90	13 Sep 2021	12 Dec 2021
❖ Fund realized for CSIR-JIGYASA 2 Virtual Laboratory Integration Project (HCP0101).					

Business Development Leads

- ❖ Demonstration of progress of **NPK Sensor** for its value addition [Sep 02]
- ❖ Meeting with **M/s. Technip India Ltd.** to discuss potential opportunities in Green Hydrogen, Fuel Cells and Electrolysers [Sep 03]
- ❖ Demonstration of Supercapacitor based Battery Pack Controller by **Qmax Systems India Pvt. Ltd.** [Sep 07]
- ❖ Internal Meeting on *Feasibility Studies on Hydrogen Generation by Sea Water Electrolysis* [Sep 07]
- ❖ Online Meeting with **M/s. Bharat Forge Limited, Pune** on R&D Collaboration in Electrolyser Technology Development [Sep 08]
- ❖ Discussion on *Organic Radical Batteries* [Sep 14]
- ❖ Visit of **DRDO** officials for discussing CECRI's contribution to Defense (especially on Unique Technologies and Batteries for Defense Applications) and Brainstorming on *Batteries for Defense Applications* [Sep 16-17]
- ❖ Meeting with **High Energy Batteries Ltd.** on *Development of Advanced Magnesium Alloys Nodes for Energy Applications* [Sep 17]
- ❖ Internal Discussion on Project Proposal on **Battery Recycling** [Sep 21]
- ❖ Internal Discussion on *Nd based Magnet Alloy Making* for MeitY Meeting [Sep 21]
- ❖ Meeting on PEM Electrolyser Know-How with **M/s. Kalyani Center for Tech. & Innovation** [Sep 23]
- ❖ Project Review Meeting with officials from **Indian Oil Corporation Ltd.**, Southern Region Pipelines, Ramanathapuram [Sep 24]
- ❖ Visit of Mr. Aranganathan, Educationist and Team to learn about Technology Leads and Facilities available at CSIR-CECRI [Sep 24]
- ❖ Meeting with **CMTI, Bangalore** on R&D Collaboration in *Battery Technologies* [Sep 27]
- ❖ Online Meeting with **Team BPCL** Corporate Research & Development Centre, Noida on R&D Collaboration in *Fuel Cell Technologies* [Sep 27]
- ❖ Discussion with **M/s. Glowers Green Technologies** on R&D Collaboration [Sep 28]
- ❖ Discussion with **M/s. Technip India Ltd.** on R&D Collaboration [Sep 28]
- ❖ Meeting by **CSIR TMD-SEMI** on CSIR's Proposal *Production of Neodymium Metal through Molten Salt Fluoride Electrolysis Route at Industrial Scale* [Sep 30]

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

- ❖ **ICeNGESS:**
 - **Core Committee Meeting** [Sep 06, 15]
 - Meeting & Discussion with **CSIR-Innovation Management Directorate** on finalizing the **Expression of Interest** [Sep 21]
 - 2nd Meeting of **Monitoring Committee** chaired by Dr. R Chidambaram, Former PSA [Sep 30]
- ❖ **Advanced Materials Mission Project [HCP-030]:** 2nd Monitoring Committee Meeting [Sep 02]
- ❖ Meeting with CSIR-NBRI on **Aroma Mission Activities** [Sep 09]
- ❖ **Hydrogen Mission Program:** Initial Presentations on the Draft Proposals [Sep 14]
- ❖ Monitoring Committee Meeting to review on-going FTT/FTC Projects under **Mining, Minerals, Metals and Materials (4M) Theme** [Sep 14]
- ❖ **E2D Theme:** FBR Project Review Meeting - *Organic Redox Flow: Batteries* [Sep 14]

Technology Transferred /Agreements/MoUs Signed

Technology Transfer:

Jeevach Coating Pvt. Ltd., Mumbai [April 15, 2021]
Cement Polymer Composite Coating System for Corrosion Protection of Rebars in Concrete Structures [Document exchanged on Sep 24, 2021]

MoU Inked:

Tunga Aerospace Industries Pvt. Ltd. [Sep 01]
Title: Indigenous Development of Lithium Ion Battery for Submarine Application

NDA Signed:

Stanwix Forbes LLC, USA [Sep 09]
Title: Development of Technology for Enhancing the Efficiency of Breath Samplers

NDA Signed:

Bosch Limited, Bengaluru [Aug 23]
Title: Testing and Characterisation of Secondary Cells and Battery Packs

Centre for Education and AcSIR Highlights

AcSIR:

- ❖ 3rd DAC Meeting of Mr. S. Sam Sankar, UGC-JRF PhD Scholar (Guide: Dr. Subrata Kundu) [Sep 02]
- ❖ 3rd DAC Meeting of Ms. K.B. Bhojanaa, AcSIR PhD Scholar (Guide: Dr. A. Pandikumar) [Sep 03]
- ❖ 3rd DAC Meeting of Ms. K. Sangeetha, AcSIR PhD Scholar (Guide: Dr. Subrata Kundu) [Sep 07]

- ❖ 3rd DAC Meeting of Mr. S. Vinoth, AcSIR PhD Scholar (Guide: Dr. A. Pandikumar) [Sep 07]
- ❖ Synopsis Submission of Mr. G.S. Ayyappan, Principal Scientist (Guide: Dr. B. Ramesh Babu) [Sep 08]

Centre for Education:

- ❖ B.Tech. Faculty Meeting [Sep 03]
- ❖ B.Tech. Admission - Other State Quota [Sep 29]

Recent Research Publications

- ❖ *Experimental and Theoretical Study on Optimizing $\text{Ca}_x\text{Ba}_{1-x}\text{SnO}_3$ Perovskite Materials as Photoanode of Dye-Sensitized Solar Cells*
A. Soundarya Mary, K.B. Bhojanaa, P. Murugan and A. Pandikumar
Journal of Alloys and Compounds, 888, 161439 (2021)
<https://doi.org/10.1016/j.jallcom.2021.161439>
- ❖ *Efficient Photoelectrochemical Reduction of Carbon Dioxide into Alcohols Assisted by Photoanode Driven Water Oxidation with Gold Nanoparticles Decorated Titania Nanotubes*
A.G. Karthick Raj, C. Murugan and A. Pandikumar
Journal of CO_2 Utilization 52, 101684 (2021)
<https://doi.org/10.1016/j.jcou.2021.101684>
- ❖ *Mixed-Ligand-Devised Anionic MOF with Divergent Open Co(II)-Nodes as Chemo-resistant, Bi-functional Material for Electrochemical Water Oxidation and Mild-condition Tandem CO_2 Fixation*
N. Seal, K. Karthick, M. Singh, Subrata Kundu and S. Neogi
Chemical Engineering Journal, 2021 (in press)
<https://doi.org/10.1016/j.cej.2021.132301>
- ❖ *Recent Progresses in Engineering of Ni and Co based Phosphides for Effective Electrocatalytic Water Splitting: a Review*
K. Sangeetha, K. Karthick, S. Sam Sankar, A. Karmakar, R. Madhu, K. Bera and Subrata Kundu
ChemElectroChem, 2021 (in press)
<https://doi.org/10.1002/celc.202100984>
- ❖ *Self-Assembled Cationic Organic Nanosheet: Role of Positional Isomers in Guanidium-Core for Efficient Lithium-Ion Conduction*
A. Dey, V.R. Ramlal, S. Sam Sankar, Subrata Kundu, A.K. Mandal and A. Das
Chemical Science, 2021 (in press)
<https://doi.org/10.1039/D1SC04017K>

Honours and Awards



Dr. S. Vasudevan, Senior Principal Scientist and Head, Electrochemical Process Engineering Division has been nominated as:

- **Member of the Syndicate of Madurai Kamaraj University**
- **Editorial Board Member of the International Journal *Green Technology, Resilience and Sustainability* published by Springer Nature**



Dr. B. Ramesh Babu, Dean, CFE has been nominated by Vice-Chancellor, Anna University as a **Member of the Board of Studies** of the Constituent Colleges and Non-Autonomous Colleges Affiliated to Anna University



Shri. V. Raja Gopal, AcSIR Scholar (Guide: Dr. V. Suryanarayanan) has been offered **AcSIR-RMIT Australia Joint (Cotutelle PhD) - Program 2021** in the Department of Applied Chemistry and Environmental Science, School of Science (STEM College), RMIT, University, Australia under the guidance of Prof. Lathe Jones [Sep 01 2021 to Aug 31, 2023]

Skill Development Activities

Connect with Scientists Webinar Series:

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

1. *Modern Techniques to Explore Biological Communication: Way to Future Science* by Dr. V. Murugan [Sep 02]
2. *Sustainable Polymers and its Composites for High Performance Applications* by Dr. V. Ravi Babu [Sep 09]
3. *Multiplexed Electrochemical Sensors for Healthcare Monitoring* by Dr. M. Pandiaraj [Sep 16]

4. *Lithium Sulfur Batteries : A Futurist System* by Dr. A. Manuel Stephan [Sep 24]

5. *Thermal Barrier Coatings for Strategic Applications* by Dr. G. Sreedhar [Sep 29]

❖ **CSIR-JIGYASA - ATL School:** Webinar on *Plastic Waste Management: The Way Ahead* by Dr. S. Sudhakar for students of CSIR-CECRI adopted ATL schools [Sep 18]

❖ **Online Quiz Competition** was conducted in connection with the 80th CSIR Foundation Day Celebration 2021 for IX-XII standard students of Kendriya Vidyalaya, Navodaya Vidyalaya, ATL Schools and Govt./Govt. Aided Schools (Number of Participants: 405) [Sep 22]

Official Events

❖ **CSIR-HRDC Online Programme** on *Noting, Drafting and Office Procedure* [Sep 02-03]

❖ Review of the current status of **ERP** in all CSIR Labs/Institutes/Units [Sep 04]

❖ Lecture by Dr. V. Ganesh on *Electrochemical Science and Technology: A viable and efficient solution to global issues* in the Science Webinar organized by NASI-Delhi Chapter and University of Delhi [Sep 08]

❖ 7th Meeting of Electroplating Chemicals and Photographic Materials Sectional Committee [Sep 09]

❖ **Connect Karo 2021** Virtual Programme on **Building Sustainable Ecosystem for EV Batteries in India** organized by WRI India, New Delhi: Director, CSIR-CECRI gave a lecture on *Battery Technologies for EV Applications* [Sep 15]

❖ Peer Committee Meeting of Sr. Pri. Scientist to Chief Scientist (2018-19) [Sep 15]

❖ Meeting of the Vidyalaya Management Committee, Kendriya Vidyalaya, CECRI Campus, Karaikudi [Sep 16]

❖ Quarterly Meeting of the **Official Language Implementation Committee (OLIC)** [Sep 17]

❖ **Society for Advancement of Electrochemical Science & Technology**, Karaikudi: Governing Council and General Body Meeting [Sep 20]

❖ Online Meeting of DG, CSIR with Directors of all CSIR Labs [Sep 22]

❖ Presentation by Director, CSIR-CECRI on *Nd based Magnet Alloy Making - Current Technologies Status at National Level* in the Brainstorming Organized by MeitY, New Delhi [Sep 22]

❖ **Joint Hindi Workshop with BHEL:** Online Lecture by Mr. Sudhir Kumar, Senior Hindi Officer, BHEL on *Important Factors of Official Language Implementation* [Sep 22]

❖ Online Meeting with CSIR-Technology Management Directorate [Sep 23]

❖ TNSCST and DST - Celebration of **Vigyan Utsav** - on *STI Ecosystem in Tamil Nadu for Self-reliant India* - Director, CSIR-CECRI made a presentation on *CECRI and its Technologies* [Sep 24]

❖ **Address by DG, CSIR** to the CSIR fraternity on the occasion of 80th CSIR Foundation Day [Sep 24]

❖ Online Meeting of **Town Official Language Implementation Committee** [Sep 24]

❖ Second Meeting on **Energy & Power Requirements for On-board Systems in Defence & Related Applications** - Director, CSIR-CECRI made a presentation on *Battery Technologies @ CECRI for Present and Future* [Sep 25]

❖ Online **Kickoff Meeting** on Collaborative Work with University of North Dakota, USA based on the **MoU between CSIR and UND** [Sep 27]

❖ **CSIR Young Scientist Awardees Conference** - Presentation by Dr. K. Giribabu, Scientist, CSIR-CECRI [Sep 27]

❖ Online Interview for Engagement of Project Personnel [Sep 29]

❖ 23rd Meeting of Secondary Cells and Batteries Sectional Committee, ETD 11 - BIS [Sep 30]

❖ **Hindi Month-2021** Valedictory & Prize Distribution Function [Sep 30]

❖ Farewell and Felicitation on Superannuation to Smt. Panjali Natarajan [Sep 30]

Snapshots



CSIR Young Scientist Award Ceremony



Presentation by CSIR Young Scientist Awardees



Technology Transfer (CPCC) to Client



IOCL Project Review Meeting



Address by DG-CSIR on 80th Foundation Day



Opening of Renovated Class Rooms, CFE & AcSIR Office



Valedictory Function of Hindi Month-2021



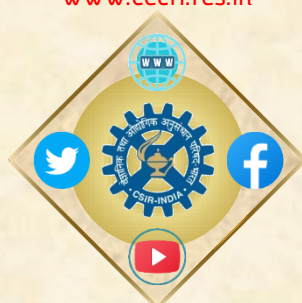
Farewell & Felicitation Function on Superannuation

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 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 (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 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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