Annual Report
2024 - 2025

CSIR-Advanced Materials and Processes Research Institute, Bhopal

From Director's Desk

CSIR-Advanced Materials and Processes Research Institute (AMPRI), Bhopal is a constituent laboratory of Council of Scientific & Industrial Research, carries out advance research in frontier and multidisciplinary research areas of lightweight metallic and polymeric materials, smart and functional materials, advanced radiation shielding materials, cement free concrete, materials of biomedical interest and hybrid green composites towards industrial benefit for the masses.

During the last few years, this institute has special focus on the institute–industry amalgamation and commercialization of technologies through NDAs, MOUs and technology transfer. The sustained efforts in this direction have resulted in transfer of significant technologies for commercialization which include Lead Free X-Ray Shielding Tiles to M/s Prism Johnson Ltd Mumbai, Surface Plasmon Resonance (SPR) Raman substrates to M/s Technos Instruments Jaipur, Multifunctional Bamboo Composite Material for Modern Housing and Structures to M/s Permali Wallace Pvt Ltd Bhopal and M/s Asili Bamboo Products, Meerut, Defluoridation of Drinking Water using Nano Adsorbent based Domestic Filter, AMPRICARE - Sanitizer and Face Mask to M/s MSW Social Enterprises Pvt. Ltd. Indore, A novel process for making advanced radiation shielding materials for broad application spectrum to M/s ASSURAYS Noida ,U.P., Evergreen hybrid composite of Parali-Agro waste and industrial waste to M/s Shubh Green Sheet Pvt Ltd, Durg, Chhatisgarh, M/s Amit Densified (Doors) Private Limited, Sonipat, Haryana, M/s Magniro Global Private Limited and M/s Permali Wallace Private Limited, Bio-Binder for Making Bio-Composites from Bamboo/Other Natural Resources – A Green & Sustainable Approach to M/s Permali Wallace Private Limited, Utilization of Zero liquid discharge plant residue (ZLDR) for development of a new class of wall tiles/Wall Cladding Panels to M/s Grasin Industries Ltd, Nagda, "@mprisensors: Intelligent Sensors and Alarms for Smoke, Heat & Fire' technology to M/s Rahul Infotech, Bhopal. Eco-friendly red mud-based X-ray radiation shielding panels to M/s NATURE'S GLOBAL SERVICE (Brand: X-Shield), New Delhi, Nanoadsorbent-Nano biocides based membrane filter for the removal of arsenic, fluoride, micro-organisms etc of drinking water to M/s IBS Water Nano Purifier LLP, Bhopal and M/s RollabsHitech Industries, Kolkata, and AMPRICARE-Disinfectant Box (UV Rays Hybrid Technology) to M/s Apt Medical System Pvt. Ltd., Pune, Makeshift Buildings for Hospitals, Housing and other purposes to M/s Janta Tent & Events, Bhopal, AMPRICARE: Instantaneous hypochlorite generator using Kitchen salt to M/s HES Water Engineers (India) Private Limited, Nagpur and Process for making Light Weight AL-SI Alloy-SiC Composite Manhole Cover to M/s VS Enterprises, Bhopal Further, the institute is progressing well in terms of quantity and quality of publications and patents.

Besides these, the Scientists of this Institute are very actively involved in mission mode activities for improvement of the livelihood of the society through various interactive programs, adoption of villages under CSIR-800 program, waste to wealth programme, skill development programmes and strategy for social development.

The dedicated team of Scientific, Technical and Administrative staff strives for achieving excellence and contribute to the needs of the industry, social sector and the Nation at large. We expect to keep this spirit high in the coming year also and make every effort to take CSIR-AMPRI, Bhopal to newer heights and to position it globally as a leading materials research laboratory.

Dr. Avanish Kumar Srivastava

Director

CSIR – AMPRI: An Overview

Advanced Materials and Processes Research Institute (AMPRI), Bhopal was instituted in May 1981 as "Regional Research Laboratory" (RRL) and officially started functioning from CSIR, New Delhi. The institute was then shifted to Bhopal and was located in Bhopal (now Barkatullah University campus). It subsequently found a place in the present premises in December 1983. The laboratory initially had about 15 scientists, with 10 of them specialized in metallurgy/materials science. This was the core strength of the institute at that time.

The institute initially undertook R&D on the synthesis and characterization of aluminium-graphite metal matrix composites and natural fibres. Gradually the scope of R&D broadened to include waste to wealth (building materials and wood substitute), mineral processing, environmental impact assessment, water resource modelling and problems related to agricultural, mining, sugar mill and thermal power plant machinery components. Health assessment, improvement and failure analysis of engineering components/systems and development of lightweight materials/components/products and processes for the automobile sector constituted other activities of significance. The work was extended with FEM simulation and modelling which became an integral part of the studies in many cases. Through its activities on water resource modelling, surface treated agricultural implements, bell metal artefacts, handicrafts using sisal fibre, use of fly ash for building materials and agricultural soil reclamation, etc., the institute became visible as a promising institute for rural technologies related to the specific problems of Madhya Pradesh.

The Governing Body of the Council of Scientific & Industrial Research renamed all its five Regional Research Laboratories (RRLs) to enable them to reflect a futuristic outlook. The changed profiles of the laboratories with respect to their direction of growth, orientation of expertise and accumulated excellence have all been weighed in while rechristening them. The name changed from Regional Research Laboratory, Bhopal to Advanced Materials and Processes Research Institute (AMPRI) with effect from March 6, 2007. In consonance with the new identity, R&D programmes in lightweight materials such as Al and Mg alloys, metallic foams, polymer-based composites, functional materials, microfluidics for point of care diagnostics, nanomaterials, new materials based on industrial wastes such as fly ash and red mud, and CSIR-800 projects of societal relevance have been undertaken. These programmes have an industry/user link from inception stage. A state-of-the-art processing and characterization facility and simulation modelling capabilities are being set up to trigger new materials development, innovations and improvements.

CURRENT PROGRAMMES AND FUTURE PERSPECTIVES

The present manpower includes scientists that are well trained in different disciplines of material science and other related areas along with supporting staffs. The number of scientists is planned to increase in the near future in view of the widened range of R&D activities. AMPRI is equipped with modern facilities for material synthesis, processing and property characterization such as SEM, HR-TEM, pressure die casting machine, semisolid processing unit, rolling mill, Mg melting unit, FESEM, Electromagnetic forming/joining unit, cryomilling unit, DTA, XRF, FT-IR, Raman Spectrophotometer, X-ray attenuation testing machine, electrochemical analyzer, UV-Visible spectrophotometer, AAS and those related to nanoscale R&D have been added in past few years.
The current activities of AMPRI are broadly categorised under

- Lightweight Materials,
- Nanostructured Materials,
- Smart and Functional Materials,
- Integrated Approach for Design and Product Development,
- Waste to Value added Materials
- Jigyasa and Skill Development Activities.

These activities have been performed in different divisions as under

- Industrial Waste Utilization, Nano and Biomaterials
- Alloys Composites and Cellular Materials
- Intelligent Materials and Advanced Processes
- Hybrid Building Materials and Manufacturing Division
- Advanced Centre for Radiation Shielding &Geopolymeric Materials
- Green Engineered Materials and Additive Manufacturing
- Water Resource Management & Rural Technology Division

In the category of lightweight materials, important activities are related to Al metal matrix composites, Al foam and Mg-based alloys. CSIR-AMPRI has laid a major emphasis on lightweight materials development like Al foam, Mg-based alloys, *in-situ* MMCs and nanostructured materials. Also,

activities on electromagnetic forming, smart and functional materials, steel and Ti foams, and materials modelling and design are being carried out since the last 12th Five-year Plan.

Under the research theme of nanostructured materials, lab is constantly working for the development of nanostructured material for different applications like nano-adsorbent, capacitor application, energy related areas, for sensors etc. Under this theme the lab has already established a process for the bulk scale synthesis of nanoalumina by a cost-effective process. The developed nano adsorbents possess significantly high fluoride and arsenic adsorption capacity. The sediment domestic water filter device has also been developed using this nanoalumina and the know-how is transferred to the industries.

Institute is employing integrated approach for design and product development in the area of shape memory polymer composites, natural fibre polymer composites, hierarchical carbon fibre reinforced composites, graphene-metal composites, coating materials, metallic foam, sandwich panel and metal matrix composite, bamboo composites etc. Advanced techniques like 3D surface scanning, 3D printing and selective laser melting processes, CVD techniques, micro compounding of nano-materials with smart polymers, universal bamboo shaping machine, design & analysis software, advanced characterization equipments are being used to develop products and processes. A dedicated team of scientists and technical staff along with students and project staff are working coherently to contribute significantly in S&T advancement.

In the area of Waste to Wealth, the institute is mainly engaged on the utilization of fly ash and red mud. The institute has developed wood substitute technology using red mud, fly ash and natural fibres and has potential applications for making doors, panels, partitions and furniture. CSIR-AMPRI has developed radiation shielding materials from red mud and holds a US Patent on the work. The potential applications of this technology are for the shielding of gamma and neutron in nuclear power plants and for diagnostic X-ray shielding in X-ray and CT scan rooms. This material has been started for use by the hospitals to shield diagnostic X-rays.

CSIR-AMPRI has worked on various rural development and dissemination activities which will have large implications for CSIR-800. The institute has taken up a project under Rural Sector Projects – Sisal Fibre Technologies for Rural Employment Generation. Sisal plant produces the hardest vegetable fibre which will have applications in cordage and handicrafts. The yarn and textile made out of this fibre is used for making composites for applications in sectors like housing, automobile, geotextiles, etc.

CSIR-AMPRI is actively engaged in microfluidic electrochemical &fluorescence-based biosensors which have recently been advanced for portable point-of-care diagnostics by integrating lab-on-a-chip technology and electrochemical analysis. Institute have developed several automated

procedures for electrochemical detection of biomarkers, pharmaceutical and environmental samples using micro liquid, capillary gas chromatographic and capillary electrophoretic separation techniques and micro-chip-based separation under the concept of lab-on-a-chip. The microfluidic electrochemical & fluorescence-based biosensors approach offers a new platform for a rapid, miniaturised, and sensitive diagnostic sensor in a single device for various human diseases.

The overall objective of AMPRI is to achieve a world-class status in the area of engineering materials, components and process development. Accordingly, the HR Profile and S&T infrastructure aims to address the needs of both fundamental and applied research, technology development and business development in the area of materials of the future. The present resource base being created would not only provide commercial tractability for the present but also provide a root for more lucrative, elite and innovative areas for the future. It is envisaged to make the institute a place of pilgrimage for top material scientists and the stakeholders.

Vision

CSIR-AMPRI, Bhopal is committed to develop innovative, cutting edge, internationally competitive, energy efficient and environmentally friendly technologies /products in the area of advanced materials for societal benefits and to contribute to the Nation's Economy.

Mandate

- Research & Development on Engineering Materials for Strategic, High Performance and Societal Applications
- Materials, Processes and Technology Development for Component/Products for a variety of engineering materials, including Metals & Alloys, Composites, Polymers, Building Materials and materials from Waste to Wealth
- To undertake consultancy, sponsored, grant-in-aid, network & other national, international projects for both public and private sectors in above areas.

Research Council

S.N.	RC Constitution	Name and Contact details
1	Chairman	Prof. Vinod Kumar Singh Chair Professor Department of Chemistry Indian Institute of Technology Kanpur — 208016
2	Member: Industry Representative	Dr. Vilas Tathavadkar Senior Vice President, Aditya Birla Science & Technology Company Ltd. Plot No. l& I-A/l, MIDC Taloja, Panvel.Navi Mumbai - 410208
3	Member: Industry Representative	Shri Sudipta Saha President Tile Operations & Business Head Industrial Products H&R Johnson, India Ltd.Pune,- 41103, Maharashtra, India
4	Member: Academia	Prof. Shampa Aich Department of Metallurgical and Materials Engineering Indian Institute of Technology Kharagpur-721302
5	Member: Academia	Prof. N. Ravi Shankar Department of Materials Research Centre Indian Institute of Sciences, CV Raman Road Bengaluru-560012
6	CSIR- HQ Representative	Dr. Mayank Mathur Chief Scientist Central Planning Directorate Council of Scientific & Industrial Research (CSIR) Ministry of Science & Technology, Anusandhan Bhawan, 2, Rafi Marg, New Delhi — 110 001 Phone - 011-23710311
7	Member (Directors/Sr. Scientist from a sister laboratory)	Prof. Bikramjit Basu Director CSIR- Central Glass & Ceramic, Research Institute 196, Raja S.C. Mullick Road Kolkata – 700032
8	Member (Agency Representative)	Dr. S.V.S. Narayana Murty General Manager, Materials Development and Production Group Liquid Propulsion Systems Centre, Indian Space Research Organisation (ISRO) Trivandrum – 695547
9	Member (Director of the Laboratory)	Dr. Avanish Kumar Srivastava.Director, CSIR-AMPRI
10	Member (RC Secretary)	Dr. J. P. Chaurasia, Chief, Scientist & Head, PPD CSIR-Advanced Materials and Processes Research Institute Hoshangabad Road, Bhopal – 462 026.

Management Council

1	Director, CSIR – AMPRI	**Chairman**
2	Dr. Manish Mudgal, Chief Scientist, CSIR – AMPRI	Member
3	Dr. Kirti Soni, Principal Scientist, CSIR – AMPRI	Member
4	Dr. Chetna Dhand, Senior Scientist, CSIR – AMPRI	Member
5	Mr. Narendra Singh, Senior Scientist, CSIR – AMPRI	Member
6	Dr. E Peters, Principal Technical Officer, CSIR – AMPRI	Member
7	Director CSIR-NPL, New Delhi	Member
8	Dr. J. P. Chaurasia, Chief Scientist & Head, PPD CSIR-AMPRI, Bhopal – 462 026.	Member
9	F&AO, CSIR – AMPRI	Member
10	COA /AO, CSIR – AMPRI	Member-Secretary

MoU with Academic/R&D Institutions

S. No.	CSIR Lab	Name of Organization/ Name of the Indian Company/agency	Date of Signing	Validity (Duration)
1	AMPRI	President of India, acting through Secretary, Department of Biotechnology, Ministry of Science and Technology, Government of India, New Delhi & AIIMS, Bhopal & IISER Bhopal	30/05/2024	18 Months
2	AMPRI	Aero Engine Research and Design Centre, CV Raman Nagar, Suranjan Das Road, Bengaluru-560093	03/05/2024	5 Years
3	AMPRI	President of India, acting through Secretary, Department of Biotechnology, Ministry of Science and Technology, Government of India, New Delhi	09/05/2024	3 Years
4	AMPRI	M/S Indian Rare Earths Limited Technology Development Council, Odisha Sands Complex, IREL (India) Limited, Odisha	28/06/2024	24 Months
5	AMPRI	IES University, Bhopal (MP)	31/07/2024	120 Months
6	AMPRI	IES College of Technology, Bhopal (MP)	31/07/2024	120 Months
7	AMPRI	Scope Global Skills University, Bhopal (MP)	31/07/2024	120 Months
8	AMPRI	Rabindranath Tagore University, Bhopal (MP)	31/07/2024	120 Months

9	AMPRI	Maharishi Mahesh Yogi Vedic University, Bramhasthan-Karuandi, Dist. Katni (MP)	31/07/2024	120 Months
10	AMPRI	Ram Krishna Dharmarth Foundation University (RKDF), Bhopal (MP)	31/07/2024	120 Months
11	AMPRI	Mahatma Gandhi ChitrakootGramodaya Vishwavidyalaya, Chitrakoot (MP)	31/07/2024	120 Months
12	AMPRI	Chakr Innovation Private Limited, Ground Floor, Commercial Building Mohan Dev, Janpath, Central Delhi, New Delhi 110001	23/07/2024	12 Months
13	AMPRI	Construction Industry Development Council, Hemkunt Chambers, 89, Nehru Place, New Delhi – 110019	05/09/2024	36 Months
14	AMPRI	Awadhesh Pratap Singh University, Rewa (MP)	06/09/2024	120 Months
15	AMPRI	M/s Grasim Industries Limited, Staple Fibre Division, Birlagram, Nagda, Madhya Pradesh – 456331	06/09/2024	120 Months
16	AMPRI	M/s Permali Wallace Private Limited, Hoshangabad Road, Opp. RBI, Bhopal – 462011 (MP)	26/09/2024	120 Months
17	AMPRI	M/s Permali Wallace Private Limited, Hoshangabad Road, Opp. RBI, Bhopal – 462011 (MP)	26/09/2024	120 Months
18	AMPRI	M/s Rollabs Hitech Industries, Kolkata	30/10/2024	120 Months
19	AMPRI	IIT Indore	22/12/2024	60 Months
20	AMPRI	Rahul Infotech, Bhopal	17/01/2025	120 Months
21	AMPRI	VJTI, Mumbai	17/01/2025	60 Months
22	AMPRI	Directorate of Skill Development (DSD), Madhya Pradesh,	10/01/2025	120 Months
23	AMPRI	Ministry of Chemicals & Fertilizers, Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilizers, Government of India, Shastri Bhawan, New Delhi	25/02/2025	48 Months

Knowhow Transfer Projects

S.No.	Name of Knowhow	Name of Party	Date
1.	Evergreen Hybrid Composites of Parali (Agro Wastes)	M/s Magniro Global Private Limited, Phafadih, Raipur – 492001	24/06/2024
2.	Utilization of Zero liquid discharge plant residue (ZLDR) for development of a new class of wall tiles/Wall Cladding Panels (Date of Development – 05/07/2024)	M/s Grasim Industries Limited, Staple Fibre Division, Birlagram, Nagda, Madhya Pradesh	06/09/2024
3.	Evergreen Hybrid Composites of Parali (Agro Wastes)	M/s Permali Wallace Private Limited, Bhopal (MP)	26/09/2024
4.	Bio-Binder for Making Bio-Composites from Bamboo/Other Natural Resources – A Green & Sustainable Approach (Date of Development – 05/08/2024)	M/s Permali Wallace Private Limited, Bhopal (MP)	26/09/2024
5.	Nanoadsorbent-based filter for the arsenic & fluoride-free drinking water	M/s Rollabs Hitech Industries, Kolkata, West Bengal, 700050	30/10/2024
6.	"@mprisensors: Intelligent Sensors and Alarms for Smoke, Heat & Fire' technology	M/s Rahul Infotech, Chambur, Bhopal (MP) – 462016	17/01/2025

List of Ongoing Projects

CSIR Funded MLP/NWP/HCP/NCP/FBR/FTT/FTC/MMP/IHP:

S. No.	Project Code	Project Title	Sponsoring Agency	Date of Start	Date of Completion	Project Cost in Rs.	Principal Investigator
1	FIR080305	Development of Prototype Liquid Metal-based additive manufacturing system for lightweight alloys	CSIR, New Delhi	2024-08-16	2026-03-31	8700000	Dr. Gaurav Kumar Gupta
2	FTT060501	Low and Medium Temperature Organic Phase Change Materials for thermal comfort in buildings	CSIR, New Delhi	2024-04-01	2026-03-31	5300000	Dr. Mohit Sharma

3	FTT080501	Design and Development of aluminium composite-based support components for high-end equipment using additive manufacturing	CSIR New Delhi	2024-04-01	2026-03-31	13200000	Dr. Mohd Ashiq
4	FTT080502	Extraction of valuable metals and development of advanced polymeric composites from inorganic jarosite waste	CSIR, New Delhi	2024-04-01	2026-03-31	11444000	Dr. Manoj Kumar Gupta
5	HCP0044	Catalyst Development for Electrolysers (FBR): Development of non-noble Ni-Fe and Ni-Fe-GO modified large area anodes for efficient hydrogen production by alkaline water electrolysis	CSIR New Delhi	2022-04-01	2025-03-31	3360000	Dr. Archana Singh
6	HCP0047	Phenome India-CSIR Health Cohort Knowledgebase	CSIR New Delhi	2022-03-08	2027-03-30	2575000	Dr. Raju Khan
7	HCP0054	Pilot Scale Fabrication of Joint Free Brick Size Gamma and Neutron Shielding Blocks (WP4)	CSIR, New Delhi	2023-09-04	2026-03-31	15262000	Dr. Shabi Thankaraj Salammal
8	HCP0054	Up-Scaling of Fly Ash based Advanced Geopolymeric Roller Compacted Concrete for all Weather Road	CSIR New Delh	2023-09-04	2026-03-31	14975000	Dr. (Eng.) Manish Mudgal

		Applications (WP2)					
9	HCP0054	E-waste from spent nickel metal hydride battery: promising materials for hydrogen generation by alkaline electrolysis of water and water treatment application (FBR1)	CSIR New Delhi	2023-09-05	2026-03-31	6790000	Dr. Archana Singh
10	HCP0054	Semi Pilot Demonstration for Conversion of Fly ash and Pond ash into Synthetic Aggregates – An alternative to River Sand (WP1)	CSIR New Delhi	2023-09-05	2026-03-31	15365000	Dr. Prabha Padmakaran
11	HCP0101	CSIR-Jigyasa 2.0 Virtual Lab Integration	CSIR New Delhi	2022-07-27	2026-03-31	20042000	Dr. Satanand Mishra
12	IHP002401	Cu/Graphene-based hybrid coating for improving thermal conductivity and corrosion resistance of commercial grade AZ91E Mg alloy for strategic applications	CSIR New Delhi	2024-05-21	2026-03-31	800000	Dr. Dipen Kumar Rajak
13	IHP002402	Development of graphene/Mxene-based materials for reversible hydrogen storage	CSIR New Delhi	2024-05-21	2026-03-31	700000	Dr. Pradip Kumar
14	IHP002403	Advanced bamboo-derived activated charcoal and Polyphenylsulfone polymer-based mix matrix	CSIR New Delhi	2024-05-17	2026-03-31	750000	Dr.MCS Nayak

		membranes for wastewater treatment					
15	IHP002404	3D-Printed Electrode Fabrication with Tin-based Catalyst for Electrochemical Reduction of Carbon Dioxide into Format	CSIR New Delhi	2024-05-21	2026-03-31	800000	Dr. Tamal Chatterjee
16	IHP002405	Assistive telescopic tool with Shape Memory Alloy wire actuator based soft robotic gripper with machine vision for engineering applications	CSIR New Delhi	2024-05-21	2026-03-31	1550000	Mr. Samarth Singh
17	IHP002406	Exploring the possibility of in-situ alloying using pre-mixed/blended alloy powders in LPBF additive manufacturing and its effect on the 3D-printed parts	CSIR New Delhi	2024-05-21	2026-03-31	800000	Mr. Nikhil Gorhe
18	IHP002407	Engineering the electronic structure, magnetic properties and spin transport properties of MXenes and Janus 2D Materials for designing Next-Gen innovative spintronic and electronic devices	CSIR New Delhi	2024-05-21	2026-03-31	800000	Dr. Supriya Saha
19	IHP002408	Investigation of Deep Learning for Real-Time Melt	CSIR New Delhi	2024-05-24	2026-03-31	700000	Mr. Atul Chatter

		Pool Classification in Additive Manufacturing					
20	IHP002409	Design and Development of Next-Generation SelfRechargeable Energizers using Graphene Nanosheets and Low Dimensional Nanostructures Beyond Graphene	CSIR New Delhi	2024-05-21	2026-03-31	800000	Dr. K Kathikeyan
21	IHP002410	Development of open-cell Aluminum foams through In-direct 3D printing (polymer 3D printed foam+ vacuum infiltration) technique	CSIR New Delhi	2024-05-21	2026-03-31	800000	Mr. Sriram Sathaiah
22	IHP002411	Development of next-generation Al-Air batteries: Designing & Configuring Combinations of High-Performance Electrodes	CSIR New Delhi	2024-05-21	2026-03-31	800000	Dr. Ram Kumar
23	IHP002412	Study of alternate curing methods for curing of cement mortar/concrete	CSIR New Delhi	2024-05-21	2026-03-31	700000	Mr. Shiv Singh Patel
24	MLP0301	Centre of Excell-ence in Graphene & its applications	CSIR New Delhi	2022-04-27	2025-03-31	148000000	Dr. Sathish N
25	MLP0307	Graphene based composites for high performance thermally conducting interface and Electromagnetic	CSIR New Delhi	2022-09-20	2025-03-31	79812000	Dr. Sathish N

		Interface shielding applications					
26	MMP035202	Development of Fully Biodegradable Paddy Straw-PLA based Packaging Materials	CSIR, New Delhi	2024-07-23	2027-03-31	6494560	Dr. Manoj Kumar Gupta
27	NCP040301	Maximum Uitilization of Red Mud (up to 90 wt%) to Develop Red-Mud Composites at Very Low Temperature for High-Performance Radiation Shielding Systems for Civil Structures	CSIR, New Delhi	2024-04-01	2026-03-31	11444000	Dr. Alka Mishra
28	NWP0100	CSIR Integrated Skill Initiative-Phase II	CSIR New Delhi	2021-01-25	2025-03-31	22360000	Dr. J P Shukla (Upto 31/07/2024), Dr. Sandeep Singhai (31/07/2024 Onwards)
29	OLP0201	Development of flexible Piezoelectric two-dimensional nanostructures-based hybrid nanogenerator for harvesting mechanical energy	CSIR New Delhi	2021-07-02	2026-07-01	2500000	Dr. Manoj Kumar Gupta
30	OLP0301	Nature inspired fractal patterned Micro-Nano structured catalyst	CSIR New Delhi	2022-05-27	2025-05-26	2950000	Dr. Archana Singh

		modified electrodes: A novel approach for efficient hydrogen production by electrolysis of water					
31	OLP0302	Designing and Development of Multifunctional light weight carbon allotropes based nanostructured material viz. Bandage for radiation shielding and biomedical applications	CSIR-AMPRI	2023-11-07	2026-11-06	2373949	Dr. Sarika Verma
32	OLP0303	On-Site Cultivation of Bamboo and Sisal at CSIR-AMPRI, Bhopal For Eco-Friendly Bamboo/Sisal Biocomposite Development – A Green and Sustainable Approach	CSIR, New Delhi	2024-02-19	2029-02-18	100000	Dr. Sarika Verma
33	OLP0304	Additive Manufacturing of Emerging 2D Mxene Derived Printed Composite Materials for Electromagnetic Interference Shielding Applications	SERB, 3rd & 4th Floor, SERB Block II, Technology Bhavan, New Mehrauli Road, New Delhi-110016	2024-03-14	2027-03-13	800000	Dr. Sarika Verma

Grant-in-Aid Projects (GAP):

S. No.	Project Code	Project Title	Sponsoring Agency	Date of Start	Date of Completion	Project Cost in Rs.	Principal Investigator
1	GAP000141	Simultaneous Photo-Bio-Electro-Degradation of Recalcitrant Compounds in Wastewater and Bioenergy Generation through Visible Light-Induced Electrodes in Advanced Microbial Fuel Cells: Sustainable Synergy and Enlightened Solutions	Department of Biotechnology, Ministry of Science and Technology	2024-05-09	2027-05-08	7982560	Dr. Shiv Singh
2	GAP000143	Design and Development of Microfluidics based Device to determine antimicrobial susceptibility directly in clinical samples	DBT, New Delhi	2024-05-30	2025-11-29	3216920	Dr. Raju Khan
3	GAP000144	Study of atmospheric boundary layer characteristics over the Mumbai region	Maharashtra Pollution Control Board, Mumbai	2024-07-04	2029-07-03	3393000	Dr. Kirti Soni
4	GAP000145	Exploring the feasibility of Converting Iron Rich IREL's Red Clay into X- and Gamma Ray Shielding Materials	IRELTDC, Technical Services Department, IREL(India) Limited, OSCOM, Chhatarpur - 761045	2024-08-02	2026-08-01	3424608	Dr. Shabi Thankaraj Salammal
5	GAP000146	Development of non-noble metal ion based	DST Inspire	2024-02-16	2029-02-15	2932000	Ms Neha Narendra Mishra

		electrocatalyst for Electrochemical Reduction of CO2 to value added products					(Dr. Archana Singh)
6	GAP000147	Design and Development of High Performance Electrocatalysis for Urea Assisted Hydrogen Generation (Ecat-UH2)	IGSTC Center, Technology Bhavan, New Mehrauli Road, New Delhi	2024-08-30	2027-08-29	3900000	Dr. Archana Singh
7	GAP000148	Development of open cell graphene foam and aluminum foam for lightweight high energy density and fast charge aluminum-ion battery	Department of Science & Technology, New Delhi-110016	2024-09-12	2029-09-11	3369600	Dr.Neelam Sharma (Mentor: Dr. Gaurav Kumar Gupta)
8	GAP000150	Development of Bimetallic Nanoparticles Incorporated Bioinspired Reduced Graphene Oxide Nanocomposite Based Electrochemical Immunosensor for the Ultrasensitive Detection of Amyloid -β Peptides and Tau Protein	Department of Science & Technology, Govt. of India New Delhi-110016	2025-01-02	2030-01-02	3369600	Neha Bisht Women Scientist (Mentor: Dr. Chetna Dhand)
9	GAP000151	High-Performance Hybrid Coatings Based on Plasma-Grown Carbon and 2D Materials for Combating Tribological and Corrosion Problems of	Department of Science & Technology, Govt. of India New Delhi-110016	2025-01-02	2030-01-02	3369600	Ragini Sharma, Women Scientist (Mentor: Dr. Neeraj Dwivedi)

		Defense and Aerospace Systems					
10	GAP0107	Development of Advanced Composite Pressure Vessels for Hydrogen Storage (ADHERE)	DST, New Delhi	2021-08-09	2025-12-30	5492106	Dr. Surender Kumar
11	GAP0111	Synthesis, characterization and applications of Lead-free Heavy Metal Oxide based Glass systems	DST-INSPIRE, New Delhi	2021-03-10	2026-03-31	2774644	Dr. Rezaul Karim SK (Dr. Mohammad Ashiq)
12	GAP0116	Advanced Multi-Functional Asbestos-Free Thermal Insulating Material-A Gizmo for Energy Conservation	Central Power Research Institute, Bangalore	02/03/2022	2026-03-31	8906000	Dr. Sarika Verma
13	GAP0117	Design and Development of an instrument for real time assessment of ferromagnetic phase fraction in ferrous alloys	DST, New Delhi	2022-03-22	2025-03-31	2411279	Dr. H N Bhargaw
14	GAP0119	Double heterojunction magnetic nanoparticles for textile industry waste water purification	DST, New Delhi	2022-04-22	2025-04-21	3239601	Dr. AngelinEban ezar John (Dr. Deepti Mishra)

15	GAP0120	Nature inspired fractal patterned Micro-Nano structured catalyst modified electrodes: A novel approach for efficient hydrogen production by electrolysis of water	DST, New Delhi	2022-05-27	2025-05-26	3440480	Dr. Archana Singh
16	GAP0126	Exploration of 2D MXene for Energy Applications	DST, New Delhi	2022-03-21	2027-03-20	2866156	Ms. Shilpee Chauhan (Dr. Pradip Kumar)
17	GAP0127	Development of High-Performance Ultrathin Overcoats for Hard Disk Media and Tape Head Devices for Futuristic High Storage Capacity Magnetic Memory Systems	DST, New Delhi	2022-03-21	2027-03-20	2865920	Mr. Rajesh Kumar (Dr. Neeraj Dwivedi)
18	GAP0128	Development and Scale up (TRL 5) of cost effective Copper-Graphene materials using in-situ synthesis & coating in Fluidized Bed Process Systems	Ministry of Mines, Government of India	2023-03-06	2025-08-31	2295960	Dr. Tilak Chandra Joshi
19	GAP0130	Development of Aerospace Components Through Electromagnetic Welding	AR&DB, Room No. 411, 4th Floor, NTB Building, DRDO HQ Annexe, Metcalfe House, Civil Lines, New Delhi - 110054	2023-08-25	2026-08-24	4633216	Dr. Meraj Ahmed
20	GAP0131	Monitoring and Analysis of	MPCST Bhopal	2023-10-10	2025-10-09	550000	Dr. Kirti Soni

		Atmospheric Boundary Layer height over Bhopal region using SODAR (Sound Detection and Ranging) System					
21	GAP0132	Silicon-based nanostructures for SERS applications	DST-SERB, New Delhi	2023-02-03	2028-02-02	2932000	Sh. Keshendra Kumar (Mentor: Dr. Vandana)
22	GAP0133	Development of Carbon Nanofiber materials from Cow Dung/ Bio-sludges for Smart Fabric Textile and Selective CO2/H2 energy storage applications by 3D printing technology	National Technical Textiles Mission, Ministry of Textiles	2023-11-09	2026-11-08	5850000	Dr. Sarika Verma
23	GAP0134	Development of Antiviral and antimicrobial textile based Personal Protective equipment (PPE) using polymer nanocomposites with metal and metal oxide nanoparticles immobilized proteolytic enzymes	DST	2023-11-08	2025-11-07	1122000	Dr. V Sorna Gowri
24	GAP0135	Designing and Development of Multifunctional light weight carbon allotropes based nanostructured material viz. Bandage for radiation	DST	2023-11-07	2026-11-06	4336680	Dr. Sarika Verma

		shielding and biomedical applications					
25	GAP0136	Novel sub-1.7nm Thick Overcoats for Beating Friction, Wear and Corrosion of Hard Disk Media: Boosting Storage Capacity of Hard Disk Drives via Reducing the Thickness of Commercial Protective Overcoats from 2.5-3.0nm to sub-1.7 nm	DST	2024-01-01	2025-12-31	3788640	Dr. Neeraj Dwivedi
26	GAP0137	Development of Highly Sensitive and Selective Aptasensor for Early Diagnosis of Parkinson Biomarker Alpha-Synuclein using MXene-based Nanocomposites	DBT, New Delhi	2023-12-11	2026-12-10	3320000	Ms. Mansi Chaturvedi (Dr. Chetna Dhand)
27	GAP0138	Development of Bio-inspired Superhydrophobic Antimicrobial Nanocoatings on the Urinary Catheters to Impede Microbial Biofilm Formation and Catheter-Associated Urinary Tract Infection	SERB, 3rd & 4th Floor, SERB Block II, Technology Bhavan, New Mehrauli Road, New Delhi-110016	2023-12-04	2026-12-03	5195059	Dr. Chetna Dhand
28	GAP0139	Additive Manufacturing of Emerging 2D Mxene Derived Printed Composite Materials for Electromagnetic	SERB, 3rd & 4th Floor, SERB Block II, Technology Bhavan, New Mehrauli Road, New Delhi-110016	2024-03-14	2027-03-13	3265920	Dr. Sarika Verma

		Interference Shielding Applications					
29	GAP0140	Development of 2D Mxene-based Materials for Efficient Reversible Hydrogen Storage at Ambient Conditions	SERB-CRG 3rd & 4th Floor, SERB Block II, Technology Bhavan, New Mehrauli Road, New Delhi-110016	2024-03-16	2027-03-15	2917080	Dr. Pradip Kumar
30	GAP0142	Development of Hand-Held Immunosensor Device using Bio-inspired Graphene-Based Nanocomposites for the detection of Parkinson's disease Biomarkers	ICMR, New Delhi	2024-03-15	2028-03-14	13660000	Dr. Chetna Dhand
31	GAP000152	"Unveiling Novel Properties of Quantum Materials for Emerging Technologies Using Quantum Chemical Approaches"	Anusandhan National Research Foundation-IRG, New Delhi	2028-03-23	2025-03-24	2961750	Dr. Supriya Saha

Sponsored Projects (SSP/TSP):

S. No.	Project Code	Project Title	Sponsoring Agency	Date of Start	Date of Completion	Project Cost in Rs.	Principal Investigator
1	SSP000071	Assessment of Implementation of Consent to Establish (CTE) and Environment Clearance (EC) Conditions of Proposed Common Hazardous Waste, Treatment, Storage and Disposal Facility	M/s Re-Sustainability Limited (Formerly Ramky Enviro Engineers Limited) Level 11, Aura Reality, Hyderabad Knowledge City, Hitech City Road, Hyderabad,	2024-04-23	2025-04-22	2153320	Dr. Md.Akram Khan

		(CHWTSDF) at Maneri, District Mandla (M.P.)	Telengana – 500081				
2	SSP000073	Investigations of Boron ore samples for Boron content and solubility	Indo Borax & Chemicals Ltd., Pithampur, Indore (MP)	2024-07-15	2025-07-14	354000	Dr. Surender Kumar
3	SSP000074	Utilization of zero liquid discharge plant residue generated from Grasim Industries Ltd., Nagda, M.P. for development of new class of wall tiles/ wall cladding panels	Grasim Industries Limited Staple Fibre Division, BIRLAGRAM, Nagda, Madhya Pradesh	2024-09-06	2025-05-05	2478000	Dr. Alka Mishra
4	SSP0064	Monitoring of Mixing Height Profile of atmosphere for Jamshedpur City using SODAR System	Tata Steel, Jamshedpur (Through NEERI Nagpur)	2023-03-01	2025-02-28	3200000	Dr. Kirti Soni
5	SSP0066	Development of Manufacturing Methodology/Process and supply of samples of High strength aluminum foam for blast mitigation	Combat Vehicle Research & Development Establishment (CVRDE), DRDO, Chennai	2023-04-18	2025-04-17	2496054	Dr. D P Mondal (Before). Dr Venkat A N Chilla (Now)
6	SSP0068	Development of Aluminium hybrid composite foams core sandwich structures for Boot Anti Mine Applications	Defence Material and Store Research and Development Establishment (DMSRDE), DRDO, Govt. Of India, GT Road, Kanpur	2023-06-09	2025-06-08	3444420	Dr. Venkat AN Ch
7	SSP0069	Assessment of Impact of Leaching from existing ash pond for identification of piezometric points for Sanjay Gandhi Thermal Power Station Birsinghpur (MP)	M/s Sanjay Gandhi Thermal Power Station, Birsinghpur, District Umaria (MP)	2023-11-03	2025-05-02	1585920	Dr. Mohd. Akram Khan
8	SSP0070	Investigating the Leachability Studies and Utilization	M/s Boon Metal & Alloys Corporation, Plot	2024-02-19	2025-05-18	1116280	Dr. Mohd. Akram Khan

		Potential of Ferro-Molybdenum Slag generated at M/s Boon Metal & Alloys Corporation, GIDC Sarigam, Valsad, Gujarat	No. 3002, GIDC Sarigam, District Valsad, Gujarat – 396155				
9	SSP0072	Design and Development of Aluminium alloy (AA 6061) open-cell foam core sandwich panels for space applications	M/s U R Rao Satellite Centre, HAL Airport Road, Vimanpura, Bangalore - 560017	2024-01-29	2026-01-28	2205000	Mr. Sriram Sathaiah
10	TSP000001	Technical Service Project for Testing of Samples	M/s Bulk MRO Industrial Supply Pvt. Ltd., 2nd Floor, A Wing, Todi Estate, Sun Mill Compound Lower Parel West, Mumbai-400013	2024-05-28	2025-05-27	436600	Dr. Sandeep Singhai
11	TSP000002	Technical Service Project for Testing of Samples through TEM & FTIR	TACC Limited (A subsidiary of HEG Ltd, Mandideep (Near Bhopal), District Raisen - 462046 MP India	2024-06-26	2025-06-25	436600	Dr. Md .Ashiq
12	SSP000075	Investigations of Boron ore sample (EBCOL-25, ETICOL-43) for elemental contents through titration, and physico-chemical characterizations	Indro Borax & Chemicals Ltd., Pithampur,Indore, Madhya Pradesh, India	2025-03-11	2026-03-10	413000	Dr.Surender Kumar

List of Completed Projects

NWP/MLP/HCP Projects

No.	Title of the Project	Project Code	Name of Sponsoring Agency	Date of Start	Date of Completion	Project Cost Rs.	Project Leader
1	CSIR Integrated Skill Initiative-Phase II	NWP0100	CSIR New Delhi	25/012021	31/03/2025	22360000	Dr. J P Shukla

							(Upto 31/07/2024), Dr. Sandeep Singhai (31/07/2024 Onwards)
2	Engineered Shape Memory Polymer-based Portable Heat/Fire Alarm Devices	MLP0303	CSIR New Delhi	13/09/2022	12/09/2024	9820000	Dr. Neeraj Dwivedi
3	Up-Scaling & Demonstration of Advanced Brine Sludge-Based Flexible and Mouldable Polymeric Composite sheets for circular economy	MLP0304	CSIR New Delhi	13/09/2022	12/09/2024	1152040	Dr. Sarika Verma
4	Design and Development of Aligned Steel Fiber Cementitious composite using Electromagnetic Field along with its Mechanical Characterization	MLP0306	CSIR New Delhi	09/09/2022	09/08/2024	6100000	Dr. Sanjay Kumar Panthi

Grant in Aid Projects

No.	Title of the Project	Project Code	Name of Sponsoring Agency	Date of Start	Date of Completion	Project Cost Rs. in Lakhs	Project Leader
1	Multiplexed Non-invasive Aptamer Based Electrochemical Biosensors for Early Detection of cancer-seeking signals in biological fluid	GAP0108	DST, New Delhi	06/08/2021	05/08/2024	3493800	Dr. Aparna Parihar
2	Design and Development of an instrument for real time assessment of ferromagnetic phase fraction in ferrous alloys	GAP0117	DST, New Delhi	22/03/2022	31/03/2025	8906000	Dr. H N Bhargaw
3	Red Mud Valorization to achieve zero waste, Conversion of residue	GAP0118	Ministry of Mines,	19/04/2022	31/10/2024	4397384	Dr.Shabi Thankaraj Salammal

	into diagnostic X-Ray Shielding tiles after recovery of scandium		Governme nt of India				
4	Upscaling of carbon foam technology for lead-acid battery development and grapheme foam for flexible Li-ion batteries	GAP0121	DST-SERB, New Delhi	01/07/2022	30/06/2024	4600000	Dr. Rajeev Kumar
5	Studies on Utilization of inert broken tiles, sanitary wares & polishing dust/slurry for Development of Advanced Geopolymeric Prefabricated Precast Pathway Components for Infrastructural Applications	GAP0122	Central Pollution Control Board, Regional Directorate (West), Vadodara (Gujrat)	06/07/2022	05/01/2024	8351760	Dr. Manish Mudgal
6	Pilot Scale Development of "AMPRICARE – Instantaneous Hypochlorite Generator Using Kitchen Salt"	GAP0124	DST NECTAR	11/01/2022	29/05/2024	1554000	Dr. Archana Singh
7	Laser-fabricated nanocomposite flexible nanogenerator for energy and self-powered sensor applications	GAP00149	CSIR, New Delhi	03/10/2024	31/12/2024	500000	Dr. Manoj Kumar Gupta

Sponsored Projects: (3)

No.	Title of the Project	Project Code	Name of Sponsoring Agency	Date of Start	Date of Completion	Project Cost (Rs. in Lakhs)	Project Leader
1	Design and Development of Gold foam for jewelleries Applications	SSP0062	Titan Company Limited, Bengaluru	25/02/2022	31/07/2024	2006000	Dr. D P Mondal (before) Mr. Sriram Sathaiah (Now)

2	Design and Development of Technology and processes of specialized Aluminium and graphene foam for electrodes in High Performance extra fast recharging Light Weight Al-ion battery	SSP0063	M/s. Nordische Technologies Private Limited, Bengaluru	09/05/2022	08/05/2024	3481000	Dr. D P Mondal (before) Dr. Gaurav Kumar Gupta (Now)
3	Monitoring of Mixing Height Profile of atmosphere for Jamshedpur City using SODAR System	SSP0064	Tata Steel, Jamshedpur (Through NEERI Nagpur)	01/03/2023	28/02/2025	3481000	Dr. Kirti Soni

Patents

Patent Applications Filed in India:

SNo	NFNO	Country	Lab	Title	Inventors	Prov. Filing Date	Comp. Filing Date	Application No.
1	0026NF2024/IN	IN	AMPRI	Low Friction and Wear Resistant Shape Memory Polyurethane-Molybdenum Titanium Aluminum Carbide MAX Composites	Neeraj Dwivedi, Shubham Jaiswal, Chetna Dhand, Avanish Kumar Srivastava	---	29-May-2024	202411041896
2	0220NF2023/IN	IN	AMPRI	Hybrid Chemically Acclimated Brine Sludge - Graphene Oxide Functional, Flexible	Sarika Verma, Kamna Chaturvedi, Ayushi Jaiswal, Mohammed Akram Khan,	---	05-Jun-2024	202411043841

				Composite Material and The Process Thereof	Avanish Kumar Srivastava			
3	0141NF2023 /IN	IN	AMPRI	A Composition Comprising Dual Chem-Heat Treated Brine Sludge Waste for Flexible and Moldable Material and A Process for The Preparation Thereof	Sarika Verma, MedhaMili, Mohammed Akram Khan, Avanish Kumar Srivastava	---	13-Jun-2024	202411045947
4	0028NF2024 /IN	IN	AMPRI	Chemically Formulated And Multi-Layered Designed, Lead-Free, Metal-Oxide/Graphene Oxide Flexible Material And The Process Thereof	Sarika Verma, Ayushi Jaiswal, Mohammed Akram Khan, Avanish Kumar Srivastava	---	19-Jun-2024	202411047253
5	0110NF2024 /IN	IN	AMPRI	Nickel Oxide Anchored Graphitic Carbon Nanofiber For Embedded Sensing, Fabrication And Application Thereof	Shiv Singh, Smriti Mishra, Pradip Kumar, Sheelendra Pratap Singh, Baban Kumar Bansod, Dehi Pada Mondal, Mohammed Akram Khan	---	11-Jul-2024	202411053210
6	0025NF2024 /IN	IN	AMPRI	Brine Sludge Derived Flexible and Moldable Compositions for Radiation Shielding Applications and A Process for The	Sarika Verma, Mohammed Akram Khan, Avanish Kumar Srivastava	---	19-Jul-2024	202411055559

				Preparation Thereof				
7	0124NF2024/IN	IN	AMPRI	Bamboo Biocomposite Material And The Process For Preparation Thereof	Sarika Verma, Anju Singhwane, Mohammed Akram Khan, MedhaMili, Nikhil Rajendra Gorhe, Ajay Naik, Prasanth Narayanan Nair, Sandeep Singhai, Jamana Prasad Chaurasia, Avanish Kumar Srivastava	---	14-Aug-2024	202411062019
8	0266NF2024/IN	IN	AMPRI	A Shape Memory Polymer Composite Based Electromagnet-Driven Reset Mechanism Enabled System For Heat And Smoke Detection	Neeraj Dwivedi, Ankit Kumar Pandey, Jeet Vishwakarma, Shubham Jaiswal, Chetna Dhand, Alka Mishra, Sandeep Singhai, Avanish Kumar Srivastava	---	04-Dec-2024	202411095852
9	0260NF2024/IN	IN	AMPRI	Process For PrepartionOf Closed-Cell Foam Through Melt Route Technique Using Mg-Al-Zn Mixture And Sic Particles	Dipen Kumar Rajak, Gaurav Kumar Gupta, Neeraj Dwivedi, Sriram Sathaiah, Tilak Joshi, Venkat A N Ch, Avanish Kumar Srivastava	04-Dec-2024	10-Jan-2025	202411095855

10	0205NF2024/IN	IN	AMPRI	Bamboo Based Composition For 3d Printed Composite Material And The Process Thereof	Sarika Verma, Mohammed Akram Khan, Sandeep Singhai, Jamana Prasad Chaurasia, Avanish Kumar Srivastava	10-Dec-2024	---	202411097676
11	0209NF2023/IN	IN	AMPRI	Stimulated Brine Sludge-Mxene Based Composition For Advanced Flexible And Moldable Material And A Process Thereof	Sarika Verma, Kamna Chaturvedi, Manish Dhangar, Mohammed Akram Khan, Avanish Kumar Srivastava	---	10-Dec-2024	202411098125

Patents Granted in India:

SNo	NFNO	Country	Lab	Title	Inventors	Comp. Filing Date	Application No.	Status	Grant Date	Patent No.
01	0120NF2019/IN	IN	AMPRI	Multi - Functional Hybrid Composite Material From Bamboo And Process For Preperation Of The Same	Hashmi Syed Azhar Rasheed, Verma Sarika, Mili Medha, Gorhe Nikhil Rajendra, Naik Ajay, Rathore Sanjai Kumar Singh, Srivastava Avanish Kumar	04-Oct-2019	201911040180	IF/2026	11-Mar-2025	562322

Patent Applications Filed in Foreign Countries -Nil

Patents Granted in Foreign Countries:

S.N	NFNO	Country	Lab	Title	Inventors	Prov Filing Date	Comp. Filing Date	Application No.	Status	Grant Date	Patent No.
1	0022NF2018/MY	MY	AMPRI	High performance glossy finish green hybrid composites with variable density and an improved process for making thereof	AsokanPappu, Gupta Manoj Kumar, Mishra Alka, Peters Edward, Kulshresthth Ajay, Rathore Sanjai Kumar Singh, Srivastava Avanish Kumar	---	02-Nov-2020	PI 2020005714	IF	01-May-2024	MY-202509-A
2	0030NF2020/US	US	AMPRI	Bidirectional, Linear and Binary, Segmented Antagonistic Servo mechanism-based Shape Memory Alloy (SMA) Actuator	Bhargaw Hari Narayan, Joshi Tilak Chandra, Hashmi Syed Azhar Rasheed, Srivastava Avanish Kumar, John Pretesh	---	20-Oct-2023	18/491436	IF	19-Nov-2024	12146477
3	0022NF2018/US	US	AMPRI	High performance glossy finish green hybrid composites with variable	AsokanPappu, Gupta Manoj Kumar, Mishra	---	01-Nov-2020	17/052193	IF	18-Feb-2025	12227458

				density and an improved process for making thereof	Alka, Peters Edward, Kulshresthth Ajay, Rathore Sanjai Kumar Singh, Srivastava Avanish Kumar						

Designs: Filed or Registered

SNo	Lab	Ref NO	Title	Inventor	Application No	Date of Filing	Registration No	Date of Registration	Lab Ref No
1	AMPRI	001DN2025	A New Dual Hybrid interlocking Half-Circular Structure Design		444532-001	10-Jan-2025	---	---	IP/SVD1/2025

Research Publications

1. K. Krishnamoorthy, P. Pazhamalai, R. Swaminathan, V.Mohan, Sang-Jae Kim, Unravelling the Bi-Functional Electrocatalytic Properties of $\{Mo_{72}Fe_{30}\}$ Polyoxometalate Nanostructures for Overall Water Splitting Using Scanning Electrochemical Microscope and Electrochemical Gating Methods**,** **Advanced Science**, First published: 12 April 2024. https://doi.org/10.1002/advs.202401073. IF:14.3.

2. S. Ghotia, T. Rimza, S. Singh, N. Dwivedi, A. K. Srivastava and P. Kumar, Hetero-atom doped graphene for marvellous hydrogen storage: unveiling recent advances and future pathways, **Journal of Materials Chemistry A**, 12, 12325, 2024.IF:10.7.

3. R. Dash, R. N. Sahoo, G. Pattnaik, , A. K. Sarangi, V. Kandi, S.Mishra,; S.Verma,, R. K. Mohapatra, An open call for nano-based therapy to address COVID-19 and oncological clinical conditions, **International Journal of Surgery**, 110(4), 2430, 2024.IF:12.5

4. P. Dutta, S. K. Deb, A. Patra, G. M. Karim, A. Majumder, P.Kumar, P.K.Iyer, N. Padma, U. N. Maiti, Activating Ion Channels in Collapsed Hydrogel Derived Densified MXene Films with Cellulose Nanofibers to Overcome the Areal Versus Volumetric Capacitance Trade-Off**,** **Nano-Micro small**, First published: April 2024, https://doi.org/10.1002/smll.202400119.IF:13.

5. K. Chaturvedi, M. Dhangar, A.Jaiswal, A. K. Srivastava, The uniqueness of flexible and mouldable thermal insulation materials in thermal protection systems—A comprehensive review, **Canadian Journal of Chemical Engineering**, 102 , 3372, 2024. https://doi.org/10.1002/cjce.25278. IF:1.6.

6. N. Siraj, S. A. R. Hashmi & S.Verma, Influence of modified halloysite nanotube on the properties of poly(ether ether ketone), **Journal of Materials Research**, 2024 . https://doi.org/10.1557/s43578-024-01351-3. IF: 2.7.

7. M. Devi, S. Tomer, P. Pathi and Vandana, Effect of films thickness and hydrogen annealing on passivation performance of plasma ALD based Hafnium oxide films, **Physica Scripta**, 99, 055969, 2024. IF:2.6.

8. V. K. Mariappan, K. Krishnamoorthy, P.Pazhamalai, R. Swaminathan, Sang-Jae Kim, Stimulus of Work Function on Electron Transfer Process of Intermetallic Nickel–Antimonide Toward Bifunctional Electrocatalyst for Overall Water Splitting, **Nano-Micro small**, 2402355, 2024. DOI: 10.1002/smll.202402355. IF:13.

9. N. Ram, J.Kaarthik, S. Singh , H. Palneedi , P. D. Prasad , A.Venkateswarlu, Boosting energy harvesting of fully flexible magnetoelectric composites of PVDF-AlN and NiO-decorated carbon nanofibers, **Ceramics International**, 50, 17465, 2024. IF:5.1.

10. V.K. Patle, Y Mehta, and R. Kumar,Nickel and iron nanoparticles decorated carbon fibers reinforced phenolic resin-based carbon composites foam for excellent electromagnetic interference shielding, **Diamond and Related Material, 145, 111069, 2024. IF:4.3.**

11. V.P. Singh, G.K Gupta, & S. Mishra, Microstructural Evolution and Mechanical Properties of Multi-layered Aluminum Alloy 6061 Processed by Accumulative Roll Bonding, **Journal of Materials Engineering and Performance**, (2024). https://doi.org/10.1007/s11665-024-09675-1. IF: 2.2.

12. S.Patel, S. Gupta, H.Saket, K. Bakna, S.S.Patel,S. Kumar, V. R. Rao and R. K.Mandava, Effect of infill pattern on the mechanical properties of PLA and ABS specimens prepared by FDM 3D printing, **Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering**, First published online June 11, 2024, https://doi.org/10.1177/09544089241258744. IF:2.3

13. A. Parihar, P. Sharma, N.K.Choudhary, R.Khan, E. Mostafavi, Internet-of-things-integrated molecularly imprinted polymer-based electrochemical nano-sensors for pesticide detection in the environment and food products, **Environmental Pollution**, 351,124029, 2024. IF: 7.6.

14. Shweta, V. Singh, V.Singh, S. Yarramaneni, M. Ashiq, K.Kumar, P. Gautam & A. Kumar, Photocatalytic Activity of MWCNT-Reinforced MoS2 Nanosheets, **Journal of Electronic Materials**, 53, 5193, 2024. https://doi.org/10.1007/s11664-024-11187-6.IF: 2.2.

15. S.K. Gupta, J. Vishwakarma, A.K. Srivastava, C. Dhand , N. Dwivedi, Aluminum batteries: Opportunities and challenges, **Energy Storage Materials**, 70, 103538, 2024. IF 18.9

16. K. Kumar, M Shafeeq M, P. Kumar, R. Munjal, S. Mukhopadhyay, D. P. Mondal, M.A. Khan, Vandana, Detection of water pollutants using super-hydrophobic porous silicon-based SERS substrates**, Microchimica Acta,** 191, 357,2024. IF:5.4.

17. S.Mehra, Mamta, J.Tawale, G.Gupta, V.N. Singh, A.K. Srivastava, S.N.Sharma, Evaluating Pb-based and Pb-free Halide Perovskites for Solar-Cell Applications: A Simulation Study, **Heliyon** 10, e33243,2024. IF:3.4.

18. C Sharma, A K Srivastava, and M K Gupta, Li Doping-Mediated Ultrahigh Current Generation from Flexible 2D MoS_2 Nanosheets-Based Nanogenerators, **Energy Technology Generation, Conversion, Storage, Distribution,** 12 , 2301315, 2024.IF:3.6

19. A. Das , N. Sathish , M. Ashiq , D. Qiu , R. Das, Role of scan parameters on mechanical and wear properties of additively manufactured graphene-reinforced austenitic stainless steel 316L composites,**Materials Chemistry and Physics,** 319, 129309, 2024.IF:4.3

20. A. Singh , S. S. Bhadauri, A.A.Thakare, A. Kumar, M.Mudgal, S. Chaudhary, Durability assessment of mechanochemically activated geopolymer concrete with a low molarity alkali solution, **Case Studies in Construction Materials**, 20, e02715,2024, July 2024.IF:6.5.

21. S.Pandey, S.Mishra, A review of sensing technologies for arsenic detection in drinking water, **International Journal of Environmental Science and Technology**, 2024. https://doi.org/10.1007/s13762-024-05912-1.IF: 3.0

22. R. Raj, A.Pandey, G.Gupta, S. Sriram, N. Prasanth, Venkat Chilla & D. P. Mondal, Effect of Kevlar and Carbon Fiber Face Sheet on the Deformation Behavior of Aluminum Hybrid Composite Foam Core Sandwich Panel under Flexural Loading, **Journal of Materials Engineering and Performance**, 2024. https://doi.org/10.1007/s11665-024-09698-8. IF: 2.2.

23. S.Sathaiah, L. Singh, N. R. Gorhe, T. C. Joshi, A. Pandey, A. N. Ch. Venkat, G. K. Gupta, L.M. Joshi, K. K. Saxena & D. P. Mondal, Effect of Compaction Pressure on Microstructural, Mechanical, and Thermal Properties of Aluminum Foams Processed through

Space-Holder Technique, **Journal of Materials Engineering and Performance**, 34, 6362, 2024.https://doi.org/10.1007/s11665-024-09614-0. IF:2.2.

24. B. Kaur, P. Rana, P. Singh, A. Singh, V. Chaudhary, S. Kaya, Quyet Van Le, Van - Huy Nguyen, P. Raizada, Unveiling new horizons of progress on manipulating the structure and characterization of phosphate-modified polymer for selective uranium adsorption, **Coordination Chemistry Reviews**, 518, 216057, 2024.IF: 20.3.

25. P.K.Goyal M.Mudgal, M and PK Ghosh, Assessing the viability of using BOF steel slag treated with tartaric acid as coarse aggregate in concrete**, Construction and Building Materials,** 436, 136912, 2024.IF:7.4.

26. V. Soni, D.A. Dinh, K. Poonia, R. Kumar, P. Singh, V. K. Ponnusamy, R.Selvasembian, A. Singh, V. Chaudhary, S. Thakur, L. H.Nguyen, Lan-Anh Phan Thi, Van-Huy Nguyen, P. Raizada, Upcycling of polyethylene terephthalate (PET) plastic wastes into carbon-based nanomaterials: Current status and future perspectives, **European Polymer Journal**, 215, 113249, 2024. IF:5.8

27. P. Bharti, S. Jaiswal, R.Kumar, P. Kumar, M. Shafeeq M, A. K. Khare C. Dhand, N. Dwivedi, Large control of friction and wear enabled by Ti 3 AlC2 MAX- multilayer graphene-polydopamine composites, **FlatChem**, 46, 100671, 2024.IF:5.9.

28. N. Ul Haq, L. Ali , P. Pazhamalai , K. Krishnamoorthy , V. Natraj , Sang-Jae Kim, One fell swoop strategized bipolar energy device for triboelectric energy harvesting and electrochemical energy storage, **Sustainable Materials and Technologies**, 40, e00908, 2024.IF:8.7.

29. S.Ghotia, P.Kumar, & A.K. Srivastava, A review on 2D materials: unveiling next-generation hydrogen storage solutions, advancements and prospects, **Journal of Materials Science**, 2024. https://doi.org/10.1007/s10853-024-10054-3 IF: 3.5.

30. S.Sahoo, V.Natraj, R. Swaminathan, P. Pazhamalai, K.Krishnamoorthy, S.-J. Kim, High-Performance Piezoelectric Nanogenerator and Self-Charging Photo Power Cell Using Hexagonal Boron Nitride Nanoflakes and PVDF Composite **Advanced Engineering Materials**, 2400658. 2024.IF:3.4

31. S. K. Srivastava, J.Elambasseril, M.K. Gupta, G. K.Gupta, S. Badatya, Uthra B, T. C. Joshi, M.Brandt and Ma Qian, Spray Fluidized Bed Assisted Flexible Robust Lightweight Hollow Metallic Sphere Based Triboelectric Nanogenerator **ACS Applied Electronic Materials**, August 2024. https://doi.org/10.1021/acsaelm.4c01010. IF:4.4

32. V. Parmar, ; P. Padmakaran, and MA Khan, Exploring Pet coke Fly Ash Characteristics for Wider Application as Cement-Based Composites, **Journal of Scientific & Industrial Research**, 83 , 845, 2024. IF: 0.8.

33. N. Singh, M. Goswami, N. Sathish and S. KumarEngineering the Hot-Spots in Au-Ag Alloy Nanoparticles through Meniscus-Confined 3D Printing for Microplastic Detection, 3D Printing for Microplastic Detection, ,**ACS Applied Materials & Interfaces**, 16, 44830, 2024. IF:8.5

34. S.Singh, H.N Bhargaw, M. Jadhav, P.John, A comparative analysis between deep neural network-based 1D-CNN and LSTM models to harness the self-sensing property of the shape memory alloy wire actuator for position estimation, **Smart Materials and Structures,** 33 , 085045, 2024.IF:3.7

35. M. R. Jadhav, Samarth Singh, P. John, H. N. Bhargaw, and D. K. Rajak, Advancements and recent trends in shape memory alloy actuators: Position control and emerging applications, *Int. J. Dyn. Control*, 13(3), 114, 2025. IF:1.9

36. Mahendra R Jadhav, PR Wankhede, S.Srivastava, H.N Bhargaw, S.Singh, Breath-based biosensors and system development for non-invasive detection of diabetes: A review, Diabetes and Metabolic Syndrome, **Clinical Research and Reviews**, 18 (1), 102931, 2024. https://doi.org/10.1016/j.dsx.2023.102931 (23-24) .IF:3.4.

37. N. Bisht , M. Patel , D P Mondal , A. K. Srivastava , N. Dwivedi , C. Dhand , Comparative performance analysis of mussel-inspired polydopamine, polynorepinephrine, and poly-α-methyl norepinephrine in electrochemical biosensors**, Microchimica Acta,** 191, 456, 2024. IF:5.4

38. S. Nema, M. Patel, S. Jaiswal, C. Dhand, N Dwivedi, Polydopamine modified Ti3AlC2 3 AlC 2 MAX phase promotes electrochemical metal detection, **Surfaces and Interface,** 51,104752, 2024.IF:5.7

39. R.Paulose, V.Agrawal, R.Arya , A. Bijanu, G. Rajak, P.K.Nair, D. Mishra, M. A. Khan A. Bhisikar, U. Singh, P. Mondi, J. Pendam, A.K. Srivastava, ST Salammal, Red mud and bismuth oxide based X-ray shielding tiles for upcoming hospitals: A comprehensive study on phase quantification and physical properties, **Construction and Building Materials,** 439, 137414, 2024. IF:7.4

40. V. Mohan, P. Pazhamalai, K. Krishnamoorthy, , S.J. Kim, Free-standing graphene oxide/carboxymethyl cellulose paper-based triboelectric nanogenerator for self-powered motion sensor, **Surfaces and Interfaces,** 51, 104553, 2024. IF:5.7

41. A. Parihar, P Vishwakarma and R. Khan, Miniaturized MXene-based electrochemical biosensors for virus detection, **Bioelectrochemistry** 158, 108700, 2024. IF:4.8.

42. S.K. Ojha, Kamlesh, S. Tiwari, M. Mudgal, P.Raizada, P.Singh& A. Singh, Electrodeposited Ni-Se on recycled steel substrate as eco-friendly electrodes with enhanced electrocatalytic activity towards urea oxidation reaction, **Journal of Applied Electrochemistry** 2024. https://doi.org/10.1007/s10800-024-02195-9.IF:2.4

43. V. Natraj, V. Mohan, P. Pazhamalai, K. Krishnamoorthy, Sang-Jae Kim, Unveiling the energy-harnessing properties of free-standing Lithium Niobate/PVDF nanocomposite film toward biomechanical and wave energy harvesting, **Surfaces and Interfaces**, 53, 105031, 2024. IF:5.7

44. S Agarwal, DK Dwivedi, P. Lohia, M.K. Gupta, Yttrium-induced tunable bandgap for optical data storage applications,**RSC Advances,** 14,.29812, 2024. IF:3.9

45. J. Vishwakarma, S. Jaiswal, S. K. Gupta, N. Gorhe, D. K. Rajak, N. Prasanth, R. J. Yeo, C.Dhand**,** N. Dwivedi**,** Synergies of Nanocopper and Graphene as Cofillers in a Shape-Memory Polyurethane, **ACS Applied Polymer Materials**, 6 , 11070, 2024.IF:4.5.

46. S. Sharma, M.K. Gupta, and V.K. Singh, Observation of band gap enhancement and green-yellow emission of thermally stable MXene nanosheets**, Optical Materials**, 155, 115780 2024.IF:3.8

47. K.Sharma , S.Sonu , A. Sudhaik , T. Ahamad , S. Kaya , S. Thakur , Quyet Van Le, Van-Huy Nguyen, A. Singh , Lan uong Nguyen, P.Singh , P. Raizada, Mechanistic insights into the reaction pathway for efficient cationic dye photocatalytic degradation and the importance of the enhanced charge isolation over dual Z-scheme CeO_2/BiOCl/Ag_2WO_4 photocatalyst, **Journal of Water Process Engineering**, 66, 105918, 2024. IF:6.3.

48. N.Siraj, SAR Hashmi, S. Verma, Synergistic effects of graphene nanoparticles on the thermomechanical properties of PEEK-HNTs nanocomposites, **Journal of Thermoplastic Composite Materials**, 2024. DOI:10.1177/08927057241289918. IF:3.6

49. Kamlesh, P Aggarwal, M. Mudgal, A. K. Srivastava, P. Raizada, P. Singh, A. Paul, A.Singh, Electrochemistry of Nickelocene-Ferrocene Organometallic Complexes for Electrodeposition of Nickel–Iron–Based Nanostructured Film under Ambient Conditions for Oxygen Evolution Reaction**,ACS Applied Nano Materials**, 7, 24455 2024. IF:5.3

50. P.Ranjan, R. Khan, Impedimetric Biosensor of Silver Molybdate Anchored on rGO Sheet for Detection of Breast Cancer Mucin-1 Biomarker, **ChemistrySelect**, 9, e202403162, 2024. IF: 1.9.

51. S. Singhai, R.Singh, H K Sardana, A. Madhukar, Factors Influencing the Performance of Technology Commercialization in the Context of PFROs: a SEM based Approach, **Journal of Scientific & Industrial Research**, 83, 1114, 2024. IF:0.8.

52. SkRezaul Karim, G.F. Ansari, S. Kumar, S. Natarajan, M.Mudgal, M. Ashiq, Structural, thermal and X-ray photoelectron spectroscopic properties of boro-tellurite based quaternary glass system, **Optical Materials**, 156,115989, 2024.IF:3.8

53. R.J. Bani, K. Ravi, K.B. Patel, R.Patidar, B. Parmar, A.V.Biradar, D.N. Srivastava,G.R.Bhad Iron nanoparticle engineered N-doped graphitic carbon composite as a binary electrocatalyst for overall water splitting and supercapacitor, **International Journal of Hydrogen Energy**,88, 163,2024. IF:8.1

54. N. Bisht, S. Jaiswal, J.Vishwakarma, S. K. Gupta, R. J. Yeo, S.K.R.S. Sankaranarayanan, C. Dhand, N. Dwivedi, Mxene enhanced Shape Memory Polymer Composites: The rise of MXenes as fillers for stimuli-responsive materials, **Chemical Engineering Journal,** 498,155154, 2024**.** IF:13.4

55. B.Kaur, V. Soni, R. Kumar, P. Singh, R. Selvasembian, A. Singh, S. Thakur, A. A. P. Khan , S. Kaya , L.H.Nguyen, Van-Huy Nguyen , P. RaizadaRecent advances in manipulating strategies of NH2-functionalized metallic organic frameworks-based heterojunction photocatalysts for the sustainable mitigation of various pollutants, **Environmental Research**, 259, 119575, 2024.IF:7.7

56. Y. Budania., M. Chauhan, S. Mishra, S.Singh, N/NiO-ornated graphitic fiber-engrained micro-carbon beads: Innovative packed bed type capacitive electrodes for microbial fuel cells, **Chemical Engineering Journal**, 499, 156018, 2024.IF:13.4.

57. J.K. Tiwari , V.K. Singh , T.Anwer , M.Ashiq , M. Amirthalingam, Investigation of micro structure and thermal expansion behaviour of a functionally graded YSZ/IN718 composite produced by laser-powder bed fusion, **Journal of Alloys and Compounds**, 1005, 175947, 2024. IF:5.8

58. .K. Yadav, A. Singhwane, M. Milli, N. Gorhe, A. K. Srivastava & S. Verma, Shape memory polymers as new advanced loss circulation materials for drilling applications. **Polymer Bulletin**, 81, 15293, 2024. IF:3.1

59. P. Pazhamalai, P.K.Krishnamoorthy, V. Natraj, V. Mohan, J. Chennakrishnan, Sang -Jae Kim, Unveiling the bi-functional electrocatalytic properties of rhenium di-sulfide nanostructures towards the development of high-rate alkaline water electrolyzer, **Chemical Engineering Journal**, 500, 156356, 2024.IF:13.4

60. S. Patidar, S. Mishra and M. Ashiq, Study on Mechanical Properties and Corrosion Behaviour of Graphene-Reinforced AlSi10Mg Composite Manufactured by Additively L-PBF Technique, **Journal of Materials Engineering and Performance**, 2024. DOI https://doi.org/10.1007/s11665-024-10283-2. IF: 2.2

61. S. Kumar , R. Sharma, S. Dubey , M.Gupta , S. Natarajan , S. Kumar, Engineering the mass transport properties in potassium-ion intercalated pristine Prussian blue for sustainable potassium-ion batteries, **Journal of Power Sources,** 623, 235408, 2024. IF:8.1

62. R. M. Saha , K. Banerjee , A. Banerjee, N. Gayathri, G. Pramanik , T.S. Shabi, V. Agrawal, B. Satpati, S. Jana , S. Hazra, Investigation of spitting effect in the boron target preparation using vapour deposition technique, **Vacuum**, 230, 113642, 2024.IF:3.8.

63. Z. Zaidi, Kamlesh, Y. Gupta, S. Singhai, M.Mudgal &**A. Singh,** Emerging trends in research and development on earth abundant materials for ammonia degradation coupled with H_2 generation, **Science and Technology of Advanced Materials**, 25, 2301423, 2024.IF:7.4.

64. J.Vishwakarma, S. Jaiswal, C. Dhand, R.J. Yeo, Hui Ru Tan, R.Kumar, P. Kumar, N. Singh, A.Mishra, A.Naik, A. K. Srivastava & N. Dwivedi, High-performance shape-memory-polymer (SMP) composites via optimization of multidimensional graphitic-carbon fillers and development of heat-fire-and-smoke alarm devices using SMP composites, **Advanced Composites and Hybrid Materials**, 7, 203, 2024. IF:23.2

65. A. Kumar, S. Tomer, Vandana, T. Fix, M. Dutta, S. K. Srivastava and P. Pathi, Oxygen-mediated defect evolution and interface analysis of MoO_x/n-Si devices,**Journal of Physics D: Applied Physics,** 57, 505105, 2024.IF:3.1.

66. K. Yadav, K. Chaturvedi, A. Singhwane, A. K. Srivastava, S. Verma, Single step synthesis of gadolinium oxide nanorods decorated graphene oxide nanocomposites as promising bactericidal agents for the biomedical sector, **Inorganic Chemistry Communications**, **171**, 113562, 2025.IF4.4.

67. .A. Sharma ·, R. Kumar ·, N. Dwivedi ·, G.Gupta , A.K. Srivastava , D.P. Mondal ,Electroplating of silver on graphene-modified carbon foam for high thermal conductivity and outstanding electromagnetic interference shielding performance, **Journal of Alloys and Compounds**, **1010**, 177080, 2025. IF:5.8

68. A Menon, D K Rajak, and D K Singh, High entropy alloys: Next-generation material for space exploration, **Materials Chemistry and Physics**, **329**, 130091, 2025. IF: 4.3

69. A. Parihar, P. Vishwakarma c, P. Prajapati c, R. Khan, Non-invasive ultra-sensitive detection of breast cancer biomarker using cerium nanoparticle functionalized graphene oxide enabled impedimetric aptasensor**, Biosensors and Bioelectronics, 268, 116925, 2025.** IF:10.7.

70. R. Devapati, A.A. Sinha, D. P. Mondal & S. K. Khanna, Effect of High Strain Rate and Temperature on the Mechanical Response of Graphene-Reinforced Aluminum Foam, **Journal of Materials Engineering and Performance** (2025). https://doi.org/10.1007/s11665-024-10543-1.IF:2.2

71. A. Khan, S. Mishra, S. Pandey, T. Sardar, A. Mishra, M. Mudgal, and S. Singhai, A Critical Review of IoT-Based Structural Health Monitoring for Dams, **IEEE Internet of Things Journal**, 12, 1368, 2025.IF:8.2

72. C.S.Chitransh, S.Saxena, Fracture Mechanics Based Determination of Initiation Fracture Toughness (KIC) of Al-MMC Using Experimental, Analytical and Numerical Techniques, **International Journal of Metal Casting**, 2025 DOI:10.1007/s40962-025-01546-2. IF:2.6.

73. N. Bisht, J.Vishwakarma, S.Jaiswal, P. Roy, A. K. Srivastava, C. Dhand, ,N .Dwivedi, Synergizing chemistry: unveiling the potential of hybrid fillers for enhanced performance in shape.memorypolymers, **Advanced Composites and Hybrid Materials**, 8, 7, 2025, DOI https://doi.org/10.1007/s42114-024-01059-2. IF:23.2.

74. S. Tomar, R. Gupta, A. Singh, S. T. Salammal , D.K. Kashyap, M. A. Khan , D. Mishra, Mechanochemically activated, durable, corrosion protective, advanced geopolymer material, containing gamma-Al2O3 and zinc phosphate, **Materials Today Communications**, 43, 111722, 2025.IF:3.7.

75. A.K. Shukla, D.P. Mondal,M. Dileep, J. D. Majumdar, Studies on AluminumCenosphere Composite Foam Developed by Plasma-Spray-Assisted Additive Manufacturing, **Journal of Materials Engineering and Performance** (2025). DOI: https://doi.org/10.1007/s11665-025-10739-z.IF: 2.2

76. N. R. Gorhe, S. Sathaiah, L. M. Joshi, T. C. Joshi & D. P.Mondal, Effect of Graphene Nanoplatelet Reinforcement on the Compressive and Thermal Performance of Copper Composite Foams Fabricated using Space-Holder Technique. **Journal of Materials Engineering and Performance** (March 2025) https://doi.org/10.1007/s11665-025-10926-y. I.F. 2.2.

77. R. Karim Sk , M. Ashiq, Hazardous-free alternatives for radiation shielding in medical diagnostics: BaO-doped TeO2-ZnO-CaO-B2O3 glass system, **Journal of Alloys and Compounds**, 1020, 179451, 2025. IF: 5.8

78. A Ali, M Ahmed, M Soni, S Kumar KSGavel , V Chilla, Effect of bridge wire material on electro-hydraulic forming of AA5754 sheet metal, **The CanadianJournal of Metallurgy and Materials Science**, 2025. https://doi.org/10.1080/00084433.2025.2471615. IF:1.4.

79. N. Bisht, J.Vishwakarma, S. Jaiswal, Shivani, K.K. Patel A. Mishra, A.K. Srivastava, C. Dhand, N. Dwivedi, Shape memory polymer coatings for smart and sustainable systems, **Materials Today Chemistry**, 45, 102607, 2025. IF:6.7

80. A. Bhargav, M. Ahmed, K. Gavel, M. Lodhe, Evaluation of Joint Strength and Process Parameters in Aluminium-Stainless Steel by Electromagnetic Pulse Welding, **Experimental Techniques** (2025). https://doi.org/10.1007/s40799-025-00787-4. IF 1.9.

81. P.Rajguru, K.D.Dihingia , A Konwar, P Bora , C. Bhuyan , S. Saha , G. N. Sastry , S. Hazarika, Carbon nanotube/Fe2O3 nanocomposites for optimizing membrane-based separation of antibiotics: Experimental and computational approach, **Materials Today Communications**, 45, 111951,2025.IF: 3.7.

82. M. Goswami, S. Yadav, L. Atram, S.Kumar, S. Kumar, N.Singh, H. Siddiqui, N. Sathish, A. A. Khan, A. Tripathy, P. Bhardwaj, P. Kumar, M. A. Khan, A.K. Srivastava, M. S. Santosh, S.

Kumar, Zero-waste hydrogen production using Ga-In activated aluminium composites for pressurized sea water desalination, **Chemical Engineering Science**, 306, 121300, 2025. IF:4.1

83. D. K. Kashyap, A. K. Chaturvedi, A. Pappu, A.K. Srivastava, M. K. Gupta, Hydrophobic Fully Wearable Piezoelectric WS_2 Quantum Dot-Polyaniline-Based Nanogenerator, ***ACS* Applied Electronic Materials**, 2025, 7, 3090−3103. IF:4.7

84. V. P. Singh, G. K. Gupta & S. Mishra, Evaluation of Microstructure and Mechanical Properties of GO-Reinforced Multilayer Al5052 Composite Fabricated by Accumulative Roll Bonding, JOM **The Journal of The Minerals, Metals & Materials Society** (TMS), (2025). https://doi.org/10.1007/s11837-025-07332-z. IF:2.3.

85. S.Mishra, Y. Budania, A.Tyagi, S.P. Singh, P. Kumar, S. Singh, Copper Oxide Anchored Carbon Nanofibers: A Versatile Platform for Multiplex Detection of Antibiotics, Heavy Metals and Pesticides, **Chemistry An Asian Journal**, 19(10), e202400241, 2024. IF:3.3

86. P.Gopinathan, Afaq Ahmad Khan, Vivek Singh, M. S. Santosh, T. Subramani, Amit Karmakar, Surender Kumar, Md Asif, Om Prakash Kumar, Amiya S. Naik, Pradip K. Banerjee & Prakash K. Sarangi, Photothermal conversion and geochemical characterizationof sulfur-rich lignite for non-conventional energy applications**, Scientific Reports,** 15, 6945 (2025) . IF: 3.9

87. S. Ghotia, S. Banerjee, A. Kumar, N. Dwivedi, A. K. Srivastava and P. Kumar, Palladium-decorated unconventional graphene oxide for unprecedented hydrogen storage,**Journal of Materials Chemistry A**,13, 5621–5631, 2025,IF: 9.5

88. J. Kumar, V. Panchore, D. K. Rajak, T. Joshi, Dynamic Properties and Vibration Response of Polymer Matrix Composites: Mechanisms, Influences, and Applications in Engineering, **Polymers for Advanced Technologies,** 36: e70039, 2025. 3.4.

89. R.Kumar, P. Bharti , R.J. Yeo , Patho,S. G.Pattader, A.K. Srivastava, S.K.R.S. Sankaranaraya nan, C. Dhand, Atomic-to-nanoscale thickness-driven tunable carbon and interface-chemistry immensely control tribo-interface and metal-oxidation, Neeraj Dwivedi, **Carbon**, 233, 119912, 2025. IF:11.6

90. M. Dhangar, K.Chaturvedi, A. K Srivastava, and S. Verma, Synthesis and characterisation of asbestos-free calcium silicate–based thermal insulating material using novel fly ash-based binder**, Advances in Applied Ceramics: Structural, Functional and Bioceramics** 123, (7-8, 2025 IF:1.6 https://doi.org/10.1177/17436753251316

91. S.Singh, C. Bhan, A.Bhaduri, M.K.Gupta, J.Yoon, C.Maiti, J.Singh, B.C. Yadav Self-powered fluoride detection and removal system using waste material utilization and self-healing capabilities**, Materials Today Communications**, 41, 111061, 2024,. IF: 3.7

92. A.K. Khare, M. Sharma, G. K. Gupta M.K. Gupta, N Prasanth, H N Bhargaw, Thermal Conductivity Enhancement of Phase Change Materials Using Metal Wire Woven Porous Structures for Thermal Energy Storage, **Indian Journal of Pure & Applied Physics**, 62, 1074,2024. IF: 0.846

93. V. Parmar, P. Padmakaran , M.A. Khan, Enhancing environmental sustainability through utilization of CFBC ash, **Indian Journal of Engineering & Materials Sciences**, 31, 617, 2024. IF: 0.6

94. P. Kumar Goyal, P. K. Ghosha & M. Mudgal**,** Investigation on effect of fly ash based geopolymeric coated BOF steel slag as coarse aggregate in concrete, **Indian Journal of Engineering & Materials Sciences,** 31, 641, 2024. IF: 0.6

95. P Ranjan, M Abubakar Sadique, S Yadav, R Khan, A.K.Srivastava, Electrochemical Nanobio- Sensor of lonic Liquid Functionalized MoO3- GO for Sensitive Detiction of Carcinoembryonic Antigen, **Chem Plus Chem**, 89, e202300625, 2024. IF- 2.8

96. K.S.Gavel, M.Ahmed, A. Ali, H.N.Bhargaw, S. K.Panthi, A. Bhargav, A novel tool design for magnetic pulse welding of sheet metal using compression coil, Journal of Manufacturing Processes, 144, 261, 2025. https://doi.org/10.1016/j.jmapro.2025.03.111.IF:6.8

97. A Parihar, D.S. Parihar, K.Gaur, N. Arya, V. K. Choubey, R. Khan, 3D Bioprinting for Drug Development and Screening: Recent Trends Towards Personalized Medicine, **Hybrid Advances**, 7,100320, 2024. Cite score 3.9.

98. A Parihar, NK Choudhary, P Sharma, R Khan, A. Gupta, Evaluation of Electrochemical and Antimicrobial Efficacy of Green Synthesized Sliver Functionalized Reduced Graphene Oxide Nanocomposites, **Biomedical Materials & Devices**, 3, 504,2025. Cite score 4.4.

99. K. Chaturvedi, M. Dhangar, M.Mili, A. K.Srivastava & S.Verma, Synthesis and studies of advanced adsorbent zeolites by using red mud and rice husk ash as a thermal insulation agent, **Arabian Journal of Geosciences**, 18(5),105, 2025.

100. K. Chaturvedi, K. Yadav, A. Singhwane, R. Chowdhary, R.K. Mohapatra, A.K. Srivastava & S. Verma, Effect of Graphene Oxide on the Antibacterial, Antioxidant, and Optical Properties of Bismuth Oxide and PVA-Based Hydrogel for the Biomedical Sector, **BioNanoScience**, 15(1), 189, 2025.IF:3.2

Publication in Rajbhasha:

1. अ कु खरे, प्रशांत एन., हरि. एन. भार्गव, गौरव गुप्ता, मोहित शर्मा "धात्विक फोम-जाल एवं संवहन बिधि द्वारा, कार्बनिक अवस्था परिवर्तन पदार्थ के प्रयोग से, अपशिष्ट ऊष्मा का भंडारण – एक शोध" , अनुसंधान सन्देश, खंड 6, अंक 1, 2024, प्रष्ट क्रमांक 4-16

Book Chapters

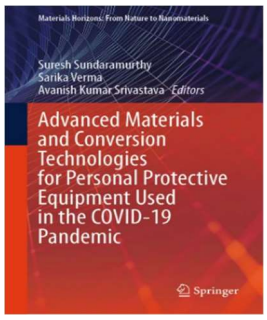
1. A. Parihar, K.Gaur & R. Khan Rapid diagnosticassays for the detection of Alzheimer`s and Parkinson`s diseases. In smart diagnostics for Neurodegenerative disorders (PP. 221-250) 2024, IOP Science.
2. A. Parihar, P. Vishwakarma & R. Khan, Mxenes-based hybrid electrochemical sensors for cancer diagnostics. IN Mxene-based hybrid Nano- Architectures for Environmental remediation and sensor applications (pp. 287-304). 2024, Elsevier.
3. A. Singhal , A.Parihar, V.Khare, G.ripathi & R. Khan, Chemical approaches to remediate heavy metals. Remediation of heavy meatals: SustainableTechnologies and recent advances, 2024,123-147, Wiley online library.
4. A. Parihar, NK Choudhary, R Khan, POCT devices for neurodegenerative disorders: form lab to clinic, Book: Smart diagnostics for Neurodegenerative Disorders, 279-310, 2024, Elsevier.
5. A. Parihar, NK Coudhary, R Khan, current challenges and future perspectives for the development of POCT devices for for neurodegenerative Disorders 311-346,02024, Elsevier.

6. A. Parihar, P Sharma, NK Choudhary, R Khan, Neurobiosensors: novel approaches towards early diagnostics of neurodegenerative Disorders, Smart diagnostics for Neurodegenerative Disorders, 1-38, 2024, Elsevier.
7. P Sharma, A Parihar, R Khan, Sampling methods and biomarkers for early detection of neurodegenerative disorders, Smaert Diagnostics for Neurodegenerative Disorders, 39-59, 2024 Elsevier.
8. A Singhal, R Devi, A Parihar, R Khan , Salivary biomarkers for neurodegenerative disorders for biomedical sensing, Smart Diagnostics for Neurodegenerative Disorders , 61-80, 2024 Elsevier
9. S. Yadav, M.A. Sadique, P. Ranjan, A. Parihar, A. Singhal, N.Kumar, R.Khan, Micro RNA-Based point- of- care devices for diagnosis and prognosis of head and neck cancer, Diagnostic, Prognostic, and Therapeutic Role of MicroRNAs in Head and Neck Cancer 2024, Pages 247-263 Elsevier.
10. M.C.S. Nayak, K. Yadav. Mxene-based 2D Materials for Biosensing. 2025. Title of Book: MXene-Based Emerging 2D Materials for Biomedical Applications. Taylor and Francis.
11. K. Chaturvedi, M.Dhangar, A. K. Srivastava & S.Verma, Environmental, Ethical, and Global Guidelines for Thermal Insulating Materials, Development of Sustainable Thermal Insulators from Waste Materials: A circular economy approach, pp 173-189, Sept 2024 DOI: 10.1007/978-981-97-5444-1_11.
12. A.Singhwane, M. Dhangar, K. Chaturvedi, M. Mili, P. Nair, N. Gohre, M. A.Khan, P. Asokan, A. K. Srivastava & S.Verma,Valorization of Engineered Bamboo-Based Thermal Insulating Building Materials: A Journey from Nature to Nature Protection—A Case Study, Development of Sustainable Thermal Insulators from Waste Materials: A Circular Economy Approach, Pp 149-172, Sept 2024, DOI: 10.1007/978-981-97-5444-1_10.
13. S. Suresh, S. Arisutha, Kamna Chaturvedi & Sarika Verma,Waste Feathers as a Resource, Its Availability, and the Recent Technology in the Production of New Thermal Insulation Materials, Development of Sustainable Thermal Insulators from Waste Materials: A Circular Economy Approach, pp 139-147, Sept 2024, DOI: 10.1007/978-981-97-5444-1_9.
14. A.Jaiswal, A.Singhwane, M.Dhangar, M. I., M. A.Khan, A. K. Srivastava & S.Verma, Textile Waste as a Resource, Its Availability, and the Recent Technology for Its Transformation to Wealth in the Form of Thermal Insulation Material, Development of Sustainable Thermal Insulators from Waste Materials: A Circular Economy Approach, pp 73-81, Sept 2024 DOI: 10.1007/978-981-97-5444-1_5.
15. S.Paul, M. Dhangar, K. Chaturvedi, H.Bajpai, N. Siraj, R. K. Mohapatra, S.Sundaramurthy, S. Arisutha, B.Jethy, B.Naik, M. A. Khan, A. K. Srivastava & S.Verma, State-of-The-Art Review

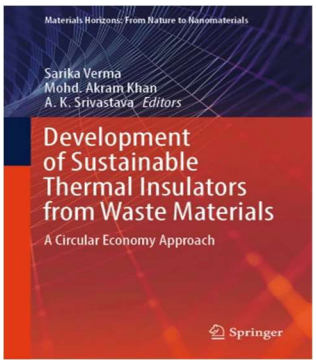
on Efficacy of Various Disinfection Techniques of the Abandoned PPE Waste, Advanced Materials and Conversion Technologies for Personal Protective Equipment Used in the COVID-19 Pandemic, pp 151-178, August 2024. DOI: 10.1007/978-981-97-4692-7_8.

Book Published

1. A Book was editied by Suresh Sundaramurth, Sarika Verma and Avinash Srivastava on Advanced Materials and Conversion Technologies for personal Protective Equipemnt Used in the COVID-19 Pandemic and published online 30 August 2024 by Springer Singapore, https://doi.org/10.1007/978-981-97-4692-7



2.A Book was edited by Sarika Verma, Mohd. Akram Khan, Avinash Srivastava on Development of Sustainable Thermal Insulators from waste materails A circular economy approach, Sep 2024 by publisher Springer Singapore DOI: https://doi.org/10.1007/978-981-97-5444-1



Book Editing

Dr. M. Chandra Shekhar Nayak edited a book “Futuristic Trends in Chemical Material Sciences & Nano Technology”, Volume 3, ISBN: 978-93-6252-591-8, under the Iterative International Publishers (IIP) series, Bangalore.

R & D Activities

Industrial Waste Utilization, Nano- and Bio-Materials Division

Investigating the Leachability Studies of Ferro-Molybdenum Slag generated at M/s Boon Metal Corporation, GIDC Sarigam, Valsad, Gujarat

The main objective of the project proposal is to investigate physico-chemical, mineralogical, morphological and leachability characteristics of ferro-molybdenum slag. Based on the characterization, suggestion of possible application of utilization of ferro-molybdenum slag as materials like bricks, blocks, pavers etc. The study aims to utilize ferro-molybdenum slag in a scientific and environment friendly manner that shall be beneficial to the industry.

Team of Scientists and Research Fellows from CSIR-AMPRI, Bhopal visited site during 1-3rd March 2024 for the Kick-off meeting with senior officials of the industry followed by sample collection. Around 200Kg of ferro-molybdenum slag samples and other raw materials used in smelting process were collected from M/s Boon Metal & Alloys Corporation and brought to CSIR-AMPRI, Bhopal. The detailed physico-chemical characterization including mineralogical, morphological and leachability studies were carried out. Based on the characterization the slag samples were crushed, pulverized and underwent sieve analysis test to compare it properties with the aggregates. Further, the processed slag samples were used for preparation of mortar samples, pavers block and some other precast building material. The testing of developed material are in progress.

Site Visit at M/s Boon Metal & Alloys Corporation, GIDC Sarigam, Valsad, Gujarat

Kick-off meeting with Senior Officials at M/s Boon Metal & Alloys Corp., GIDC Sarigam, Valsad, Gujarat

-Molybdenum at Industrial Site

Fe-Mo Slag observation after Jaw Crushing.

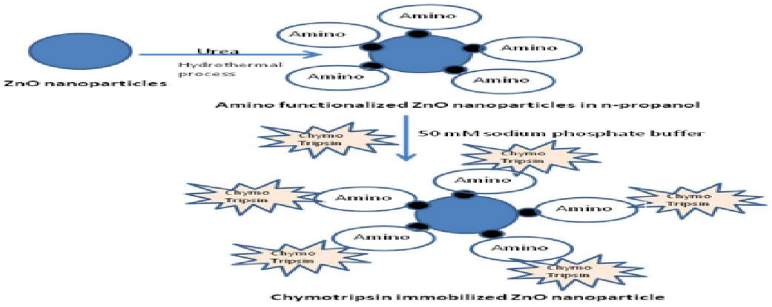
Interlockable Gamma and Neutron Shielding Bricks Developed Using Red Mud

CSIR-AMPRI has converted red mud into interlockable gamma and neutron shielding bricks (190mm x90mm x 90mm). Red mud is an underutilized noxious alumina industry waste, which is rich in Fe_2O_3 (35-55%) that is suitable for radiation shielding applications. The developed bricks are interlockable and prevents radiation streaming through the joints. The R50 curvature was found to be optimum. The developed bricks possess >50% attenuation of lead at 1.33 MeV and similar neutron attenuation like high density polyethylene (HDPE). As it attenuate both the gamma rays and neutron, it can be used to build X-ray diagnosis rooms, cancer treatment bunkers, sterilization plants, particle accelerators, nuclear reactors, hot cells, etc. This novel and economically viable shield developed using alumina industry waste is expected to place an important milestone in global market in another 3-4 years as an alternative to toxic lead and heavy weight concrete.

Interlockable gamma and neutron shielding bricks.

Development of antiviral and antimicrobial textile based Personal Protective equipment (PPE) using polymer nanocomposites with metal and metal oxide nanoparticles immobilized proteolytic enzymes

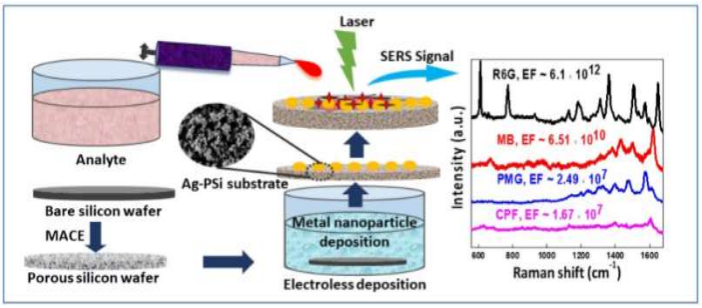
The project aims to create super hydrophobic antiviral and antimicrobial hybrid nanocoatings on fiber-based PPEs, particularly protective masks and gowns. The project will use nanoparticles and enzymes with proven antiviral and antimicrobial activity, disperse hybrid nanoparticles in polymer matrices, and characterize the treated textiles. The project will also test the antimicrobial properties and cytotoxicity of the new hybrid NPs-based fiber-based PPEs. The antimicrobial textiles will be evaluated through physical, chemical, mechanical, and morphological properties, as well as antiviral and anti-inflammatory activity measurements.



Schematic representation of enzyme immobilasation on amonio modified ZnOnaoparticles

Development of super-hydrophobic porous Silicon-based SERS substrates for detection of water pollutants detection

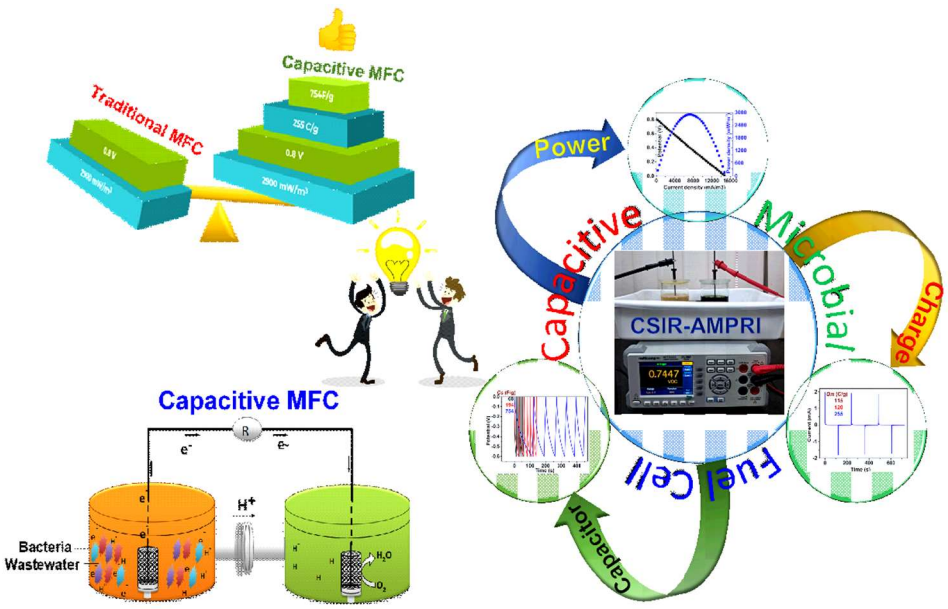
Super hydrophobic porous silicon surface is prepared using wet chemical synthesis route. Scanning electron microscopic investigation confirms a correlation between pore size and reaction time. SERS substrates exhibit excellent characteristics in terms of sensitivity, reproducibility, stability, and uniformity. They could detect rhodamine 6G in femtomolar range with good enhancement factor. Molecule-specific sensing of water pollutants such as methylene blue, glyphosate and chlorpyrifos is demonstrated for concentrations well below their permissible limits along with excellent enhancement factors.



Schematic representation of study performed

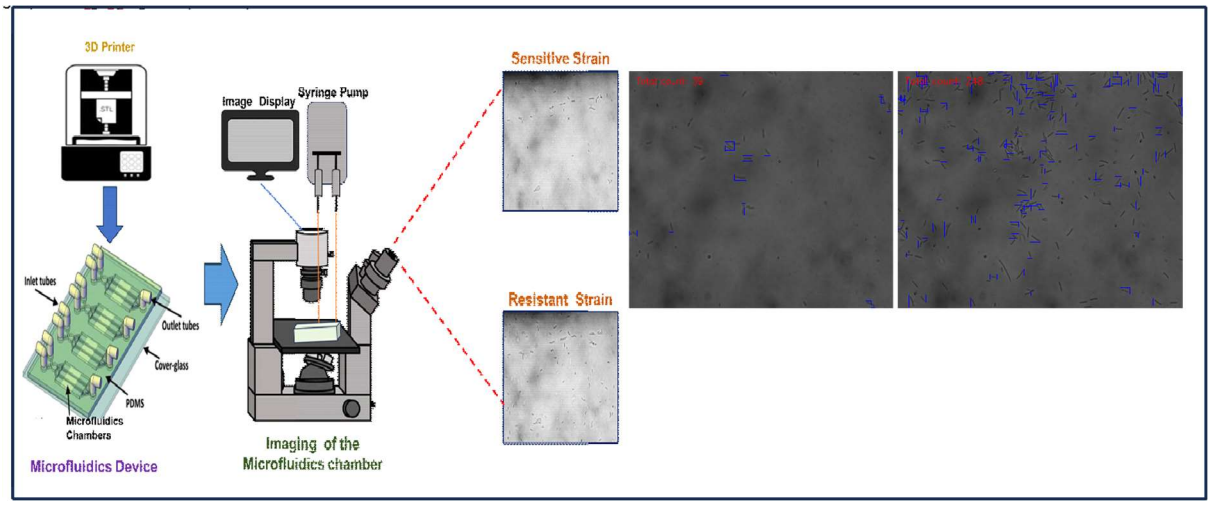
N/NiO-Ornated Graphitic Fiber-Engrained Micro-Carbon Beads: Innovative Packed Bed Type Capacitive Electrodes for Microbial Fuel Cells

Nitrogen-doped nickel oxide-catalyzed carbon nanofiber-decorated micro-carbon beads (NiO-N-CNF/ACB) were synthesized via suspension polymerization and used as capacitive fixed-packed bed electrodes in microbial fuel cells (MFCs) for wastewater treatment and electricity generation. These electrodes offer a large surface area, high biocompatibility, and three-dimensional structure, enhancing catalytic activity and charge storage. The MFCs achieved an open-circuit potential of 0.8 V, a peak power density of 2900 mW/m³, and a 74% chemical oxygen demand reduction. With a specific capacitance of 754 F/g and total charge of 255 C/g, NiO-N-CNF/ACB outperformed plain NiO-ACB and ACB, emerging as a strong candidate for efficient, sustainable MFC applications.



Design and Development of Microfluidics based Device to determine antimicrobial susceptibility directly in clinical samples

The project on Development of microfluidics-based diagnostic assay for determining antimicrobial susceptibility testing with aims to create phenotypic (using microfluidic-based single bacterial culture).The microfluidic technologies for quick AST determination along with the bacterial MIC determination, which can be commercialized and scalable to meet the current demand for AST testing. The developed microfluidic-based AST platform is expected to be utilised as a point-of-care device along with the cost effective, automated which will miniaturize the testing for multiple classes of antibiotics in a more cost-effectively manner. The developed AST device would provide which will help in facilitating timely targeted treatment which will, in turn, prevent the emergence of antimicrobial-resistant strains.



Semi Pilot Demonstration for Conversion of Fly ash and Pond ash into Synthetic Aggregates - An Alternative to River Sand

The use of natural resources to produce raw material threaten environmental conditions. The need for high volume of aggregate may cause reduction of availability of natural aggregates. Concrete needs 60-70% of aggregates (both fine and coarse) in total volume for constructional activities. Fly ash generated from thermal power have high aluminosilicate content for creation of ceramic matrix through geopolymeric sintering. The project envisages bulk utilization of fly ash as well as abandoned pond ash for making value added material (aggregates). The engineered sand as per demand (for plaster, mortar, concrete, flooring, road, pavement) can be manufactured by varying the components and composition of the constituents. The activity for manufacturing fine and course aggregate from coal ash is proposed to be demonstrated in a Semi Pilot scale at CSIR-AMPRI.

Fly Ash Fine Aggregate and Coarse Aggregate

.

Prof. E S Dwarakadasa , CEO & MD of Karnataka Hybrid Micro Devices Ltd and former Professor IISc Bangalore inaugurated newly constructed facility i.e Industrial Waste Synthetic Aggregate Laboratory for setting up of Semipilot plant for manufacturing of Synthetic aggregates from Fly ash (during CSIR foundation day celebrations October 4 2024)

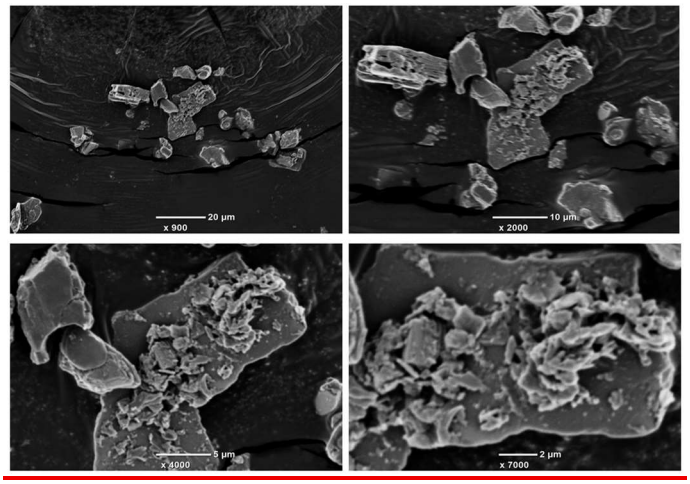
Textile Industry Waste Water Purification using Double Heterojunction Magnetic Nanoparticles

A recyclable and reusable photocatalytic material that can efficiently degrade textile dyes under natural sunlight and UV light source has been successfully synthesized using simple chemical coprecipitation method. The double heterogeneous TiO_2-CdSe-Fe_3O_4 (TCF) photocatalytic nanoparticles has a magnetic core made of Fe_3O_4 and heterogeneously capped with CdSe as middle layer and TiO_2 as outer layer. The average particle size of this TCF heterostructure is 84 nm and exhibits a super paramagnetic nature with magnetic saturation of 5.52 emu/g. The photocatalytic efficiency of the as-synthesized TCF nanoparticle under the irradiation of natural sunlight/UV is analysed using UV-Vis absorption spectroscopy. Methylene blue dye (MB), an organic dye that is carcinogenic but widely used in textile industry is taken as a model pollutant for the photocatalytic analysis. Under natural sunlight, 98.37 % of MB dye removal has been achieved in 210 min by using 50 mg of as-synthesized TCF nanoparticle. The removability of the TiO_2 coated Fe_3O_4 - CdSe nanoparticle is verified using an external magnet and the photocatalyst can be reused with a 99.35 % of colour removal efficiency achieved after 8 number of repeated cycles. Thus, the as-synthesized TCF heterogeneous nanoparticle is proven to be a promising photocatalyst to remove organic dyes in textile industries.

Colour change of dye solution observed under natural sunlight using TCF500C nanophotocatalyst with respect to the time duration (in min). (a) 2 ppm methylene blue (b) 2 ppm rhodamine B dye solution.

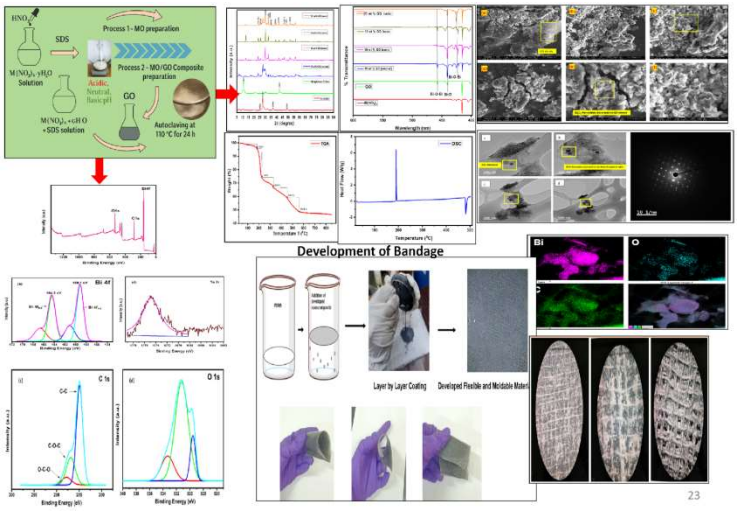
Additive Manufacturing of Emerging 2D Mxene Derived Printed Composite Materials for Electromagnetic Interference Shielding Applications

The present work demonstrates the synthesis, characterization, and additive manufacturing of MXene-based composites. MXenes derived from titanium carbide ($Ti_3C_2T_x$) and molybdenum carbide (Mo_2C_x) were synthesized using both wet and dry methods, followed by HF etching. These materials were further treated with appropriate chemicals etc., to develop various advanced nanocomposites. Comprehensive characterization through XRD, FTIR, SEM/FESEM, and electrochemical analyses confirmed the formation of layered, crystalline composites with excellent interfacial integration. The composites demonstrated enhanced redox behavior, conductivity, and surface area—crucial for EMI shielding and sensing applications. Developing printable MXene-based inks using eco-friendly solvents, such as ethyl acetate and glycerol, followed by fabrication using Direct Ink Writing (DIW), underscores the feasibility of scalable manufacturing. The printed architectures will maintain high structural fidelity, flexibility, and functional performance, making them suitable for wearable electronics, healthcare devices, and aerospace shielding applications. This work will mark a significant advancement in EMI shielding materials by merging the advantages of MXene nanotechnology with additive manufacturing, resulting in lightweight, conductive, and customizable shielding solutions.



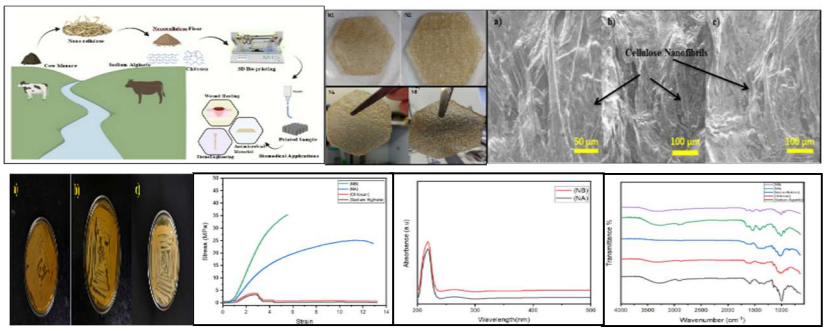
Designing and development of Multifunctional Light Weight Carbon Allotropes Based Nanostructured Material viz, Bandage for Radiation Shielding and Biomedical Applications, DST(Nanotechnology) with AIIMS, Bhopal

The project focuses on the innovative design and development of multifunctional lightweight carbon allotropes-based nanostructured material for various applications, particularly emphasizing radiation shielding and biomedical usage.The material developed is intended to address critical needs in radiation protection and biomedical fields, offering advanced solutions with enhanced performance and versatility.



Development of Carbon Nanofiber Materials From Cow Dung/ Bio-Sludges For Smart Fabric Textile and Selective CO_2/H_2 Energy Storage Applications by 3D Printing technology

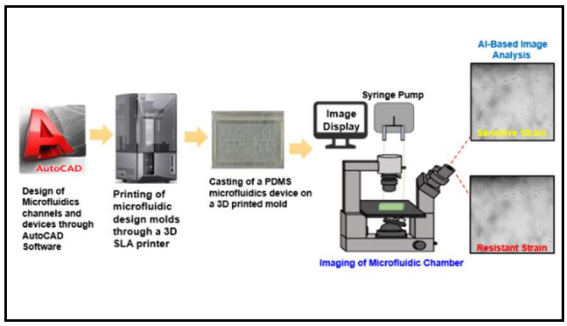
Cow dung is one of the most abundant bio-wastes generated on the earth, and it has been used as a fertilizer, fuel, and for various other purposes. Cow dung/Biosludges have been utilized as raw resource material in this project work. It has been treated appropriately and the cellulosic part was used to develop an advanced material. At the first step, the cellulose, which is a most abundant biopolymers on Earth was prepared by different chemical methods. They are the acid hydrolysis and base hydrolysis method. From cellulose, nano-cellulose was prepared through the ultrasonication process, and finally, CNF-based materials were prepared. Then, the physiochemical properties, morphological study, and other characterizations are examined using various analytical techniques, including SEM, XRD, and Raman analysis. Further, several trials for developing CNF based composite material using appropriate polymer base and raw material and its use in 3D printing are in progress



Design and development of a microfluidics-based device to determine antimicrobial susceptibility directly in clinical samples

In this project, the development and fabrication of a microfluidic device for AST application will provide cost-effective and accurate results, which will help in facilitating timely targeted treatment,

which will, in turn, prevent the emergence of antimicrobial-resistant strains. The developed technique will overcome the limitations of the conventional culture-based AST method, which takes 2-4 days to provide results (high turnaround time). The developed device can be commercialized and scaled to meet the current demand for AST testing. The developed microfluidic-based AST platform is expected to be utilised as a point-of-care device, which will miniaturize the testing for multiple classes of antibiotics more cost-effectively and lead to personalized medications.



Systematic methodology for the design and development of a microfluidics-based device to determine antimicrobial susceptibility directly in clinical samples

Phenome India -CSIR Health Cohort knowledgebase

The objective of this project is to design a comprehensive and clinically relevant personalized risk prediction score for complex metabolic disorders. We will examine the intricate interplay between genetic, environmental, and lifestyle factors that impact each CSIR employee's health profile. By integrating advanced analytical techniques and robust datasets, we aim to identify specific risk indicators that uniquely affect different populations. This initiative will empower healthcare providers to tailor prevention and intervention strategies effectively, ultimately improving patient outcomes in managing metabolic health. To develop a clinically useful personalized risk prediction score for complex metabolic disorders.

Photographs of the second phase of the phenome cohort study in June 2025 at CSIR-AMPRI, New Building

Inauguration of Advanced Laboratory for flexible and mouldable materials

The new Facility /laboratory, namely Advanced Laboratory for flexible and mouldable materials, has been constructed and inaugurated in the presence of Chief Guest Prof. E. S. Dwarakadasa in the Institute under project 4M-FTT- MLP-304, entitled- Up-Scaling & Demonstration of Advanced Brine Sludge-Based Flexible and Mouldable Polymeric Composite Sheets For Circular Economy on 4th Oct 2024.

Inauguration of Advanced Laboratory for flexible and mouldable materials

Advanced Multi-functional Asbestos Free Thermal Insulating Material – A Gizmo for Energy

The project focuses on the development of an advanced multifunctional asbestos-free thermal insulating material utilizing industrial and agricultural waste such as marble waste, rice husk ash (RHA), fly ashAfter several trials, permutations, and combinations of the relevant and appropriate chemical compositions in coherence with the various reaction process parameters like temperature, pressure, duration of ball milling, inert or non-inert environment, etc., weight % of the different raw materials used in the preparation, and applying the pertinent sequential incremental approach, the process is achieved. Several experiments were designed using raw materials for the fabrication of an advanced thermal insulating material. The work involves an initial characterization of raw materials, including fly ash, marble waste, and rice husk ash, among others. Chemical, Physical, thermal, mineralogical, and morphological properties were studied using various sophisticated and complicated techniques, such as XRD, IR, SEM, and TGA. The homogeneous nano-tailored powder was developed by optimizing and analyzing the raw material at various milling times, ranging from 1 hour to 5 hours. Further, the developed homogeneous nano-tailored powder was characterized using various complementary, sophisticated instrumental techniques, including physical and chemical monitoring, morphological analysis, and thermal analysis. Later, it was used to develop asbestos-free insulating materials by applying a desired amount of binder solution in a suitable atmosphere for processing. The work further assessed the physical, chemical, and thermal properties of the materials. The developed material exhibited uniform morphology and remarkable thermal stability, confirming its potential as a sustainable and safe substitute for conventional thermal insulating material. Further, refinements in reaction processing, interpretation of results/work, etc. is being done.

Alloy Composites and Cellular Materials Division

Development of Aluminium hybrid composite foam core sandwich structures for Boot Anti Mine Applications

CSIR- AMPRI is developing aluminium hybrid composite foams reinforced with nano materials. These foams and foam-core structures were evaluated at quasi-static and dynamic loading conditions, and found suitable for impact and blast energy absorption. DMSRDE-DRDO, Kanpur is developing BOOT-ANTIMINE against mines buried under the ground. With this back ground one sponsored project was taken up from DMSRDE-DRDO, Kanpur. Different sets of samples were prepared and provided to DMSRDE for testing and evaluation at their end (Fig. below).

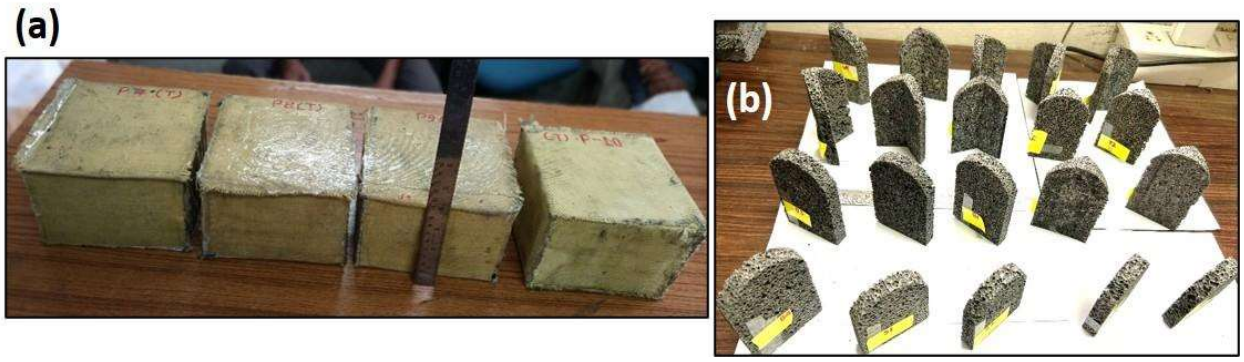


Fig.: (a) Al hybrid composite foam core sandwich structures (b) Wire EDM machined Al hybrid composite foam structures to be assembled with BOOT-ANTIMINE prototypes for blast testing and evaluation

Development of Manufacturing Methodology/process and Supply of Samples of High Strength Aluminium Foam for Blast Mitigation

CVRDE-DRDO, Chennai is developing Combat vehicles with enhanced blast protection. Based on the AMPRI's expertise, they have approached CSIR-AMPRI to provide the best solution based on Aluminium hybrid composite closed foam. In the current work initially AMPRI has provided experimental data and CVRDE has conducted simulation studies using AMPRI's previous experimental data (quasi static and high strain rate). Based on the simulated data , as per CVRDE's optimised simulations, they have requested to supply aluminium hybrid composite closed cell foam panels of 1000 x 1000 x 50 to 64 mm (9 panels). As per the user requirement (CVRDE), AMPRI has developed aluminium hybrid composite foam core structures and supplied them to CVRDE for their further blast evaluation , after integration with actual combat vehicles. Fig.below shows the Aluminum hybrid composite foam core sandwich panels of 1000 x 1000 x 55 mm.

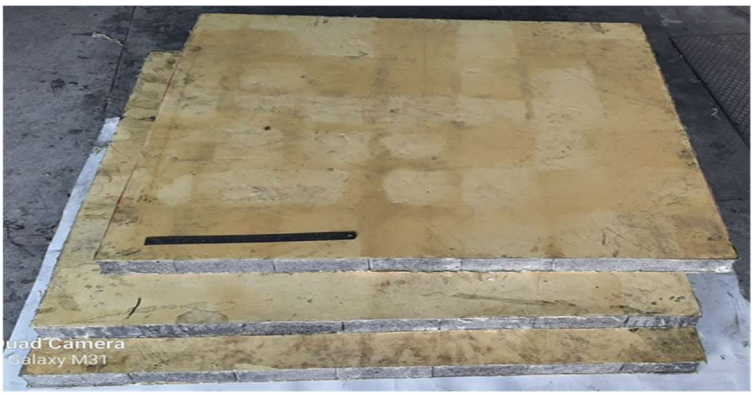


Fig. Al hybrid composite foam core sandwich panels

Development of Copper/graphene composite through fluid bed technique

Copper-graphene composites were developed using copper and graphene powders through powder metallurgy route. Generally, it is difficult to disperse nano particles like graphene into metal matrix. This problem is solved using fluid bed spray coating and drying technique. Graphene content was also optimized to minimum level for cost effectiveness. The sintered pallets were post processed into rolled sheets for practical applications (Fig. below)

Fig.: Cu-Graphene composite rolled sheets

Synthesis of Mg-Al-Zn mixture and composite closed-cell foam

Invention relates to a process for manufacturing Mg-Al-Zn mixture and composite closed-cell foam through the melt route technique, under Argon (Ar) gas atmosphere to avoid the oxide formation (Fig. below). Moreover, the Mg-Al-Zn mixture and closed-cell foam composites have desirable porosity and relative density (R_D), provide excellent mechanical, structural properties, and are qualified for many strategic applications, including the biomedical sector.

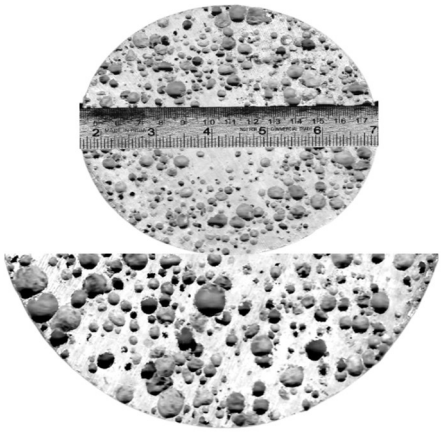


Fig.: Mg-Al-Zn closed-cell foam

Establishing numerical prediction methodology to predict flexural behaviour of closed-cell foam filled sandwich panels

It is important to establish numerical methodology to predict its maximum load carrying capacity, its mode of failure and also it is required to find the reason and the forces acting on it which will cause the failure of metallic bare foam and metal foam in-filled sandwich panels. There is also requirement to find out critical design parameter affecting the cause of first crack formation and subsequent crack growth mechanism before the final failure of metallic bare foam and metal foam in-filled sandwich panels using different binders. This study had also been carried out to find the experimental based numerical parameters determination that can define accurately the property of cohesive zone region. In the present study, using finite element analyses the numerical prediction of experimentally determined flexural behaviour of metallic bare foam and metal foam in-filled sandwich using different kind of binders has been done. Two-dimensional FEM models, has been developed in the present study using cohesive zone modelling to predict the delamination behaviour in foam in-filled sandwich panel. In the present study, an attempt has also been made to establish the methodology to develop metallic bond under atmospheric condition between the metallic face sheets and the metallic foam core. In the present study the experimentally obtained adhesion properties of polymeric/metallic binders with the aluminium face sheet has been used to define the bonding behaviour in the contact region using cohesive element properties defined by traction separation law. The FEM model developed in the present investigation is able to predict the experimentally obtained flexural behaviour (initial stiffness, load displacement curve, maximum load carrying capacity, delamination, energy dissipation etc.) of metallic bare foam and metallic foam in-filled sandwich panel (Fig. below).

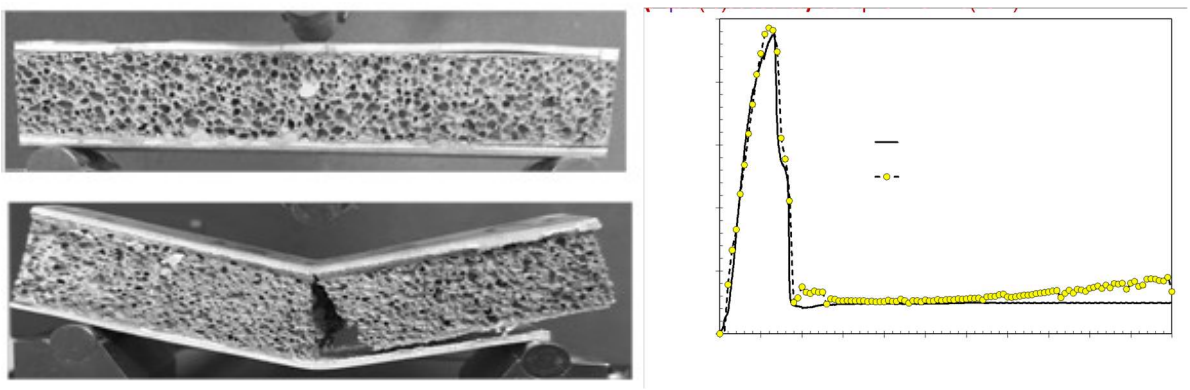


Fig: Foam-filled sandwich panel and its flexural behaviour prediction using FEM

Laser Powder bed fusion (LPBF) facility established at CSIR-AMPRI

Laser powder bed fusion (LPBF) is one of the additive manufacturing methods to produce metallic parts. The layer-by-layer manufacturing nature results in the formation of specific microstructure, achieving different properties compared to the conventional analogs. The machine installed at CSIR-AMPRI is DMP Flex 350, 3D Systems machine, which has a unique ability to reduce oxygen contamination up to a level of less than 25 ppm (Fig. A). The institute has also extended this facility to get printed near net shape components to different institutes and industries eg “Under Water Casing Part” (for CSIR-NIO Goa, Fig. B) and “Water Sample Collector” (for CSIR-NEERI, Fig. C).

Currently, LPBF is used in aerospace, defense, automobile, medical and various other fields. Currently there are limited alloys which can be employed in getting additively manufactured components, namely SS316L, Tool steel, 17/15 PH steel, CoCr alloy, In618, In718, AlSi10Mg, Ti6Al4V Grade5 and Grade 23, etc. The conventional way of material development and its process development upto the manufacturing of complex geometry component can be a very expensive and time-consuming activity. The current establishment of LPBF facility within the institute will help in exploring the possibility of printability of different alloy compositions in 3D additive manufacturing and development of near net-shape complex geometries components

Fig. A: Laser Powder bed fusion (LPBF) based additive manufacturing Facility

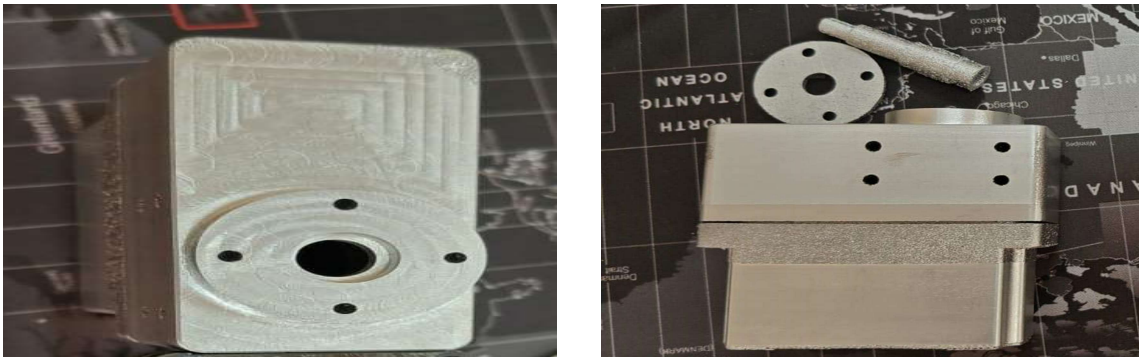


Fig. B: "Under water casing part" (for CSIR-NIO, Goa) printed at CSIR-AMPRI using LPBF facility

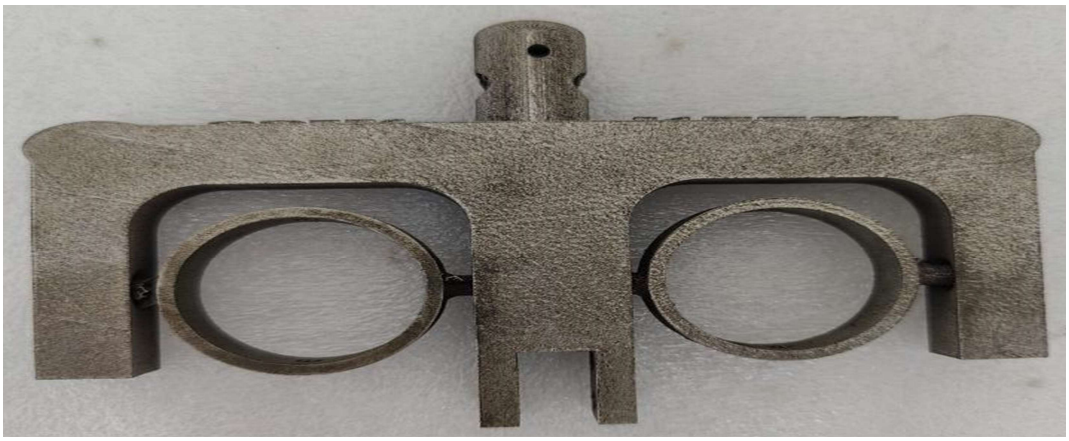


Fig. C: "Water Sample Collector" (for CSIR-NEERI, Nagpur) printed at CSIR-AMPRI using LPBF facility

Development of Prototype Liquid Metal based additive manufacturing system for light weight alloys

An additive manufacturing (AM) technique is currently being used for producing a variety of components, structures and complex geometries from CAD data. The process involves deposition of materials layer by layer. There are many commercial Metal 3D printing techniques available which use gas atomized metal powder as raw materials and wherein sintering/melting is accomplished by laser or electron beam. The raw materials and processing equipment add a lot to cost to the printed components which makes its commercialization unviable. This technology is limited to the strategic sector for customized components. Therefore there is innovation required locally to make India self-reliant in affordable 3D printing solutions. In this project, we are targeting to design a prototype machine which will not require high cost powder as a raw material. The metal ingot/scrap will be melted using induction technique and liquid metal droplets will be forced out from the nozzle on the printing bed via pneumatic pressures. The induction melting technique is cost effective in comparison to laser/electron beam based

existing metal 3D printers. In this project, we will design the pneumatic controlled vertical metal droplet delivery system with an induction melting facility for ~1-2 Kg Aluminum alloys. Customized motorized printing platforms with three degrees of freedom (X, Y, Z) with close loop control of liquid droplet delivery will also be designed. The Al based alloys will be printed using the prototype printer in different geometrical shapes. The Mechanical and microstructural evaluation will be carried out and accordingly optimization of printing processing parameters will be done.

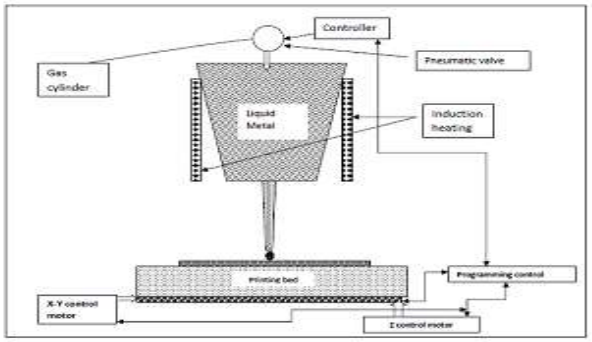


Fig.: Schematic design

Fig: Customized motorized printing platform design

Center for Advanced Radiation Shielding and Geopolymeric Materials

Studies on Utilization of inert broken tiles, sanitary wares & polishing dust/slurry for Development of Advanced Geopolymeric Prefabricated Precast Pathway Components for Infrastructural Applications

Objectives of as per the project document:

Studies on utilization of inert broken tiles, Sanitary Wares and Polishing dust/slurry for development of advanced Geopolymeric prefabricated precast pathway components for infrastructural applications

Aim of the Project: The project aims to develop process for bulk utilization of broken tiles, sanitary wares & polishing dust/slurry in combination with Thermal Power Plant Waste Industrial Waste i.e Class –F Fly Ash. Using geopolymeric matrix for the development of prefabricated precast Pathway components for Infrastructure applications.

Methodology Adopted: CSIR-AMPRI, Bhopal utilized inert broken tiles, sanitary wares & polishing dust/slurry in combination with Fly Ash through a wider spectrum potential in the form of geopolymeric approach to develop prefabricated precast Pathway components for Infrastructure applications.

Following phases have been adopted for development of prefabricated precast Pathway components for Infrastructure applications

Significant achievements:

In view of the above it is concluded that broken sanitary ware waste, broken tile waste can be crushed to make coarse and fine aggregate to be used in fly ash based Geopolymeric concrete and polishing dust can be used as filler and part replacement of fly ash for making Geopolymeric concrete

Broken Sanitary Ware Waste (Morbi)

Collection of Pullishing Dust /Slurry (Mori)

Collection of Ceramic Sanitary Ware and Tile Waste (Mori)

Collection of of Bulk Ceramic Waste from Morbi and Unloading of Bulk Ceramic Waste Samples at CSIR-AMPRI Bhopal

Different size fraction of broken sanitary ware aggregate

Mixing and Development of Geopolymeric Concrete

Development of non-noble Ni-Fe and Ni-Fe-GO modified large area anodes for efficient hydrogen production by alkaline water electrolysis.

Objectives of as per the project document

- Development of optimized NiFe and NiFe-graphene oxide based material with enhanced surface area and thus with improved ion diffusion process.
- Detailed characterization, optimization, understanding the mechanism for water oxidation reaction
- To produce screen printed electrodes of the above developed materials
- Detailed characterization of the developed film and optimization for water oxidation reaction.
- Device fabrication and analysis

Significfant achievements

- Process for bulk scale synthesis of the electrcatalyst has been established.
- The detailed characterization and scaled up material has been obtained

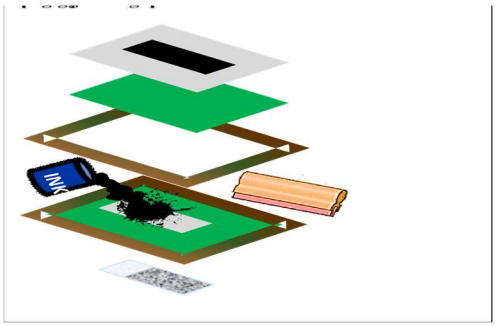


Fig.: Schematic of the methodology for the deposition of films

Synthesis, Characterization and Applications of Lead-free Heavy Metal Oxide based Glass systems

Objectives of as per the project document

i. Synthesis of B_2O_3-TeO_2 based glasses by adding heavy metal oxides (Bi_2O_3/BaO/WO_3).
ii. To determine the structural and optical properties of tellurite based heavy metal oxide glass systems.
iii. To study the experimental and theoretical radiation shielding characteristics for X-ray medical diagnostics applications.
iv. To study the experimental and theoretical radiation shielding characteristics for gamma-ray applications.

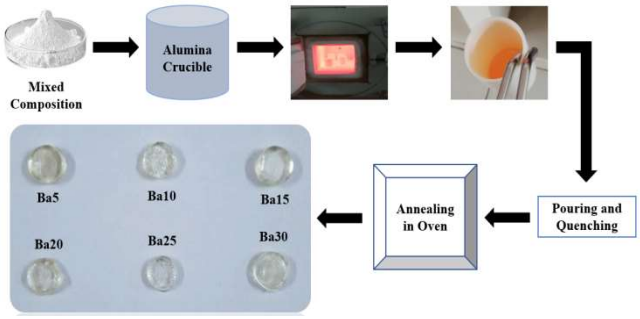
Significant achievements

i. Lead-free WO_3-doped TeZnCaB radiation shielding glass system have been synthesized by melt quenching method.

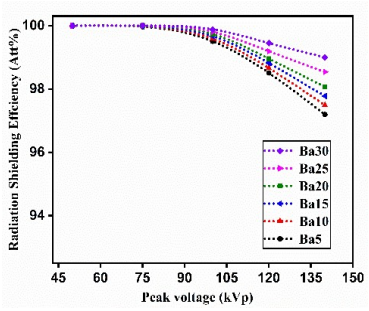
ii. The physical, optical, structural and X-ray attenuation properties of the lead-free BaO-doped TeZnCaB glass system were investigated.

iii. From the X-ray attenuation characterization, it was observed that the radiation shielding characteristics were enhanced with the increase of BaO contents in the TeZnCaB glass samples and these glass samples demonstrate the capability to attenuate almost all the x-ray photons with an attenuation percentage approaching 100%.

iv. The findings suggested that the lead-free BaO-doped TeZnCaB glasses could serve as safe, non-hazardous alternatives, making them effective and environmentally friendly choices for medical diagnostics applications.



Schematic diagram with a photograph of the synthesized glass samples.



Radiation Shielding efficiency of the BaO-based glass samples.

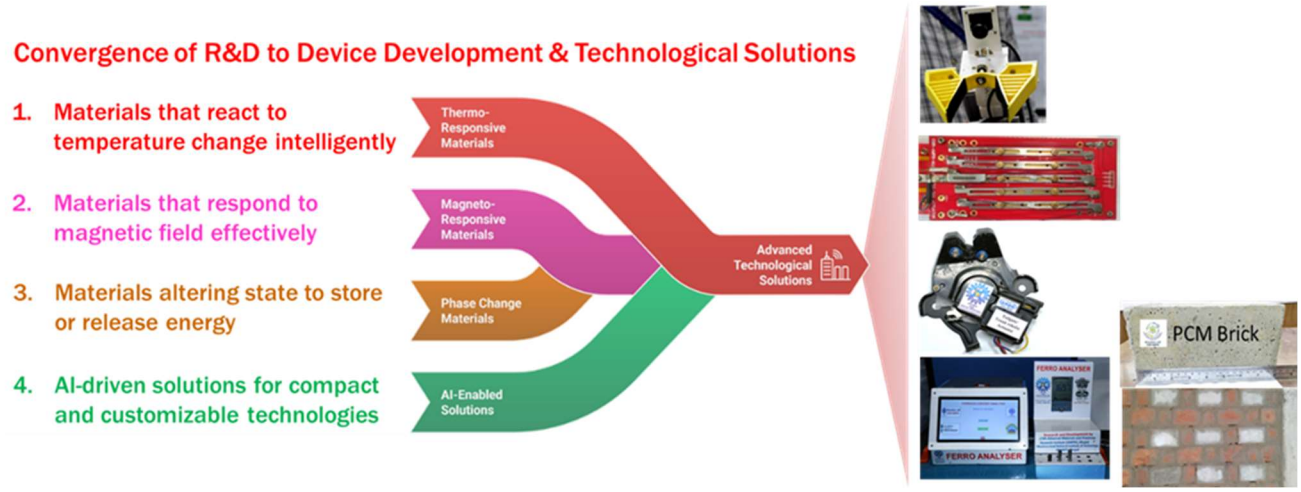
Intelligent Materials and Advanced Processes

Vision:

▪Device development using thermo- and magneto-responsive intelligent materials for engineering, societal, healthcare, and green energy sectors.

▪AI-enabled compact & customizable technological solutions for industrial and strategic applications

Focused Research Area:



Assistive telescopic tool with Shape Memory Alloy wire actuator- based soft robotic gripper with machine vision for engineering applications

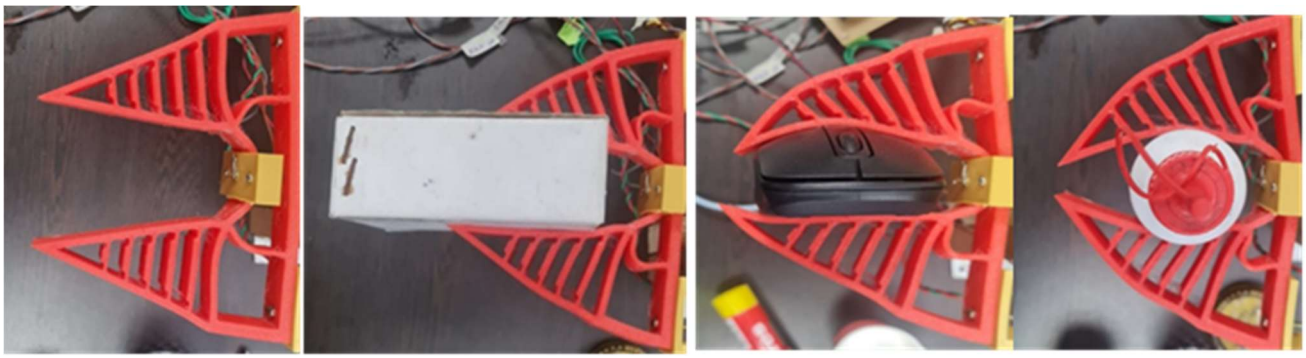
Objectives:

a. Design and development of SMA-actuated soft gripper and a vision-based deep learning model for object localization.
b. Development of Associated electronics, closed-loop control system, and algorithms for strain recovery control
c. Integrating a machine vision system with the developed gripper on to a telescopic pole and testing the prototype for distant object gripping.

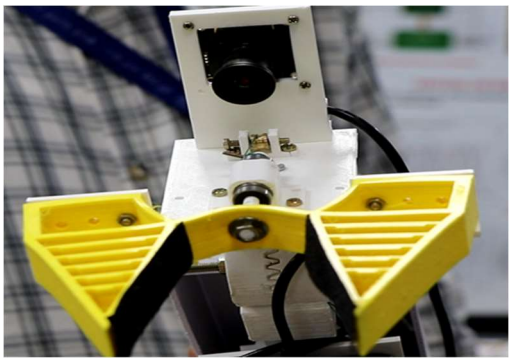
Significant achievements:

An initial prototype for Shape Memory Alloy actuated soft gripper was developed. An associated dedicated electronics and real-time control system was developed and implemented for the purpose of controlled actuation. Further, an optimal control logic was developed to improve positioning accuracy and response time of the SMA actuator for the integrated soft gripper. The initial prototype was functionally tested through integrated operation of the SMA-actuated gripper, telescopic pole, and machine vision.

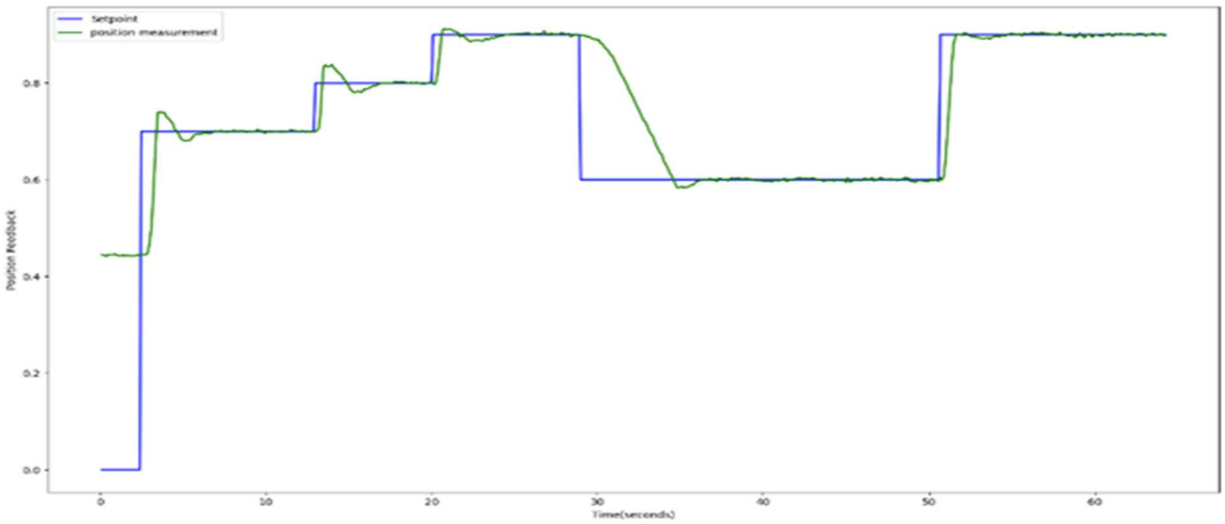
The SMA-actuated soft gripper is being integrated with a telescopic tool to enable far-reach pick and place operation for a variety of applications, including warehouses, maintenance tasks, agricultural harvesting etc. These grippers also have significant potential in broader robotic applications, where rigid grippers are predominantly used; however, due to the compliant and soft nature of the proposed gripper, it can provide safer and more adaptable grasping of objects.



SMA actuated soft gripper handling various objects



Preliminary prototype for SMA actuated soft gripper integrated with a part of assistive pole



Closed loop control set point tracking for SMA actuator

Integration of thermo-responsive Smart Material Linear Displacement Actuator for position control of 3D printer Extruder using AI-based self-sensing technique

Objectives:

a. Implementation and integration of SMA actuator and AI-based control system with 3-D printer extruder

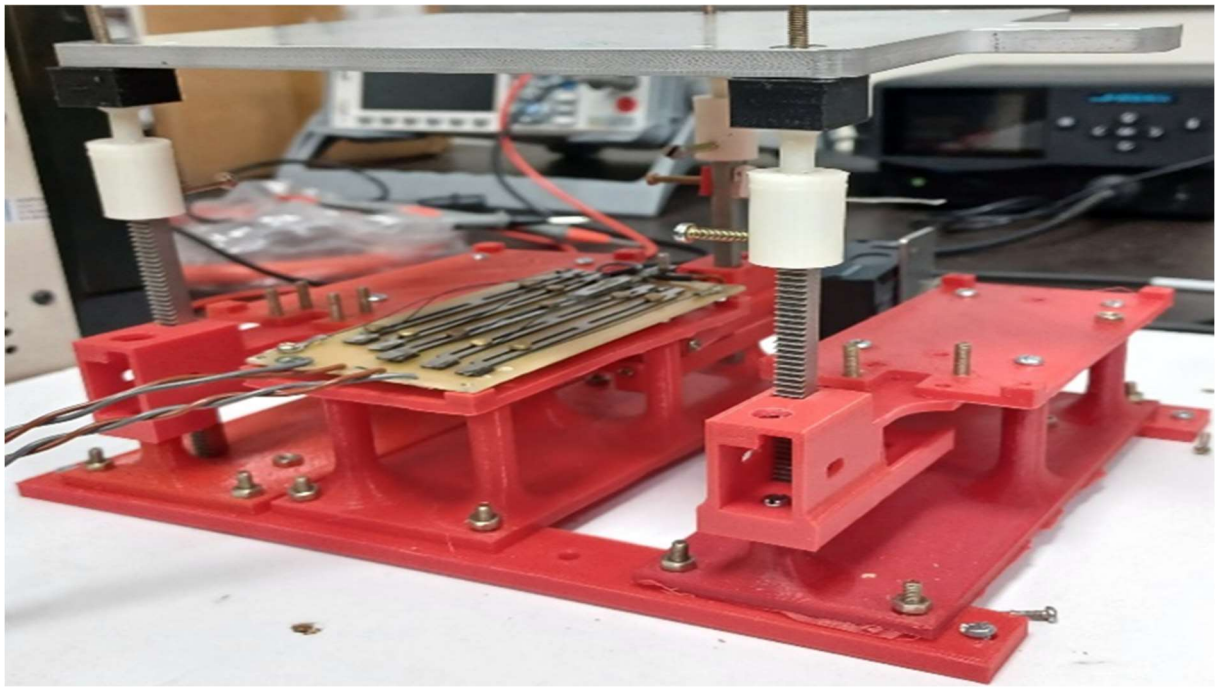
b. Development of standalone embedded control H/W with heating module

c. Implementation of AI algorithm on embedded H/W

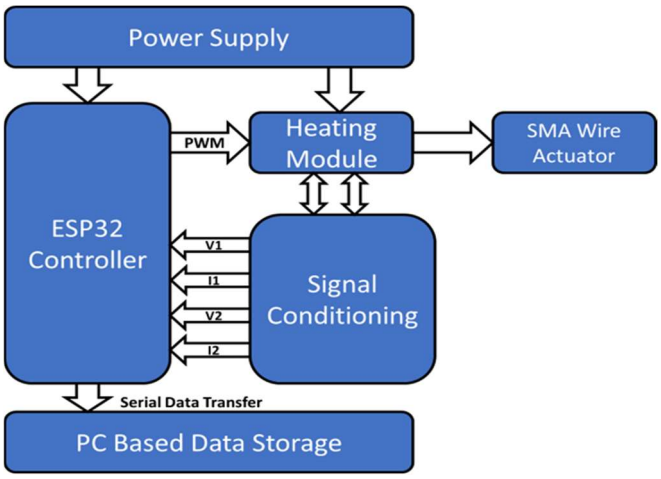
d. Training, testing data generation with 3-D printer extruder of actual working condition and field testing of an integrated system

Significant achievements:

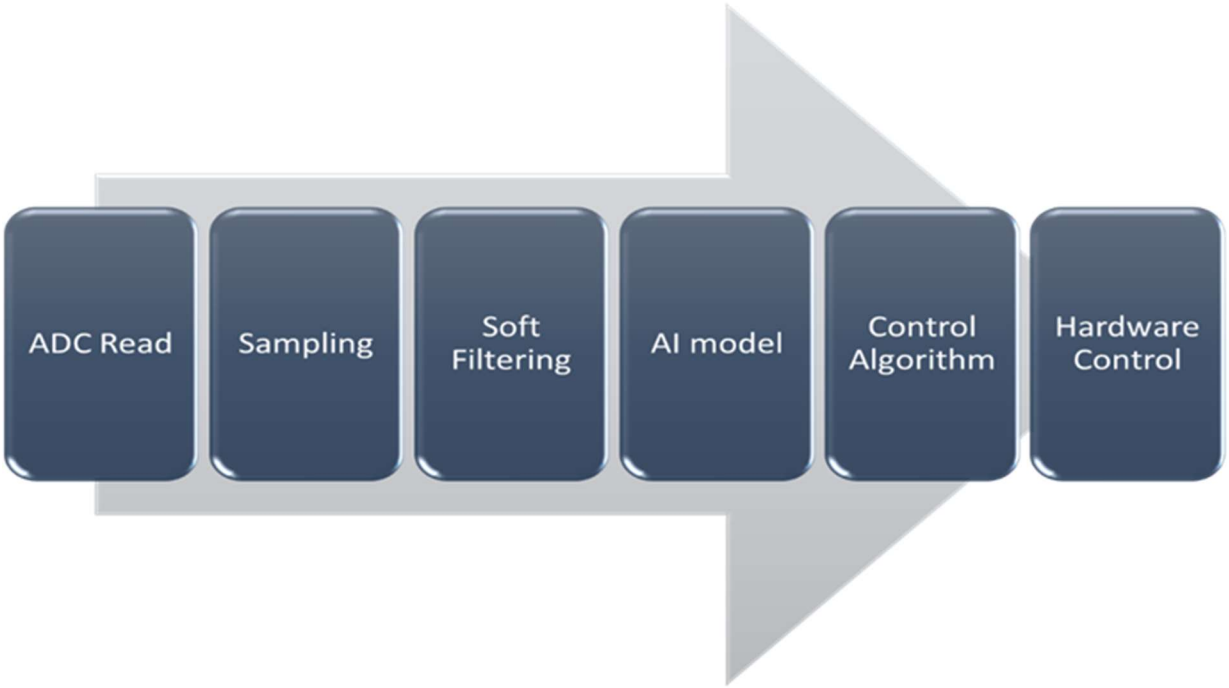
A standalone embedded control hardware system incorporating an AI-based control model and an integrated Shape Memory Alloy (SMA) actuator was designed, developed, and successfully implemented. The self-sensing AI-based model was implemented to enable sensor less displacement estimation and was deployed in a closed-loop control for real-time operation. The complete system was subjected to real-time control testing to validate its performance under operational conditions. The mechanical assembly of the SMA actuator was fabricated and seamlessly integrated with the bed-levelling experimental setup, ensuring precise actuation and desired mechanical motion. Comprehensive hardware–software integration was achieved, including seamless interfacing of control algorithms, AI model, and associated electronics, on the embedded platform. End-to-end system testing was conducted and successful execution of the intended bed-levelling functionality in real-time was achieved.



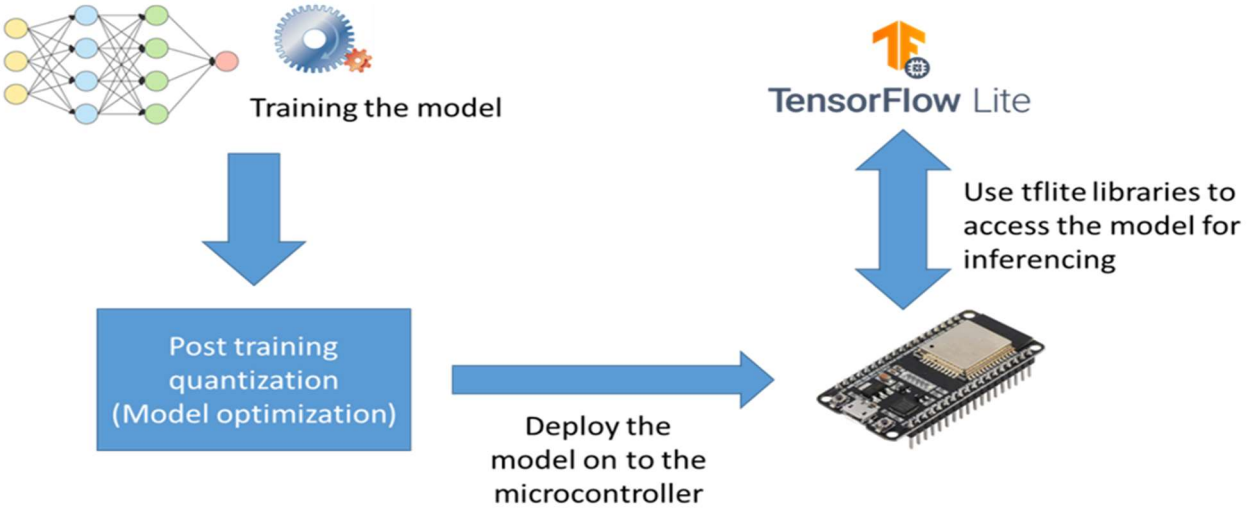
Prototype of the SMA Actuated print-bed complete setup



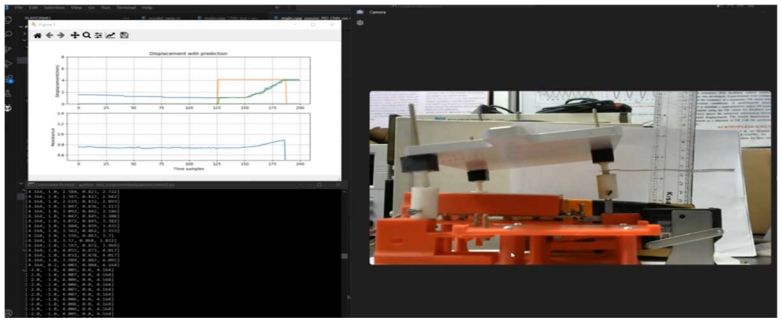
Schematic diagram of the hardware control flow



Schematic diagram of the Software Control flow



Developed AI-Model deployment sequence and control strategy



Realtime demonstration of and feedback control using AI model displacement estimation

Design and development of an instrument for real-time assessment for ferromagnetic phase-fraction in ferrous alloys

Objectives:

a) Design and development of a device for real time quantitative assessment of ferromagnetic phase during deformation of ferrous alloys.
b) Simulation, design, and development of measurement coils.
c) To develop real time data acquisition, processing and analysis routines for the prototype.
d) Development, calibration, testing and validation of a prototype instrument.

Significant achievements:

i. A prototype experimental set-up is developed for initial testing of samples and data captured for analysis.
ii. Sensing coil is design and analyzed using finite element simulation, and developed for testing of bulk-size test samples.
iii. Test sample data acquisition system developed and experimentation are carried out. The
iv. acquired data are processed and analyzed that present the trends in test samples of different ferromagnetic phase content.
v. A device has been developed for the assessment of ferromagnetic phase fraction in ferrous alloys.
vi. Device can assess the ferromagnetic phase content in the bulk of the sample relative to a
vii. standard sample (with 100% ferromagnetic phase) of the same composition.
viii. Depending on the size of the sample, the size of the test rig can be customized and, in the future, ferromagnetic phase fraction in differently sized samples can be assessed.

ix. A one-to-one correlation between the fraction of ferrite and voltage reading from the device has been noted. This shows that qualitative assessment of the ferromagnetic content in the samples of the same composition is possible with the device under static conditions.

x. A technique for quantification of ferromagnetic phase content has been developed. Only need is to calibrate it.

xi. A state-of-the-art feature of this device is that it can assess the average ferromagnetic phase fraction from the bulk of the sample. As per the investigators' knowledge, there is no device available in the market that can assess the ferromagnetic phase fraction from within the bulk of the sample.

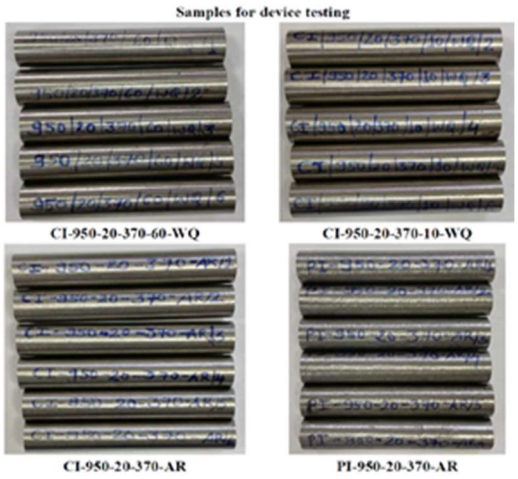
System Development

A user-friendly Graphical User Interface (GUI) and additional components were developed to ensure the smooth operation of the system, enhancing the overall user experience and system functionality, as shown in the below figure.

Ferro Analyser: Prototype instrument for ferromagnetic phase fraction analysis

Standardization of ferrous samples

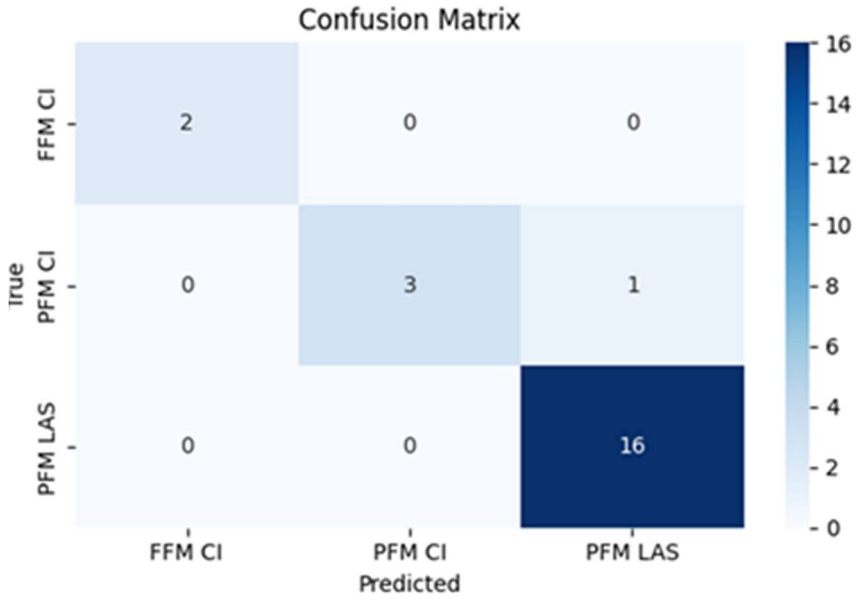
The standardization process for the developed system is developed to complete the trail and testing process and, ensuring the system meets the necessary quality and operational standards.



Test Samples fabricated for the prototype instrument

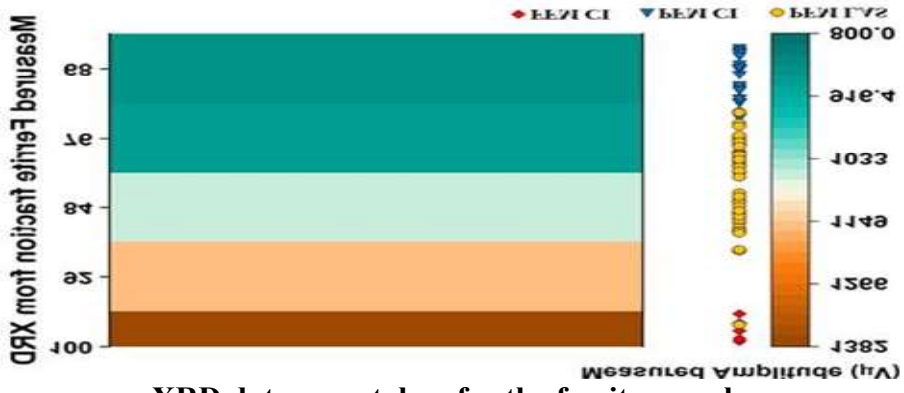
AI/ML model for classification

A classifier was trained to categorize samples into three distinct classes: 'PFM LAS', 'PFM CI', and 'FFM CI'. With the original distribution of 76 LAS samples, 19 PFM CI samples, and 12 FFM CI samples, the trained classifier achieved a test accuracy of 96.27%. The confusion matrix is shown in below figure.



Confusion matrix for test data

The obtained results are corroborated by XRD data from the ferrite samples shown in below figure, where both the XRD analysis and the trained model complement our findings.



XRD data were taken for the ferrite samples

Low and Medium Temperature Organic Phase Change Materials for Thermal Comfort in Buildings

Objectives as per the project document:

a. Development of low and medium-temperature phase change materials (PCMs) from available raw paraffin wax in the range of 35 to 45 degree C

b. Development of PCM-based brick and panels for thermal comfort

c. Increase in the thermal conductivity of PCM using metal wire foams

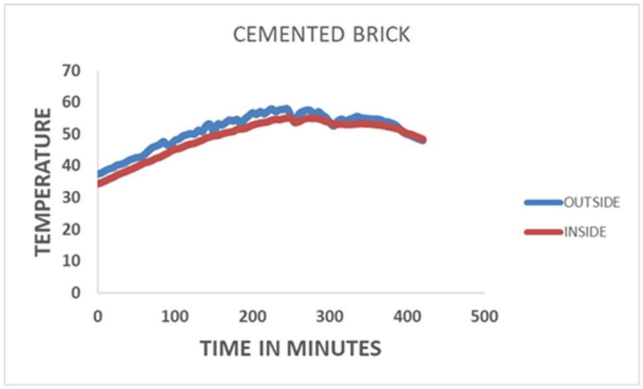
d. Varying the thickness of the PCM layer

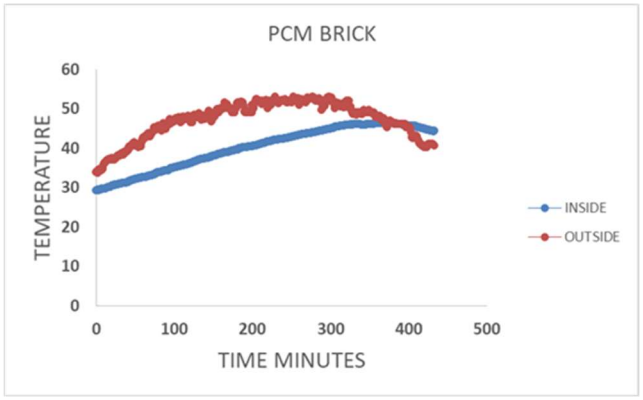
e. Real field applications in building and construction

Significant achievements of project:

Phase Change Materials (PCM)- based bricks have been developed using modified paraffin wax with suitable melting temperature in the range of 35-to-50°C. the thermal conductivity of the paraffin wax has also been increased 5 to 6 times using the aluminium wire spring structure. The PCM material has been encapsulated and casted using the cement mixture. The PCM bricks were exposed to the sunlight and covered around using the glass wool. The temperature was monitored on the outside surface, inside surface and in between the bricks inside the PCM. The temperature on the outside and inside varied slowly before noon. After noon, the temperature difference was increased to 9–11°C. the temperature difference reduced after the 5 PM and both the outside and inside temperature comes into equilibrium after the sun sets. However, it was observed that the PCM retained the heat till 10 PM after which the temperature in the PCM starts to reduce. On the contrary, the normal cement bricks do not give any difference in the inside and outside surface temperatures. The PCM bricks have also been tested for the strength and was nearly equivalent to the strength of the Class-I bricks i.e. 10 MPa.

PCM bricks exposed to sunlight radiation throughout the day and thermocouples recording the temperatures





The temperature distribution outside and inside surface of the normal cement brick and PCM bricks i.e. the temperature on both sides of the bricks has shown a large difference of approximately 9.5 degrees

Development of Aerospace components through Electromagnetic Welding

Objectives:

a. To join similar (GTM-Su-718/GTM-Su-718) and dissimilar materials (GTM-Su-718/C-263) of symmetric geometry through electromagnetic welding (EMW).

b. Optimization of joint strength and its design, process parameters of EMW and subsequent characterization of microstructural and mechanical properties.

c. Comparative study between GTM-Su-718 or C-263 weld joint by both Conventional (TIG) and Electromagnetic welding and to study effect of heat treatment condition of Inconel (GTM-Su-718 or C-263) on welding properties/quality.

d. To develop prototype scale gas turbine pipeline assembly.

Executive summary with achievements (2024-25):

Usually, conventional joining methods such as brazing, welding, TIG, riveting, etc. have been used for joining various components for aerospace and aviation programs but these methods have certain limitations with regards to materials, geometries and effectiveness along with the fact that sometimes

or in some components, the usage of these tend to make the system bulky, thus resulting in higher production and operational cost. So, the present study aims to work on solving some of these problems by joining Inconel alloys (GTM-Su-718/C-263) using electromagnetic joining process. The work consists of process optimization for joining pipelines of similar materials (GTM-Su-718/GTM-Su-718) and dissimilar materials (GTM-Su-718/C-263) through the electromagnetic welding process, having a circular tube to solid rod/adapter, and its functionality test. As the joint quality improves by reducing the HAZ of the joining interface and comparative strength, the EMW process is of utmost importance in the design of pipelines of aeroengines, and it can prove to be beneficial. Accordingly, the objective of the present study is worked out, and it aims to carry out the joining of one similar and one dissimilar material of interest of aeroengines. During the reported period, the conceptual design of the EMW system's tooling (field shaper) was carried out, and initial experimental joining trials were also conducted. The work is discussed briefly below. Conceptual design of field shaper (two alternative design: Flat taper FS design and notch design field shaper):

In an electromagnetic forming system, tooling is an important part of the system for ensuring proper joining of components. Fig. 1 shows the basic parts of a typical EMW tooling. The magnetic field and the resulting Lorentz force must be shaped or directed toward the joining zone of the workpieces. The field shaper (FS) is used for the same. For the given components (sub-assembly connecting pipe), alternative field shapers have been conceptualized, and FEM analysis has been carried out. The alternative field shaper design is shown in Fig. 2 (a) and (b). The figure shows the Flat taper FS and notched FS designs. This design is taken into consideration, as in the existing/ traditional/conventional FS, the web of the field shaper is not suitable for accommodating the sample as per drawing no KE52000. FEM model of all the field shaper designs along with bitter coil and workpiece is shown in Fig. 3. Their cut section view is also shown in the figure.

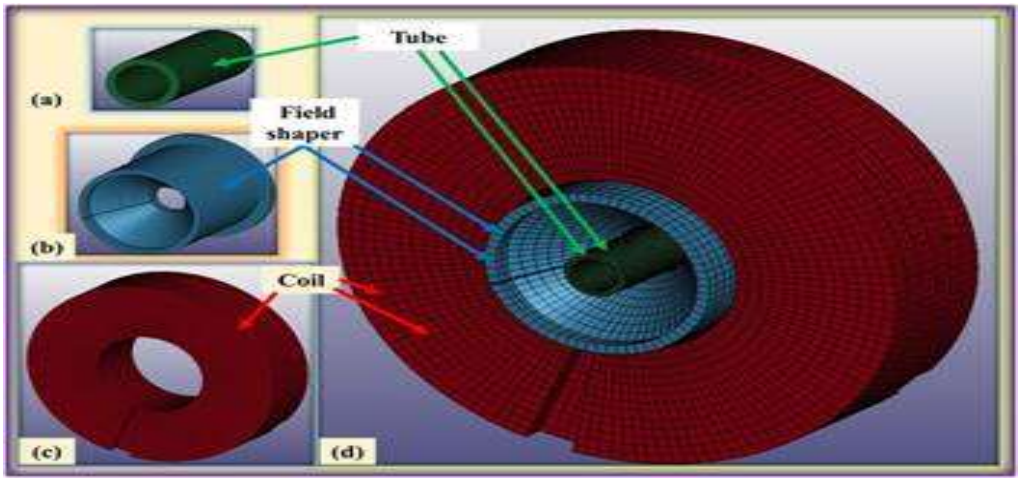


Fig. 1. FEM Model of (a) workpiece, (b) field shaper, (c) coil and(d) assembly of all parts

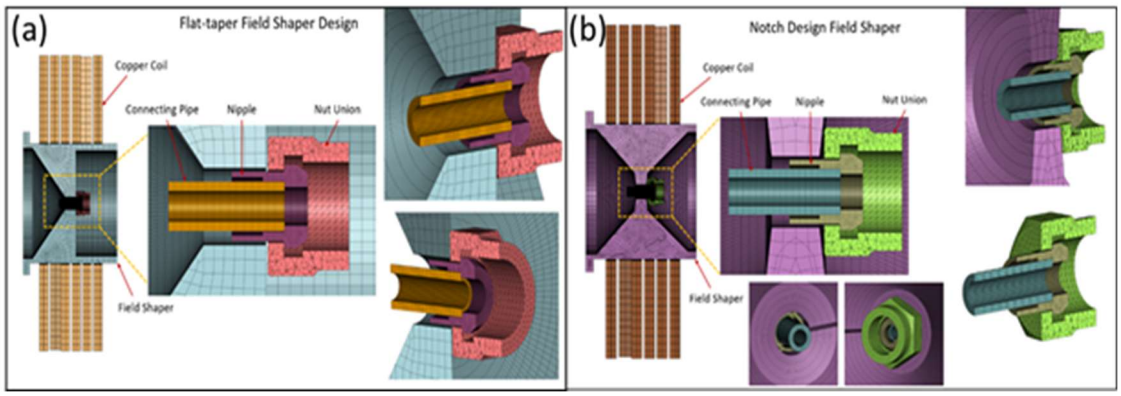


Figure 2. Conceptual design of field shaper for the target components

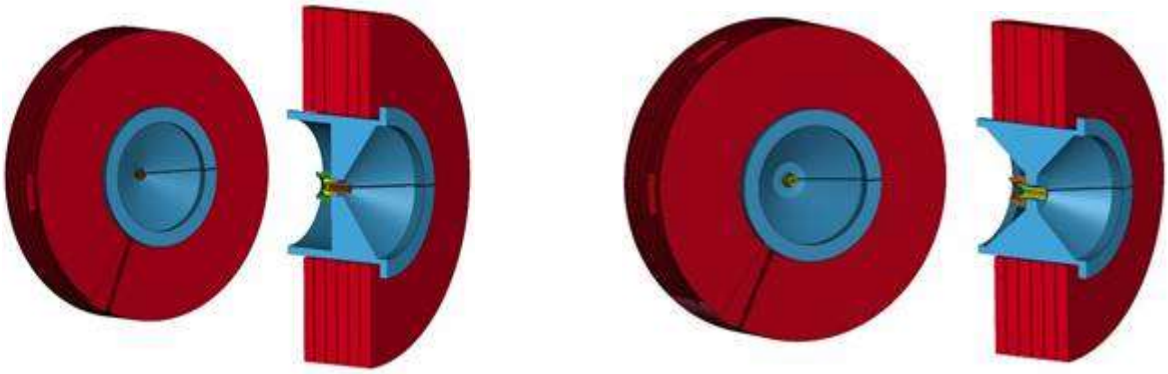


Fig. a. Flat-taper field shaper design **b. Notch field shaper design**

Fig. 3 Design of different field shapers

Finite element modelling of the process:

Finite element analysis (FEA) of the tooling design has been initiated. Convergence analysis of the FEA model is carried out. Notched FS design is considered for the prediction of important process parameters (stress, displacement, and velocity etc. Finalization of the design of the field shaper and workpiece/joint of the components for fabrication, and first trial of joining of materials of desired dimensions of the pipe is carried out. Initially, two materials for the workpiece are considered in FE simulation (Inconel 718 and Al 6061). The mechanical properties of the materials (Fig. 4 and Table 1) are taken from the literature and used in the FE simulation modelling. The actual current pulse curve is assigned as the load to the model. This current curve is obtained using Rogowski coil and an oscilloscope during experiments corresponding to 20kV-3 bank energy. The current pulse is shown in Fig 4 (a).

Simulation results show that the field shaper can concentrate the Lorentz force on the flyer workpiece and deform it, as shown in Fig. 5. The velocity fringe and graph of Al 6061 and Inconel 718 workpiece are shown in Fig. 5 and 6. It is clearly visible in the graph that aluminium shows higher deformation velocities as its flow stress is lower and has higher ductility. The velocities attained by Al 6061 and Inconel 718 samples are 540 m/s and 415 m/s, respectively. As per the literature (Kore et al., 2010),

aluminium can be joined if the collision velocity is above 250 m/s. Further work on the analysis for joining Inconel 718 is ongoing. As shown in the figure, the values of other parameters, like stress, displacement, can also be predicted in the simulation. Further experiments and characterization work (microstructural and mechanical) are being carried out.

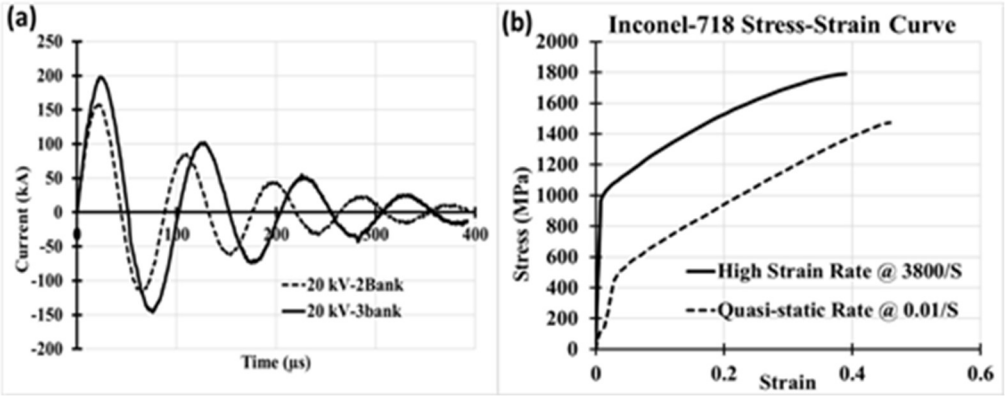


Figure 4. (a) Input current at 20 kV, 3 banks of capacitor, (b) Stress Strain curve of Inconel 718 and quasi-static and high strain (Moretti et al., 2021) (Mahalle et al., 2019).

Table 1.

Mechanical Properties of Inconel 718 used in FE simulation(Cai & Dai, 2014)

Properties and parameters	Inconel 718
Density	8190 kg/m3
Elastic modulus	205 GPa
Initial yield stress	1029 MPa
Hardening modulus	1477 MPa
Strain rate dependency coefficient	0.06
Work-hardening exponent	0.33
Thermal softening exponent	1.44

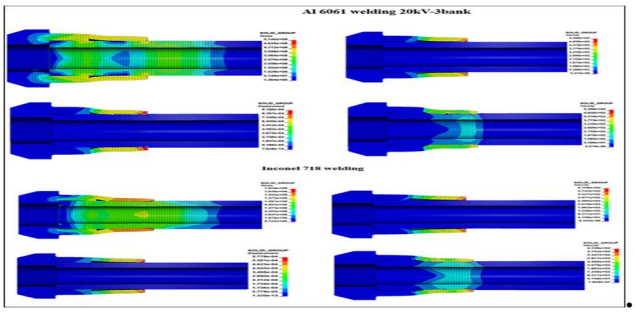


Fig. 5 Variation (fringe) of stress, displacement and velocity of Al 6061 and Inconel 718

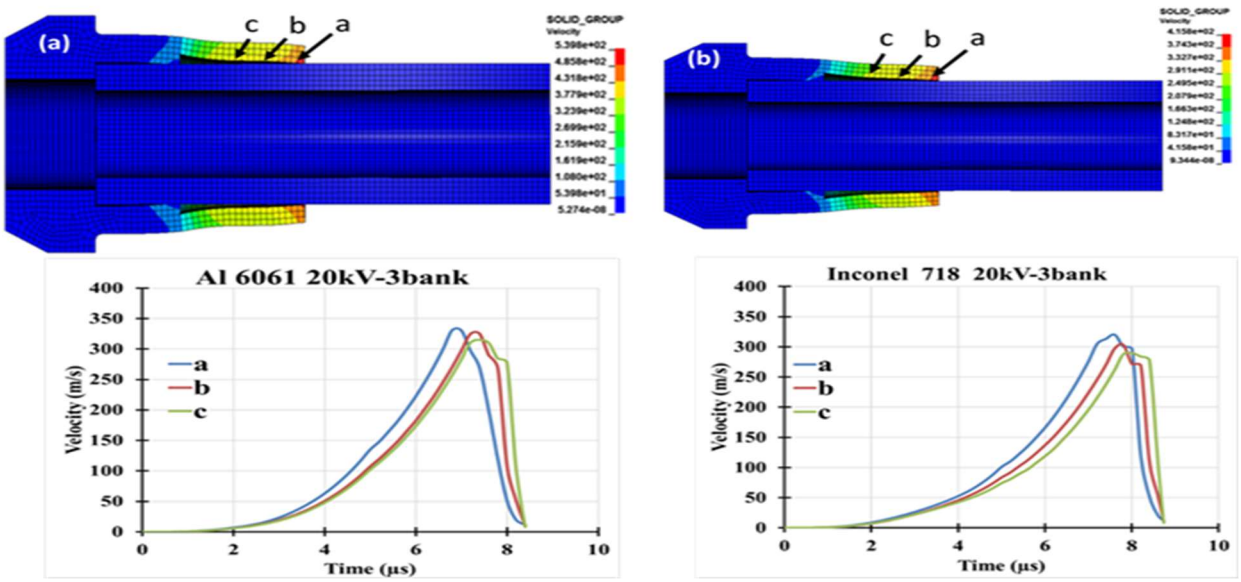


Fig. 6. (a) Variation of velocity at three different points of the workpiece, (a) Al 6061 and (b) Inconel 718, during its deforming using EMW process

Initial trials/experiments of the tooling were carried out using alternative available materials like SS/ Al, etc., The joining is carried out using an Electromagnetic Manufacturing Machine (EMM) of 40 kJ. It consists of a control console, a capacitor bank, programmable logic controller (PLC), and a working table with a coil assembly. EMM stores energy in 4 capacitor banks, each capable of storing up to 10 kJ at 20 kV. The bank can be used according to the energy requirements for experiments. Bitter type compression coil was used in experiments.

Fig.7 (a) shows samples (corresponding to the dimension of connecting pipe joint) of aluminium and SS316L before and after experiments. Figure 7 (b) actual sample (materials: Al and SS316L) according to drawing KE52000 GTRE before and after experiments trials. Figure 7(c) shows the assembly of the component before the experiments, according to the component's drawing. It also shows a half-cut section of the experimentally jointed sample.

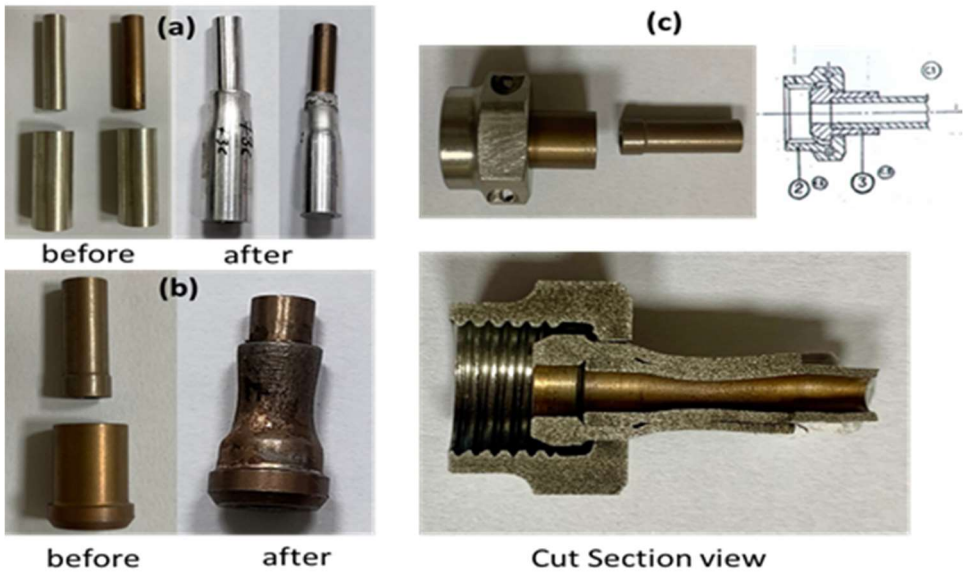


Fig 7. (a) Joined samples of aluminum 6061 and SS316L in before and after conditions, (b) Joined samples (as per actual drawing KE52000) of SS316L (before and after experiments), (c) Half cut section of joined sample of SS316L

Projects spinoffs from the ongoing and completed projects: Leveraging existing facilities, different R&D proposals have been developed and submitted to various funding agencies. A majority of these have been sanctioned, details given below:

- CSIR-CLAIM project on AI/ML-based: AI-Driven Smart Material-Actuated (SMA) Soft-Robotic Gripper with Integrated Tactile Sensor Array for Precise Gripping Control: Collaboration with CSIR-FPI and Industry M/s. SVR Infotech, Pune.
- Centre of Advanced Research and Innovations in Assistive and Rehabilitative Technologies for the elderly and Disabled Individuals; WP: Development of Smart Material (SMA) actuators, for the wearable exoskeleton / orthoses' components: Collaboration with CSIR-CEERI, CSIR-CMERI, CSIR-NISCPR, and AIIMS Delhi.

Industrial interaction:

Interaction and discussion with industry with regard to SMA technology for prospective technology transfer. Showed the capability of the actuator to the industry by modification in SMA actuator for automated lid unlatching as per their requirement.

Outreach Activity:

Developed SMA actuator technologies for automobile applications were prominently showcased at IISF-2024 Guwahati, CIAE, OWOT-AEISS Theme, at CSIR-IMMT, and the CSIR-Innovation Complex, Mumbai highlighting the division's cutting-edge R&D and their translational potentials.

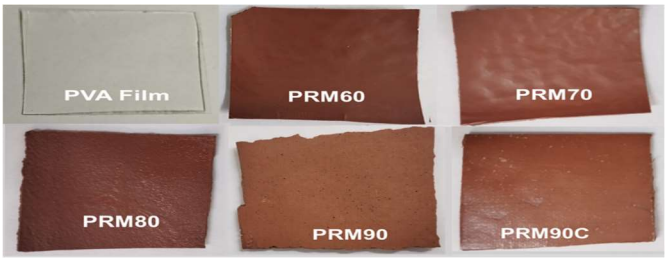
Hybrid Building Materials and Manufacturing

Maximum Utilization of Red Mud (up to 90 wt.%) to Develop Red-Mud Composites at Very Low Temperature for High-Performance Radiation Shielding Systems for Civil Structures

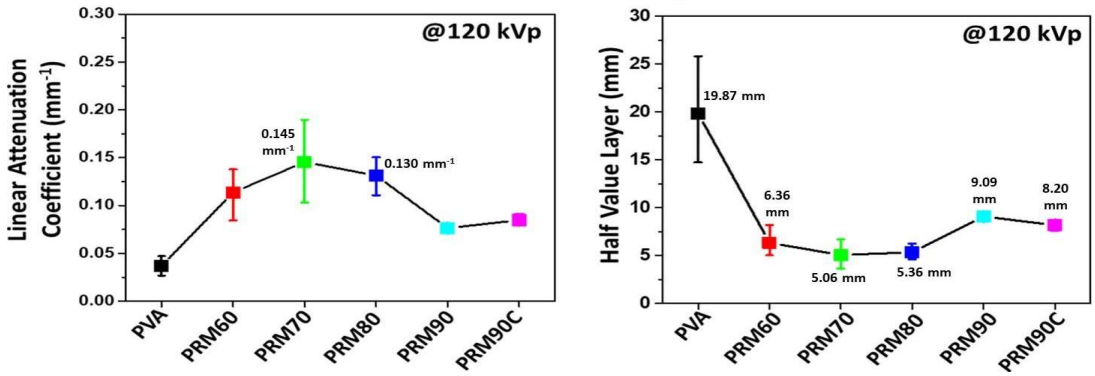
Objectives:

1. To develop high-performance X-ray shielding RM-composites of the appropriate thickness that are capable of shielding diagnostic X-rays.
2. Maximum utilization of RM (up to 70-90 wt.%) to develop high-performance radiation shielding components at very low temperatures.
3. To boost the shielding ability of RM-PVA composite with the infusion of high-density metal/metal oxide fillers in the RM- composite. (If required, very low content)
4. To develop the bilayer and multilayer structure of the best-optimized X-ray shielding sheets. This would enhance the scattering and hence more radiation shielding would be achieved.
5. Demonstration of radiation-shielding civil structures (RM-based paneling sheets) based on optimized RM-composite

Significant achievements Successfully developed RM-PVA composite sheets for shielding X-ray with the utilization of red mud up to 90 wt%. Publications: 1 publication in the Journal of Hazardous Materials Advances.



Camera images of fabricated samples: (a) PVA film, (b) PRM60 composite, (c) PRM70 composite, (d) PRM80 composite, (e) PRM90 composite, (f) PRM90C composite



Linear attenuation coefficient of RM-PVA composites (at different wt% of RM) at 120 kVp (left) and corresponding HVL value of the RM-PVA composites at 120 kVp(right)

Large-Scale Utilization of ZLDR (MSSW) Generated from Grasim Industries Pvt. Ltd., Nagda for Development of a New Class of Wall Tiles/Wall Cladding Panels

This report examines the feasibility of utilizing Zero Liquid Discharge Residue (ZLDR) from Grasim Industries Private Limited, Nagda, for developing wall tiles and wall cladding panels. It discusses the properties of ZLDR, its incorporation into tile production, and the associated environmental and economic benefits. The findings indicate that using ZLDR in tile manufacturing can reduce waste disposal costs and enhance sustainability in construction.

Two samples from Grasim Industries, Nagda i.e. ZLDR and CaO were studied for Physical, Chemical, Morphological and mineralogical characteristics. TCLP studies was done for analysing its hazardous nature.

There were twelve different types of experiments were conducted for manufacturing wall cladding panels/wall panels. In all cases epoxy resin was used as a binding medium. The quantity of polymer used in each experiments is 17%, which was optimized based on the initial experimental trials in achieving good workability.

Cladding wall panels have been developed at lab scale at CSIR-AMPRI using ZLDR as primary raw materials in combination with other raw materials such as CaO, Jute textile fibre, glass textile fibre, and sunmica. The dimension and thickness of products have been developed in compliance with the Indian standard BIS 15622-2006 (ceramic tiles) and BIS 10701-2012 (plywood wall panel).

The prepared wall tiles/ wall cladding panels were tested to access its suitability. In the present study, the physical and mechanical properties performed include flexural strength, density and water absorption.

Development of Flexible Piezoelectric Two-dimensional Nanostructures Based Hybrid Nanogenerators for Harvesting Mechanical Energy

Key Achievement:

Flexible piezoelectric nanogenerator based on the pristine MoS2 and borophene based heterostructures have been developed.

We have grown the highly crystalline 2D Li-doped MoS2 nanosheets by simple and cost-effective hydrothermal method. Piezoelectric force microscopy (PFM) study reveals the nanoscale high piezoelectric charge coefficient of 130 pm/V from few layered Li-doped MoS2 nanosheets. Surprisingly, piezoelectric flexible nanogenerator fabricated from Li-doped MoS2 nanosheets exhibited very high output voltage of 13.5 V and ultrahigh current density of 30 μA/cm2 even under small compressive force.

A wearable nanogenerator based on the WS2: PVDF nanocomposite with stable output is developed for harvesting mechanical energies.

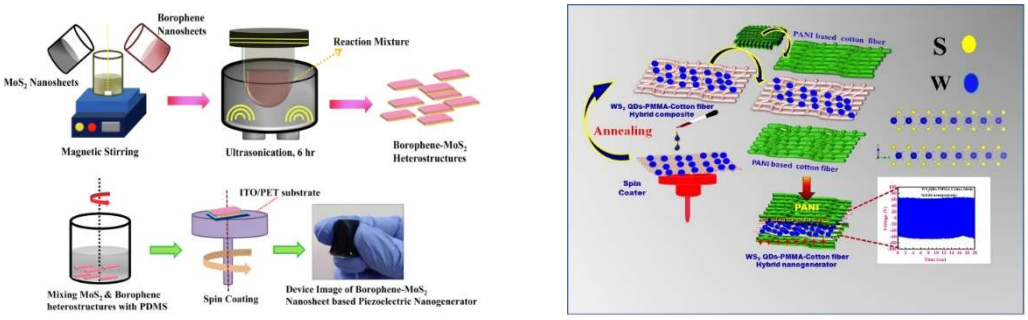


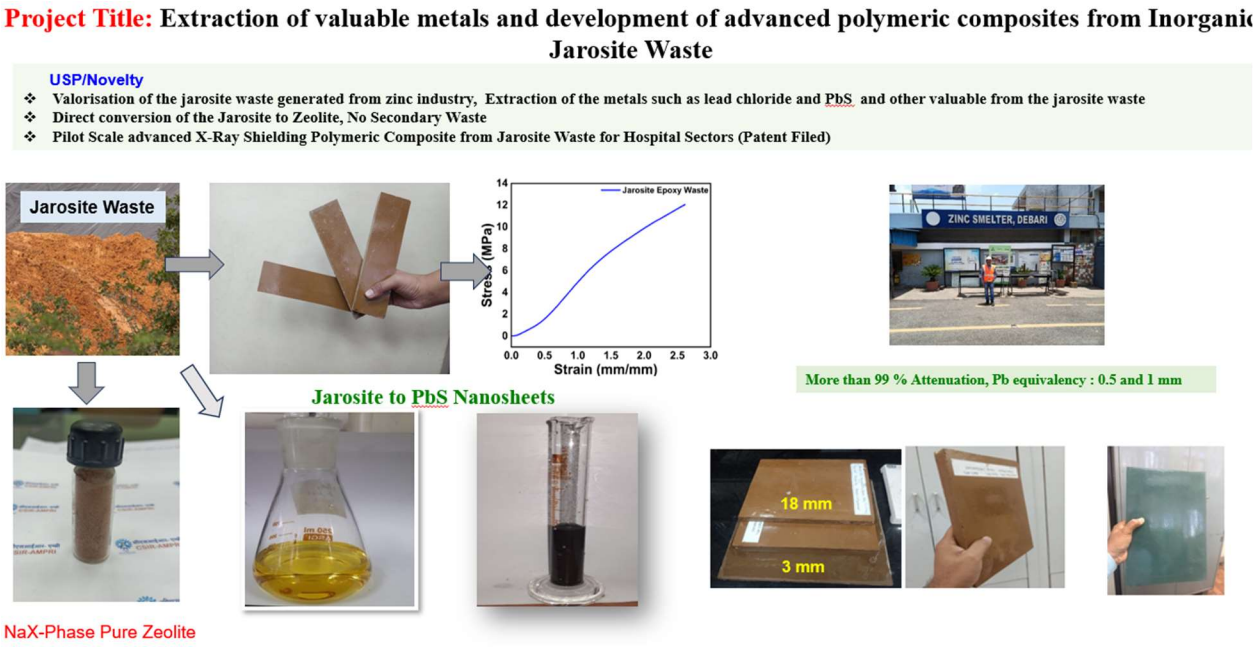
Figure: Piezoelectric nanogenerator based on borophene and WS2 nanosheets

Extraction of valuable metals and development of advanced polymeric composites from Inorganic Jarosite Waste

We have developed eco-friendly X-Ray Shielding panels polymeric tiles and panels based on the jarosite waste under high energy of the 60 KeV and 1 mm lead equivalency was successfully achieved as per BARC protocol

Developed process for extraction of Pb in form of single crystalline PbO and PbS nanosheets from jarosite waste.

Direct conversion of the Jarosite to Zeolite nanostructures is achieved



Development of Fully Biodegradable Paddy Straw-PLA based Packaging Materials

Key Achievement:

We have successfully developed the fully biodegradable granules through compounding process using the starch, paddy straw with, PLA PBAT polymers via single screw extruder process (Capacity 6 kg/hr).

We have developed the biodegradable containers using paddy straw up to 5-35 % through injection molding.

Prototype biodegradable food packaging product with different color and mechanical strength is also achieved through injection moulding.

Divisional activities under FMCD - Mechanical Workshop

The high-value systems undertaken in institute currently have been installed with technical support of division expertise.

1. BIS standard specimen of various metal & fibre compositional tests for characterization have been fabricated with utmost care.
2. Regular Dies & punches, Jigs & fixtures developed as per standards.
3. Skill training imparted to Govt. polytechnic & Engineering students. Under Jigyasa, training to kendriya board run school scholars.
4. CSIR mission work of Parali fibre Mobile stand has been performed with the highest precision and supported by Various Sizing & shaping mechanisms, Edge making and curing, Painting and QC.

Sisal mission works are involved with plant/seedling transportation, planting, and field development in the institute

In CSIR mission on Agri waste utilisation, as per DG madam instructions this division accorded system support with fabrication of 10000 parali based Mobile stand sets.

Green Engineered Materials and Additive Manufacturing

Centre of Excellence in Graphene and its applications

Objectives:

- ✓ Process for making graphene composite powders for 3D printing
- ✓ Standards for qualifying the graphene for 3D printing
- ✓ Graphene coated metal powders for 3D printing and developing application of graphene reinforced metal matrix composites through 3D printing.
- ✓ Demonstration of graphene composites components for Indian Defence (Army/Navy/Air Force)
- ✓ Micro and Nano scale 3D printing of graphene devices
- ✓ Graphene materials for energy and sensor applications

Technology Development:

- Approached by Amag, US based SEM metrology developer for semiconductors, interested in developing the Standards for SEM of Graphene for layer determination. In processes for establishing international MoU, with NIST, Amag and AMPRI in this regard.
- Graphene composites in TRL4, expected 3-5 products using Graphene SS316L or AlSi10Mg metal components are in process for commercialization.
- 3D printed Energy storage in TRL3 (Lab level demonstrated).
- Graphene based bio sensors using the bio 3D printer

Graphene reinforced metal matrix composites through powder bed additive manufacturing for aerospace and defense applications.

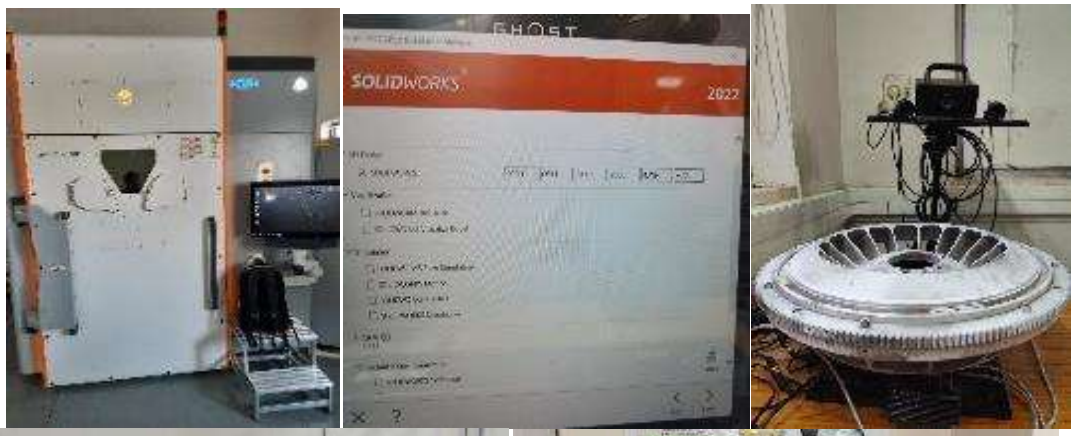
Facility Creation: In this FY, our major aim is for creation of a completed Additive manufacturing facility with at 6.0 Cr. Purchased, installed and Payment processes.

(i) Laser Powder bed Fusion metal 3D printer, Wire EDM and Archimedes density kit

(ii) DfAM software, reverse engineering software, metrology software and 3D scanner

(iii) Optical microscope

(iv) Automated polishing units with Twin jet polisher for EBSD and TEM sample preparation.



Technology Developed:

The fabrication of graphene reinforced metal matrix composites (MMCs) has been a challenging task using conventional manufacturing techniques. However, laser powder bed additive manufacturing has made it possibly create MMCs with uniform dispersion of graphene into the matrix. In additive manufacturing there is a limitation in selection of printable alloy systems. Several metal alloys such as stainless steel 316L, aluminium alloy (AlSi10Mg), and titanium alloy (Ti6AlV4) etc. have a high printability. Hence, these materials are potential candidates for preparing graphene reinforced metal matrix nanocomposite. These materials are trivial for fields like aerospace, instrumentation & strategic sectors.

Graphene, 2D allotrope of carbon exhibit excellent mechanical, thermal and electrical properties. Graphene based nanocomposites are well known for their multifunctional characteristics. The technology is not yet well explored. It is potentially useful in sectors like aerospace, marines and allied

defence sectors. Based on the research conducted at our lab, we have prepared a material data sheet for graphene reinforced stainless steel 316L and AlSi10Mg alloy. These material datasheets serve as a database for fabrication of graphene reinforced composites printed at certain process parameters. The information of the datasheets is appended below.

Data sheet

सीएसआईआर- एमपी
CSIR-AMPRI

SS316L+Graphene powder for additive manufacturing

Process specification for Bare, 0.1wt%, and 0.2 wt% Graphene reinforced SS316L

Powder description	Stainless steel powder
Layer thickness	30 µm
Laser power	320 W
Additive manufacturing system	Renishaw AM400

Powder description	Stainless steel powder + Graphene (0.1 wt%)
Layer thickness	30 µm
Laser power	320 W
Additive manufacturing system	Renishaw AM400

Powder description	Stainless steel powder + Graphene (0.2 wt%)
Layer thickness	30 µm
Laser power	320 W
Additive manufacturing system	Renishaw AM400

Material description

An austenitic stainless steel called 316L alloy is composed of iron alloyed with substantial amount of nickel, chromium, and molybdenum, with a mass fraction of up to 14%, up to 18%, and up to 3%, respectively. The alloy SS316L has been modified to have extra-low carbon content. It has excellent welding properties and is resistant to sensitization (carbide precipitation at grain boundaries). It also possesses high thermal tensile strength and a low stress to rupture.

Addition of multilayered graphene helps in strengthening the base alloy. It has improved the yield strength, hardness and reduced the overall coefficient of thermal expansion.

Material properties

- High hardness and toughness
- High corrosion resistance
- High machine-ability
- Good tribological properties

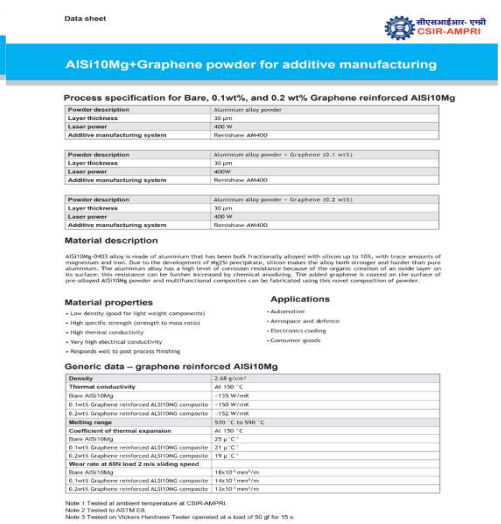
Applications

- Automotive
- Aerospace and defense
- Maritime components
- Surgical tools (without Graphene)
- General engineering
- Biomedical implants (without Graphene)

Generic data – graphene reinforced SS316L

Density	7.9 g/cm³
Thermal conductivity	16.2 W/mK
Melting range	1371 °C to 1399 °C
Coefficient of thermal expansion at 700°C	
Bare SS316L	20.4x10⁻⁶ /K
0.1wt% Graphene reinforced SS316L composite	19.9x10⁻⁶ /K
0.2wt% Graphene reinforced SS316L composite	19.5x10⁻⁶ /K
Wear rate at 10 Kg load 2 m/s sliding speed	
Bare SS316L	0.06 mm³/m
0.1wt% Graphene reinforced SS316L composite	0.05 mm³/m
0.2wt% Graphene reinforced SS316L composite	0.03 mm³/m

Note 1: In the range of 200-1100 °C.
Note 2 Tested at ambient temperature at CSIR-AMPRI.
Note 3 Tested according to ASTM E8.
Note 4 Tested according to ASTM E384-11



Data sheet

सीएसआईआर- एमपी
CSIR-AMPRI

AlSi10Mg+Graphene powder for additive manufacturing

Process specification for Bare, 0.1wt%, and 0.2 wt% Graphene reinforced AlSi10Mg

Powder description	Aluminium alloy powder
Layer thickness	30 µm
Laser power	400 W
Additive manufacturing system	Renishaw AM400

Powder description	Aluminium alloy powder + Graphene (0.1 wt%)
Layer thickness	30 µm
Laser power	400W
Additive manufacturing system	Renishaw AM400

Powder description	Aluminium alloy powder + Graphene (0.2 wt%)
Layer thickness	30 µm
Laser power	400 W
Additive manufacturing system	Renishaw AM400

Material description

AlSi10Mg (AlSi3) alloy is made of aluminium that has been bulk fractionally alloyed with silicon up to 10%, with trace amounts of magnesium and iron. Due to the development of Mg_2Si precipitate, silicon makes the alloy both stronger and harder than pure aluminium. The aluminium alloy has a high level of corrosion resistance because of the organic creation of an oxide layer on its surface; this resistance can be further increased by chemical anodizing. The added graphene is coated on the surface of pre-alloyed AlSi10Mg powder and multifunctional composites can be fabricated using this novel composition of powder.

Material properties

- Low density (good for light weight components)
- High specific strength (strength to mass ratio)
- High thermal conductivity
- Very high electrical conductivity
- Responds well to post process finishing

Applications

- Automotive
- Aerospace and defence
- Electronics cooling
- Consumer goods

Generic data – graphene reinforced AlSi10Mg

Density	2.68 g/cm³
Thermal conductivity	At 150 °C
Bare AlSi10Mg	~135 W/mK
0.1wt% Graphene reinforced AlSi10NG composite	~150 W/mK
0.2wt% Graphene reinforced AlSi10NG composite	~152 W/mK
Melting range	570 °C to 590 °C
Coefficient of thermal expansion	At 150 °C
Bare AlSi10Mg	25 µ/°C
0.1wt% Graphene reinforced AlSi10NG composite	21 µ/°C
0.2wt% Graphene reinforced AlSi10NG composite	19 µ/°C
Wear rate at 60N load 2 m/s sliding speed	
Bare AlSi10Mg	$18x10^{-3}$ mm³/m
0.1wt% Graphene reinforced AlSi10NG composite	$16x10^{-3}$ mm³/m
0.2wt% Graphene reinforced AlSi10NG composite	$13x10^{-3}$ mm³/m

Note 1 Tested at ambient temperature at CSIR-AMPRI.
Note 2 Tested to ASTM E8.
Note 3 Tested on Vickers Hardness Tester operated at a load of 50 gf for 15 s

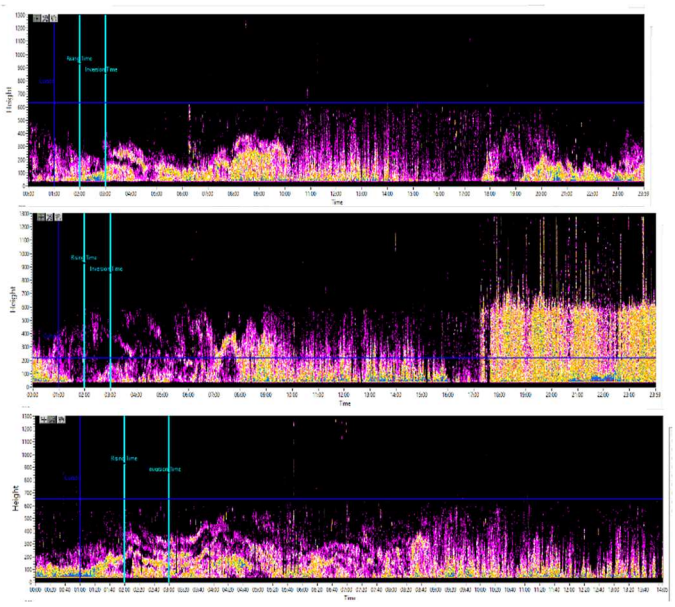
Water Resource Management & Rural Technology Division

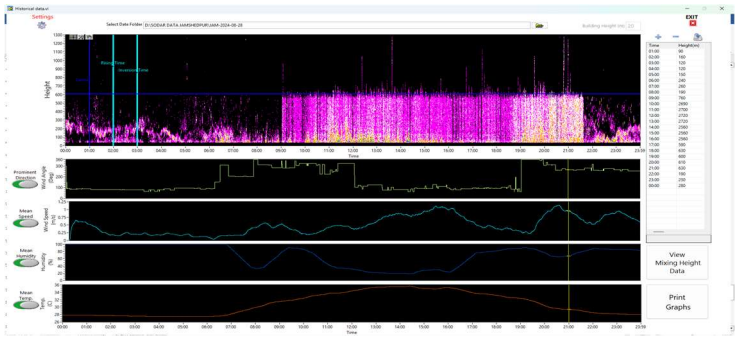
Monitoring of Mixing Height Profile of atmosphere for Jamshedpur city using SODAR System

A monostatic SODAR system deployed at TATA Steel, Jamshedpur. SODAR is acknowledged globally and advised by the Environmental Protection Agency (EPA) for simulating air quality in the Environmental Impact Assessment (EIA). The installation of SODAR was completed in December 2024 by CSIR-AMPRI. Jamshedpur experiences a tropical climate with hot summers, heavy monsoon rains, and mild winters. Special character SODAR echogram structure observed over Jamshedpur region. SODAR echograms offer useful visual representations of atmospheric boundary layer (ABL) features. These structures provide information on thermal stability, turbulence, and wind shear. Some SODAR echogram patterns include the nocturnal boundary layer, raised layer, fog layer, fumigation, multilayer structure, and wind shear of ABL. When the analysis was conducted in Jamshedpur, more multilayer structures and long spike formations were observed as shown in the echograms

SODAR system installed at Tata Steel, Jamshedpur

Site visit for SODAR system installation at Jamshedpur





Special character SODAR echogram structure observed over Jamshedpur

Study of alternate curing methods for curing of cement mortar / concrete

Objectives:

i) Identifying alternate individual and combined mortar/concrete curing systems

ii) Identifying the optimum quantity of SAPs for curing of mortar/concrete individually and with curing compounds

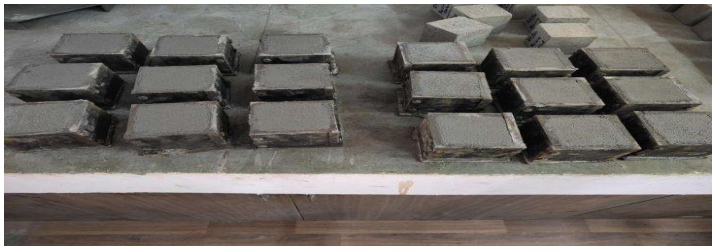
iii) Studying the strength (compressive & flexural) of mortar/concrete with alternate curing systems

Significant achievements:

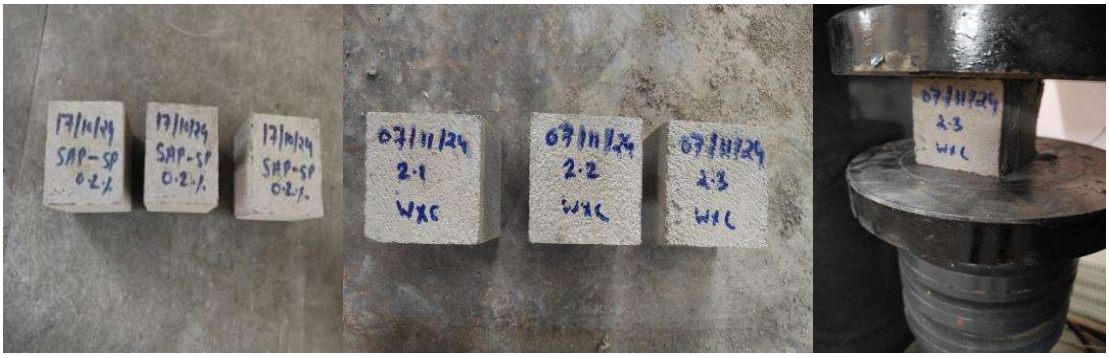
i) Casting and Testing of Mortar Cubes (70.6mm x 70.6 mm x 70.6 mm) for normal water curing

ii) Casting and Testing of Mortar Cubes (70.6mm x 70.6 mm x 70.6 mm) for internal curing (using SAP)

iii) Casting and Testing Mortar Cubes (70.6mm x 70.6 mm x 70.6 mm) for surface applied compound based curing



Casting of Mortar Cubes (70.6mm x 70.6 mm x 70.6 mm)



a. **b.** **c.**

(a & b) Curing of Cubes **(c) Testing of Cubes for compressive streng**

CSIR Integrated Skill Initiative

CSIR Integrated Skill Initiative (Phase II)

Objectives of as per the project document: To Enhance the skills of the candidates by Imparting training in areas of expertise of CSIR-AMPRI

Significant achievement:

During the FY-2024-25 (1st April to 15th December) CSIR-AMPRI, Bhopal has successfully trained 623 numbers of trainees in various skill-training programs.

Participants of Expert Lecture cum Industrial Visit for Faculty Development Program (FDP) from NITTTR Bhopal on October 24, 2024

Training Program IES College Bhopal Dated 22 October 2024

ओजोन परत पर जलवायु परिवर्तन का प्रभाव विषय पर कार्यशाला आयोजित

औद्योगिक अपशिष्ट से निकलने वाले रसायनों, गैसों के ओजोन परत पर पड़ रहे दुष्प्रभाव बताए

Training Program at Govt. Degree College Timrni, Harda, Date 18-09-2024

Tribal Day Dated 19 -11-2024

- Five students were trained in the course “Heat treatment, metallographic and materials characterization” Course coordinator: Dr. Mohit Sharma

CSIR-Jigyasa

CSIR-AMPRI, Bhopal, has been consistently working towards nurturing scientific curiosity and promoting hands-on learning among school students and teachers through the CSIR-Jigyasa initiative. During the financial year 2024–25, the institute actively organised 45 diverse programmes. A total of 21,684 students and 2,754 teachers benefited from these structured activities, designed to raise awareness about science, technology, and innovation.

The programmes included popular lectures, where scientists delivered talks on cutting edge technologies and their societal applications, and laboratory visits, which provided students with first-hand exposure to advanced instruments and experimental setups. The 8th National Science Teachers' Workshop was another major highlight, creating a platform for educators to interact with scientists, exchange ideas, and learn innovative pedagogical practices to make classroom teaching more engaging and effective.

Additionally, outreach programmes and summer vacation programmes were conducted to extend the reach of Jigyasa beyond classrooms, enabling rural and urban school students alike to experience the excitement of scientific exploration. Student-scientist interaction sessions further bridged the gap between learners and experts, allowing participants to seek guidance, clarify doubts, and gain inspiration from real-world research experiences.

In alignment with the objectives of creating lasting educational resources, CSIR-AMPRI also developed six scientific films during the year. These films serve as effective tools for science communication, ensuring wider dissemination of knowledge and creating awareness among students and teachers even beyond physical events.

Through these sustained efforts, CSIR-AMPRI has reaffirmed its commitment to empowering young minds and educators under the Jigyasa initiative, thereby fostering a culture of scientific temper and innovation.

Table: List of Programmes organised during FY 2024-25 under CSIR- Jigyasa Initiative

Sr. No.	Programme name	Date
1	Jigyasa Awareness Workshop for Students	24/04/2024
2	Jigyasa Awareness Workshop for Teachers	29/04/2024
3	Summer Vacation Programme 2024-25	30/04/2024
4	Celebration of World Environmental Day	03/06/2024 to 07/06/2024
5	One Week One Theme programme under Theme: Energy and Energy Devices	05/06/2024

6	Popular Lecture Session 1: Career Exploration in Science: Discover Your Path	25/06/2024
7	Popular Lecture Session 2: with SRM, Inyas	19/07/2024
8	Outreach Programme: Visit to KV3,	23/07/2024
9	Popular Lecture Session 03	23/08/2024
10	Exhibition and Interaction at OWOT: Ahmadabad	30/08/2024
11	Outreach Programme: Visit of a Scientist to JNV Gandhinagar	03/09/2024
12	Lab Visit: JNV Narsinghpur students	04/09/2024
13	Celebration of Engineers Day at JLU, visit of Scientists	12/09/2024
14	Popular Lecture Session 04	13/09/2024
15	Celebration of Foundation Day and Exhibition Delhi	24/09/2024
16	Celebration of Foundation Day AMPRI	26/09/2024 to 29/09/2024
17	Outreach Programme: Scientist Visit at JNV Vidisha	04/10/2024
18	Outreach Programme: Popular Lecture at IIT Indore	08/10/2024
19	Popular Lecture Session 05	14/10/2024
20	Outreach Programme: Jigyasa workshop at Jabalpur	18/10/2024
21	IISF Curtain Raiser Event	26/10/2024
22	Regional Science Congress: JNV Ratibad	08/11/2024
23	Lab Visit for NVS students	12/11/2024
24	Celebration of Jan JatiyDiwas	12/11/2024
25	Exhibition during IISF at IIT Guwahati	19/11/2024
26	Interaction with students during IISF at IIT Guwahati	30/11/2024 to 03/12/2024
27	Quiz Competition during IISF at IIT Guwahati	01/12/2024
28	Lab Visit for KV Pachmarhi	02/12/2024
29	Lav Visit for KV Bairagarh	06/12/2024
30	Lav Visit for KV No. 3	16/12/2024
31	Lab Visit and Hands-On for KV2, Bhopal	17/12/2024
32	Address of Director at APS University	20/12/2024
33	Outreach Programme: Keynote Address at APS University	19/12/2024
34	Popular Lecture and Lab Visit for NVS (Sagar, Sehore) & State govt	20/12/2024
35	8th National Science Teachers Workshop	22/12/2024
36	Outreach Programme: Popular Lecture at SIRT, Bhopal	13-14/02/2025

37	Lab Visit of NITTR	17/02/2025
38	Scientist Visit to JNV Sehore	21/02/2025
39	Outreach programme: Govt.ThakurRanmat Singh College Rewa	21/02/2025
40	Outreach programme: Visit to Vikram University, Ujjain, during MP Young Scientist Congress & Science Festival	22 to 23/03/2025
41	Projects of National Children's Science Congress	26/03/2025
42	Science and Math's Club	July 2024
43	Scientists as Teachers and Teachers as Scientists	July 2024
44	Mentoring program for Adopted ATL Schools	July 2024
45	Brain storming and carrier development program	July 2024

Scientist visit to school as outreach programme

Students and Teachers visiting labs and workshops at various events


Group photograph during the National Science Teachers Workshop


Students performing the Handson experiment


Scientists interacting with students

- Summer vacation program 03-07 June 2024: 4 School students were trained under Dr. Mohit Sharma

Celebration of Janjatiya Gaurav Diwas with Navodaya Vidyalaya school students and faculties on November 18, 2024.

CSIR–AMPRI, Bhopal celebrated Janjatiya Gaurav Diwas on November 18, 2024 to honor the contributions of tribal communities to the nation's history, culture, and independence movement. The event is celebrated with Navodaya Vidyalaya school students and faculties with an objective to

acknowledge the rich cultural heritage of tribal communities and to discuss Government Programs and Policies for tribal welfare.

In the first session, Dr. Sandeep Singhai, Senior Principal Scientist and Head, Business Development and Dr. Neeta VM Khalkho, Senior Principal Scientist, CSIR-AMPRI, Bhopal welcomed faculties of Navodaya Vidyalaya.

Dr. Satanand Mishra, Principal Scientist and Coordinator, CSIR-JIGYASA, CSIR-AMPRI, Bhopal delivered inaugural speech. He highlighted the importance of the event and the contributions of Bhagwan Birsa Munda.

Dr. Sandeep Singhai highlighted the importance of Indian culture and contributions of the tribal community. He impressed upon the pride in our roots and important role of tribal community in the freedom struggle.

Dr. Prabhat Kumar Baghel, Senior Principal Scientist and Coordinator, AcSIR, CSIR-AMPRI, Bhopal interacted with the students. He exalted that going forward some of you will be working among us. He also highlighted the importance of being independent in life.

Dr. Neeta VM Khalkho spoke about the importance of education and opportunities being provided by Government of India. She also impressed upon being self-confident and motivated.

Dr. Surender Kumar, Senior Scientist, CSIR-AMPRI, Bhopal delivered an expert lecture. He highlighted that all the great discoveries and inventions have roots in careful observation.

CSIR-AMPRI capsule Film was played at the occasion which depicted the various R&D work being undertaken by the laboratory in detail

In the second session, students and faculties visited various laboratories/facilities of CSIR-AMPRI viz. 3D Electrochemical Printing Laboratory, Transmission Electron Microscopy Laboratory, Bamboo composite Baithak and Centre for Advanced Radiation Shielding &Geopolymeric Materials (CARS&GM). Students and faculties interacted with, Director, CSIR-AMPRI and Dr. J P Chaurasia, Senior Principal Scientist and Head, Planning & Performance Division, CSIR-AMPRI, Bhopal.

Interaction with Navodaya Vidyalaya school students and faculties

Important Technological Contributions

Paddy Stubble / Paddy Straw Based Hybrid Particle Board

Every year, the burning of agro residues, specially Parali burning in open land, created severe air and smog pollution in NCR, where Delhi has been cited as one of the most polluted cities in the world and air pollution level has reached manifold than that of the World Health Organization (WHO) safe limits. Solution to stop Parali burning is need of society as well as creating new business on parali use with an aim to safeguard our environment, contributes to the Make in India, Clean India, and UN sustainable development goal.

CSIR- AMPRI, Bhopal, have came up with a green technology to manage the paddy straw (Parali) agro waste at large and pilot scale level. We have introduced a new class of materials Parali-based particle board as a wood substitute for building applications so that consumption of timber in building and house construction can be minimized and Parali can be consumed in an eco-friendly manner. This technology also offers a potential solution for the effective utilization of other several industrial wastes such as paddy straw, wheat straw, marble waste, and fly ash. The developed ecofriendlyParali board (evergreen hybrid wood), is cheaper and stronger than the conventional particle Board and Counterpart.

The developed technology can solve the long-standing problem of Parali burning by farmers in Haryana, Panjab, and NCR. The innovative composite evergreen hybrid parali particle board have a variety of application such as doors, false ceilings, flooring, architectural wall panels, partition, panels for locomotive (train) and other transport systems (Bus, ship, etc.) and furniture. It has other potential applications for infrastructure in the construction sector including locomotive (train) and other transport systems The evergreen hybrid ply and composite wood are stronger and environmental-friendly. The developed Parali product is an alternate material for wood/timber, plastic, and synthetic wood such as MDF Board. The evergreen hybrid ply and composite wood are stronger and environmental-friendly. The composite materials are fire retardant, self- extinguishing in nature, cost effective and maintenance free materials.

CSIR-AMPRI have transferred technology "Evergreen Hybrid Composites of Parali (Agro Wastes) to Permali Wallace Pvt. Ltd. Bhopal during 83rd CSIR foundation Day Celebration on 26th September 2024 at National Science Centre, Delhi. and “Evergreen Hybrid Composite of Parali (Agro waste) and Industrial Waste” to well known industry M/s Magniro Global Pvt. Ltd. Raipur, Chhattisgarh on June 24th 2024 during “One Week One Theme” (OWOT) curtain raiser programme under gracious presence of the Dr. Jitendra Singh Honorable Minister (Independent Charge) Ministry of Science & Technology, President, CSIR at Delhi. In recent past, we have transferred same technology to M/s Amit Densified (Doors) Private Limited, Sonipat, Haryana under brand of M/s Bhutan Tuff and M/s, Shubh Green

Sheet Pvt.Bhilai, Durg (Chhattisgarh). Recently, our one of the licensee M/s Amit Densified (Doors) Private Limited, Sonipat, Haryana under brand of M/s Bhutan Tuff has also lunched the product. Moreover, we have also installed our Paddy straw based particle boards at Conference centre of the Indira Paryavaran Bhawan, Ministry of Environment, Forest and Climate Change, New Delhi, Govt of India and now conference hall is fully functional.

Technology transfer to M/s Permali Wallace Pvt. Ltd. Bhopal and M/s Magniro Global Pvt. Ltd. Raipur ,CG

Installation of Parali Particle Board in the Conference Hall, MoEF CC, New Delhi

On 10 May 2024 executed for fixing of parali particle boards in the Conference Hall at MOEF CC office, Indra Paryavaran Bhawan, New Delhi. Interaction held with Mr. Gunsagar Jain, Chief Engineer, CCU MOEF CC, New Delhi. on the subject "Construction of Environment Friendly Building" at Ministry of Environment and Forest & Climate Change (MOEF & CC) office. Detailed discussion held for manufacturing and supplying of glossy finish parali particle boards and Marble composite board to MOEF CC for fixing at MOEF CC Conference Hall front entrance. Mr. Ral Lal, Assistant Engineer MOEFCC, New Delhi, other Executive Engineer, their contractors were also with us along with Chief Engineer, CCU and fixed mat finish parali based particle board developed by CSIR-AMPRI Bhopal as a wall cladding / architectural cladding panels.

Nanoadsorbent based filter for arsenic and fluoride free drinking water

Technology entitled "Nanoadsorbent based filter for arsenic and fluoride free drinking water" developed by CSIR-AMPRI, Bhopal was transferred to M/s Rollabss Hi -Tech Industries, Doctor Water, Kolkata, West Bengal on the occassion of Curtain Raiser event of IISF 2024 at CSIR – AMPRI, Bhopal on November 08, 2024. The know how is based on the CSIR-AMPRI developed technology of large scale and cost effective production of nanoalumina as nanoadsorbent that can effectively remove fluoride and arsenic from contaminated water. The domestic filters designed using this

adsorbent can provide clean water without the need of electricity as well as with zero discharge of waste water. The technology will be crucial in providing potable water to the rural as well as urban population of India.

Know-How Technology transfer of water filter

Commercial Launch of "HealthChlor: An Onsite Hypochlorite Disinfectant Generator" - know-how developed by CSIR-AMPRI and HES Water Engineers (India) Pvt. Ltd.

CSIR–Advanced Materials and Processes Research Institute (AMPRI) developed a portable device "AMPRICARE Instantaneous Hypochlorite Generator Using Kitchen Salt" which gives freedom to make hypochlorite disinfectant anywhere simply using tap water, kitchen salt, and a mobile charger. Its Know-how was transferred to industry partner "M/s HES Water Engineers (India) Pvt. Ltd., Nagpur" on 26th June 2021. This device is now being deployed on a pilot scale in the Aizawl district of Mizoram in collaboration with the Mizoram Science, Technology & Innovation Council. On 24th April 2024, on the occasion of the 49th Research Council meeting of CSIR-AMPRI in the presence of Prof. Vinod Kumar Singh (Padma Shri Awardee), Chair Professor, IIT Kanpur and Chairman RC, CSIR-AMPRI and Prof. Avanish Kumar Srivastava, Director, CSIR-AMPRI, 6-liter Hypochlorite Generator "HealthChlor" was launched. HealthChlor being developed by CSIR–AMPRI and HES Water Engineers (India) Pvt. Ltd. can generate hypochlorite solution varying from 0.2% to 1% strength, that can kill microbes including bacteria and viruses. The device does not require any skilled manpower, easy to operate, and will automatically stop once the reaction is over. The disinfectant has numerous applications such as cleaning waste generated from hospitals, glasswares, water tanks, drinking water, OT tables, cleaning vegetables, toilets, etc.

The occasion was also graced by Dr. Vilas Tathavadkar, Sr. Vice President, Aditya Birla Science & Technology Company Ltd., Shri SudiptaSaha, President Tile Operations & Business Head, Industrial Products, H & R Johnson (India) Ltd, Dr. Suman Kumari Mishra, Director, CSIR-CGCRI Kolkata,

Prof. N. Ravi Shankar, IISc Bengaluru, Dr. S. V. S. Narayana Murty, ISRO Trivandrum, Dr. Mayank Mathur, Chief Scientist, Central Planning Directorate, CSIR-
HQ New Delhi, Dr. J. P. Chaurasia of CSIR-AMPRI, Dr. Archana Singh of CSIR-AMPRI, Dr. Sandeep Singhai of CSIR-AMPRI, Dr. Manish Mudgal of CSIR-AMPRI, Mr. Pradeep Kalele, Director, HES Water Engineers (India) Pvt. Ltd. Nagpur and Mr. Jatin Ahuja, CEO, HES Water Engineers (India) Pvt. Ltd. Nagpur.

At the outset, Prof. Avanish Kumar Srivastava highlighted CSIR-AMPRI's journey from a 250 ml device to a 6 L HealthChlor in close collaboration with the industry partner. He also informed that the device is being implemented in Aizawl in a project funded by the North East Center for Technology Application and Reach, Department of Science and Technology, under which the product (250 ml) was launched by the Honorable Health Minister of Mizoram, Smt. Lalrinpuii. The device is already being implemented at the Cancer State Institute, Urban Primary Health Centre, Zemabawk, churches, and so on. He also appreciated the efforts of HES Water Engineers to bring this device to 6L capacity.

Mr Jatin Ahuja thanked CSIR-AMPRI for their support and spoke about the working principle of the device. He also mentioned countless advantages of owning HealthChlor, in various places like hospitals, primary healthcare centers, hotels, restaurants, public places, etc.

Prof. Vinod Kumar Singh appreciated the joint efforts of CSIR-AMPRI and HES Water Engineers (India) Pvt. Ltd and expected a big market for this technology.

Large Scale Utilization of ZLDR Generated from Grasim Industries Limited, Nagda for Development of a New Class of Wall Tiles/Wall Cladding Panels

This technology titled "Large Scale Utilization of ZLDR Generated from Grasim Industries Limited, Nagda for Development of a New Class of Wall Tiles/Wall Cladding Panels" involved feasibility of utilizing Zero Liquid Discharge Residue (ZLDR) generated from Grasim Industries Limited, Nagda, for developing wall cladding panels. It discussed the properties of ZLDR, its use for making panels and associated environmental and economic benefits. The findings of this study indicated that using ZLDR for manufacturing wall panels, to use as a one of the building materials, contributes to reduce waste disposal costs and enhance sustainability in construction.

Physico-Chemical, Morphological and mineralogical characteristics were evaluated. Toxicity Characteristic Leaching Procedure (TCLP) studies was done to check the toxic elements leaching concentration in ZLDR and understand its hazardous nature. Wall cladding panels have been developed at lab scale at CSIR-AMPRI, Bhopal using ZLDR as primary raw materials alone as well as in combination with other raw materials such as Jute textile fibre, glass textile fibre, and sunmica.

Six different types of experiments were conducted for manufacturing wall cladding panels/wall panels. In all cases epoxy resin was used as a binding medium. Different quantity of polymer was used in each experiment and optimized the process parameters based on the initial experimental trials in achieving good workability and performance. The dimension and thickness of products have been considered in compliance with the Indian standard BIS 15622-2006 (ceramic tiles) and BIS 10701-2012 (plywood wall panel). The prepared wall tiles/ wall cladding panels were tested to access its suitability. The TCLP study confirm that the ZLDR is not hazardous as the concentration of all recommended elements such as Ag, As, Cd, Cr, Mn, Ni, Pb, Se, Zn in ZLDR were below the USEPA & CPCB recommended concentration as these elements were within the permissible limit.

Its evident that wall cladding panels made by ZLDR are equivalent in quality and cost effective to that of wall cladding materials available in the market. This technology has been transferred to M/s Grasim Industries Limited, Nagda on September 6, 2024.

Matt finish wall panel/ tile

Surface finished wall panel/ tile

Know-How Technology on "Green Binder for Bio Composites"

On the occasion of CSIR Foundation Day, a Thematic Exhibition was organized for the first time on 26th September 2024 at the National Agricultural Science Complex (NASC), Pusa Road, New Delhi. At this Thematic Exhibition, a Know-How Technology on "Green Binder for Biocomposites" has been transferred to a well-known composite materials manufacturing company, M/s Permali Wallace Private Limited, Bhopal in the presence of Dr. (Mrs.) N. Kalaiselvi, Director General, CSIR & Secretary DSIR and Mr. Kunal Merchant, Director, M/s Permali Wallace Private Limited, Bhopal. The development of green binders from renewable resources represents a major advancement in sustainable materials. CSIR-AMPRI, Bhopal, has developed a green binder for making biocomposites from bamboo/natural resources. The binder is synthesized from renewable natural resources like rice, oats, etc., as a source of starch, lignin along with other ingredients. The green binder is derived from renewable resources,

thus can reduce the dependence on petroleum-based synthetic binders and can lower greenhouse gas emissions, minimizing environmental pollution. The green binder is non-toxic, making them safer for human use and reducing harmful emissions compared to petroleum-based binders. Also, the binder is biodegradable, recyclable, contributing to environmental conservation.

The process of making the green binder is cost-effective, energy efficient and free of by-product formation, making the process environmentally friendly. The production and use of green binder contribute to a lower carbon footprint, helping mitigate climate change by reducing greenhouse gas emissions. The green binder can be used in a wide range of industries, including packaging, construction, and composites, offering a sustainable alternative without compromising performance.

Know-How Technology transfer on "Green Binder for BioComposites"

@amprisensors: Intelligent Sensors and Alarms for Smoke, Heat and Fire

With urbanization, modernization of technology and climate change, fire accidents have become more common, posing a severe threat to national infrastructure, the economy, human and animal life, and the environment when they grow out of control. The increasing adoption of rechargeable lithium-ion batteries, frequent short-circuits, heatwaves, etc., are also the cause of increased fire accidents. The development of sensitive and reliable smoke, heat and fire detectors and alarm systems is therefore extremely important.

CSIR-AMPRI, Bhopal has come up with a smoke, heat and fire detection technology employing a novel concept of hybrid shape memory polymer composite technology and optical technology. This technology has been transferred to M/s Rahul Infotech, Bhopal. The integration of magnetic technology in this novel system has also been devised to enable switchable RESET mechanism. In general, our technology enables multiple solutions such as heat detection and smoke detection for various applications along with simultaneously heat and smoke detection for fire detection.

Technology of @amprisensors transferred on 17 Jan. 2025 in the presence of Niti Aayog members, DG, CSIR and Director, CSIR-AMPRI Bhopal

Important Events

Intellectual property (IP) awareness program, on 3rd May 2024

CSIR-AMPRI, Bhopal has successfully organized an intellectual property (IP) awareness program, बौद्धिक संपदा (आईपी) जागरूकता कार्यक्रम , Intellectual Property (IP Awareness Programme- (Celebrating the World IP Day 2024) Under "Rashtriya Boudhik Sampada Mahotsav and Viksit Bharat Programme with the Theme – Importance of IP in Scientific and Technological Interventions on 3rd May 2024, at 11.00 a.m, Friday, Online Mode.

Intellectual Property (IP) Awareness Programme

One Week One Theme (OWOT) programme on Theme "Energy and Energy Devices" (EED), 25th June 2024

CSIR-AMPRI Organized One Week One Theme programme on Theme "Energy and Energy Devices" on 25th June 2024.Prof. Sudhir S. Bhadauria, Director, University Institute of Technology, R.G.P.V, Bhopal, Vice President, VIBHA was the Chief Guest at the occasion.Mr. Subhro Banerjee, Director, Nordische Energy Systems Pvt. Ltd., Bengaluru was Distinguished Guest at the function

Dr. Vinod K. Sethi, Director General (Research), RKDF University, Bhopal was Distinguished Guest and Keynote Speaker.

At the outset, Director, CSIR-AMPRI, Bhopal gave welcome address and opening remarks. He highlighted the importance of celebration of One Week One Theme programme on Theme "Energy and Energy Devices" and talked about research activities of CSIR-AMPRI which are aligned with the theme.

Capsule Film about 'Make in India' Raman Spectrometer was played at the occasion.

Dr. D.P. Mondal, Chief Scientist, CSIR-AMPRI, Bhopal spoke about the theme. He emphasised that proper direction should be given to the research carried out at CSIR for dissemination to the society. He highlighted about carbon foam, aluminium foam and graphene foam related research carried out at CSIR-AMPRI for

application in batteries. Foam related studies are also being performed in collaboration with Nordische Energy Systems Pvt. Ltd.

Mr. Subhro Banerjee, Director, Nordische Energy Systems Pvt. Ltd, Bengaluru addressed the gathering. He talked about foam related battery research going on at Nordische in collaboration with CSIR-AMPRI and emphasised that it has huge potential in energy sector.

Dr. Archana Singh, Principal Scientist, CSIR-AMPRI, Bhopal presented on Materials for Energy at CSIR AMPRI. She highlighted various materials and devices being developed at CSIR-AMPRI for energy applications.

Dr. Vinod K. Sethi, Director General (Research), RKDF University, Bhopal talked about "Renewable energy deployment towards environmental sustainability". He emphasised that carbon dioxide capture, utilisation and storage is important for sustainable future.

Prof. Sudhir S. Bhadauria addressed the gathering. He cited an example of Raman spectrometer. He emphasised that these programmes motivate students to perform research and solve problems of society like global warming and climate change in future.

Poster presentation session was organised for the students of CSIR-AMPRI and prizes were sponsored for first three winners by BioLogic India.

CSIR-AMPRI technology-based Mementos were presented to the Guests by Director, AMPRI.

Glimpses of OWOT programme on theme EED

Rashtriya Hindi Vigyan Sammelan, at CSIR-AMPRI, Bhopal, 30-31 July, 2024

CSIR-AMPRI, Bhopal in collaboration with Vijnana Bharati, Madhya Bharat Province, Madhya Pradesh Council of Science and Technology, Bhopal, Madhya Pradesh Bhoj Open University, Bhopal, CSIR-NiScPR, New Delhi, Atal Bihari Vajpayee Hindi Vishwavidyalaya, Bhopal organised Rashtriya Hindi Vigyan Sammelan, at CSIR-AMPRI, Bhopal 30-31 July, 2024. The conference's primary aim was to offer a platform for researchers to present and discuss their work in Hindi, fostering the popularisation of science and technology through this language. The event was inaugurated by Dr. Mohan Yadav, Chief Minister of Madhya Pradesh, who emphasised the importance of advancing knowledge and science in our own language. "We can become a Vishwa Guru only through knowledge and science in our own language," stated Dr. Yadav, expressing his hope for the conference to evolve into an international event.

Director of CSIR-AMPRI, in his welcome address highlighted the importance of promoting S&T research in Hindi through this conference and urged the scientific community to contribute actively.

Prof. Venugopal Achanta, Director, CSIR-National Physical Laboratory and Acting Director of CSIR-National Institute of Science Communication and Policy Research (CSIR-NIScPR), underscored the significance of using Hindi as a medium for science communication.

The Vigyan Kavi Goshti, a special event organised by CSIR-NIScPR in collaboration with other co-organisers of the conference, took place on July 30, 2024. Inaugurated by Shri Dharmendra Bhav Singh Lodhi, Minister of State (Independent Charge), Department of Culture, Tourism, Religious Trusts, and Endowments, Government of Madhya Pradesh, this science poetry seminar provided a platform for poets, science communicators, and writers to promote science through Hindi. The event featured 12 distinguished science poets who delivered captivating poetry.

On July 31, the valedictory session was graced by Shri Rajendra Shukla, Deputy Chief Minister of Madhya Pradesh. During the session, a Memorandum of Understanding (MoU) was signed between various universities and CSIR-AMPRI. The conference featured six sessions on diverse topics of Science, Technology, Engineering, Ayurveda, and Science Communication.

The Rashtriya Hindi Vigyan Sammelan 2024 has been a significant step toward enriching science and technology-based research in Hindi and fostering greater engagement with scientific discourse in the language.

Dr. Mohan Yadav, CM of M.P. addressing the gathering

Signing of MoU between University and CSIR-AMPRI

One Week One Theme (OWOT) programme on Theme "CIVIL INFRASTRUCTURE AND ENGINEERING" (CIE) and CSIR-OWOT-CIE & CIDC-ICC CONCLAVE-2024 during 5 th -6 th September 2024

Two days event of CSIR - One Week One Theme (OWOT) programme on Theme "CIVIL INFRASTRUCTURE AND ENGINEERING" (CIE) was inaugurated on 5th September 2024 at CSIR-AMPRI, Bhopal. Under the umbrella of this programme, CSIR-AMPRI, Construction Industry Development Council (CIDC) and International Council of Consultants (ICC) jointly organized CSIR-

OWOT-CIE & CIDC-ICC CONCLAVE-2024 on the topic "EMPOWERING FUTURE INFRASTRUCTURE WITH INNOVATIVE TECHNOLOGIES & BRAND CONNECT".

Dr. Mohan Yadav, Honorable Chief Minister, Govt. of Madhya Pradesh was the Chief Guest and Smt. Krishna Gaur, Honorable Minister of State, Govt. of Madhya Pradesh (Independent Charge) was special guest at the inaugural function. Dr. Mohan Yadav, Honorable Chief Minister joined the programme through online mode. Two days event was concluded on 6th September 2024. Shri Narendra Shivaji Patel, Honorable Minister of State for Public Health & Medical Education, Madhya Pradesh was the Chief Guest at the Valedictory function on 6th September 2024.

Director-CSIR-AMPRI, Bhopal, Director, CSIR-CRRI, New Delhi, Dignitaries from CSIR-AMPRI and CIDC were present and addressed the gathering.

Memorandum of Cooperation was signed between CSIR-AMPRI and CIDC-ICC in presence of dignitaries. MoU was exchanged between CSIR-AMPRI, Bhopal & Awadhesh Pratap Singh University, Rewa, MP.

More than 250 Participants which includes Dignitaries, Senior officials from Govt. of M, Bureaucrats, Engineers, consultants and industry officials from various organizations participated and presentations and technical discussions were held during the two days event. Dignitaries visited exhibition based on technologies of CSIR and startups from various states.

Technical sessions and Panel discussion sessions were held on various topics. These sessions were chaired by Director-CSIR-AMPRI, Bhopal and Director, CSIR – CRRI, New Delhi.

As an outcome of this conclave a Declaration was signed between CSIR-AMPRI & CIDC-ICC to work together for advancement and dissemination of Science and Technology.

Inauguration of exhibition and Exchange of MOU

Programme for Patent Filing Activity, 23 – 24 January 2025

A special and unique Programme was organized at CSIR-AMPRI, Bhopal for the Patent Filing Activity in collaboration with CSIR–URDIP and CSIR–IPU, CSIR– AMPRI Bhopal Agenda/Programme on 23 – 24 January 2025, at CSIR-AMPRI, Bhopal.

Glimpses of programme for the Patent Filing Activity

राजभाषा से संबंधित गतिविधियाँ

राजभाषा कार्यशाला

दिनांक 10 जनवरी, 2025 को संस्थान में सभी प्रभागों के नोडल अधिकारियों के लिए एक राजभाषा कार्यशाला का आयोजन किया गया | कार्यशाला में वरिष्ठ हिंदी अधिकारी डॉ. मनीषा दुबे ने सभी नोडल अधिकारियों को उचित प्रकार से राजभाषा कार्यान्वयन संबंधी आंकड़े रखने और उनको तिमाही रिपोर्ट में प्रस्तुत करने के विषय में बताया | सभी ने इसमें विशेष रूचि दिखाई| कार्यशाला में संशोधित संसदीय राजभाषा समिति निरीक्षण प्रश्नावली पर भी चर्चा की गयी |

हिन्दी सप्ताह

सीएसआईआर-प्रगत पदार्थ तथा प्रक्रम अनुसंधान संस्थान (सीएसआईआर-एम्प्री) में दिनांक 07 सितम्बर, 2024 से प्रारंभ होने वाले हिन्दी सप्ताह का समापन दिनांक 13 सितम्बर, 2024 को हिन्दी दिवस समारोह के रूप में हुआ। हिन्दी सप्ताह के अंतर्गत स्टाफ सदस्यों के लिए हिन्दी और हिन्दीतर वर्ग में कई प्रतियोगिताओं का आयोजन किया गया, जिनमें सभी ने उत्साहपूर्वक प्रतिभागिता की।

17 सितम्बर, 2024 को हिन्दी दिवस समारोह में डॉ. संजय कुमार, अध्यक्ष, कृषि वैज्ञानिक चयन मंडल एवं पूर्व निदेशक, आई एच बी टी, पालमपुर मुख्य अतिथि थे।

मुख्य अतिथि का स्वागत करते हुए संस्थान के निदेषक डॉ. अवनीश कुमार श्रीवास्तव ने हिन्दी दिवस के आयोजन के एतिहासिक परिप्रेक्ष्य पर प्रकाश डाला। साथ ही उन्होंने संस्थान में चल रही गतिविधियों पर भी चर्चा की। उन्होंने कहा हिंदी जनमानस की भाषा है। हर देश की अपनी भाषा होती है और उससे उस देश की पहचान होती है| भाषा के माध्यम से संस्कृति और सभ्यता एक पीढ़ी से दूसरी पीढ़ी में जाती है| उन्होंने अपने उद्बोधन में हिंदी कार्य में शासकीय अनिवार्यताओं पर प्रकाश डाला|

वरिष्ठ वैज्ञानिक डॉ. चेतना ढांड ने अतिथि परिचय प्रस्तुत किया।

मुख्य अतिथि ने अपने उद्बोधन में कहा कि एम्प्री की इंडस्ट्रियल रिसर्च में महत्वपूर्ण भूमिका रही है| वास्तव में शोध पत्रों से अधिक महत्वपूर्ण प्रौद्योगिकियाँ एवं उत्पाद है| उन्होंने हिंदी भाषा के विकास और महत्व को रेखांकित करते हुए रोजाना के उदाहरण दिए । उन्होंने आईएचबीटी की गतिविधियों को भी रेखांकित किया और जैविक संपदा से आर्थिकी के विकास के ऊपर प्रकाश डाला। उन्होंने यह भी कहा कि अनुसंधान कार्यों में एम्प्री के साथ आईएचबीटी के सहयोग के बहुत संभावनाएं हैं।

इस अवसर पर संस्थान की गतिविधियों पर तथा सी एस आई आर - एम्प्री में विकसित रमन स्पेक्ट्रोमीटर पर हिंदी में फिल्मों का प्रदर्शन किया गया |

संस्थान के वरिष्ठ प्रधान वैज्ञानिक डॉ. जे पी चौरसिया ने धन्यवाद ज्ञापन किया। इस अवसर पर हिन्दी सप्ताह के दौरान आयोजित प्रतियोगिताओं के विजेताओं तथा वर्ष भर हिन्दी में अधिक काम करने वाले स्टाफ सदस्यों को पुरस्कृत किया गया। इस अवसर पर संस्थान की राजभाषा पत्रिका 'सोपान' का विमोचन मुख्य अतिथि के कर-कमलों द्वारा हुआ। वरिष्ठ हिन्दी अधिकारी डॉ. मनीषा दुबे ने कार्यक्रम का संचालन किया।

सीएसआईआर-एम्प्री में हिन्दी दिवस समारोह की झलकियां

Outreach Activities

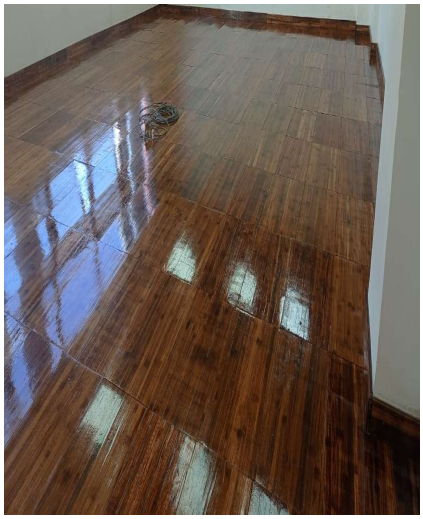
1.CSIR-AMPRI, Bhopal has been recognized by the Honorable Vice President of India Shri Jagdeep Dhankhar, who visited CSIR-AMPPRI's, Bamboo Composite know-how/ Samples in a thematic Exhibition on 26th September 2024 at the National Agricultural Science Complex (NASC) Complex, Pusa Road, New Delhi, during CSIR Foundation Day. In his speech, Honorable Vice President Sir had specifically recognised, mentioned, appreciated and motivated the AMPRIs work of Bamboo Composite.

Dr. N. Kalaiselvi, DG, CSIR & Secretary DSIR, Honourable Vice President of India Shri Jagdeep Dhankhar, 26th Sep 2024, Thematic Exhibition, National Agricultural Science Complex (NASC) Complex, Pusa Road, New Delhi, CSIR-Foundation Day, New Delhi.

2.CSIR-AMPRI, Bhopal has participated and been recognized for the product Launch program of Bamboo Composite in the prestigious CSIR-Curtain raiser program of One Week One Theme (OWOT) in the presence of S &T Minister of Science & Technology, Dr Jitendra Singh, & DG, CSIR & Secretary, DSIR, CSIR Dr. (Mrs.) N. Kalaiselvi & Dr. AK Srivastava, former Director AMPRI, Mr. Kunal Merchant, Director M/s Permali Wallace Pvt. ltd., Bhopal, and Habitat Centre New Delhi team members

Product Launch Programme- Minister Of Science & Technology, Dr. Jitendra Singh, & DG, CSIR & Secretary, DSIR, CSIR Dr. (Mrs.) N. Kalaiselvi, 24th June 2024, New Delhi

3.The CSIR-AMPRI's know-how-based 'Bamboo Composites Tiles' manufactured by the industry partner M/S Permalli Wallace, Bhopal, have been successfully deployed, installed, and inspected time to time for demonstration at 1- CSIR-HQ, New Delhi, Room No. 101 and in AMPRI's five-star rated green New Building.



Conference / Meeting Room 101 at CSIR –HQ, New Delhi and -AMPRI's five-star rated green New Building.

Awards and Achievements

- CSIR AMPRI & HES Water Engineers India Pvt Ltd. got certificate of recognition for excellence in Healthcare Innovation (Development of "HealthChlor: An Onsite Hypochlorite Disinfectant Generator) by EletsTechnomedia at 13th Elets Healthcare Innovation Summit and Awards Ceremony, New Delhi, 7-8 June 2024.
- Dr. Sarika Verma received the Women's Achievers Award 2024 from Dainik Bhaskar in the gracious presence of the Deputy Chief Minister Govt. Of Madhya Pradesh Dr. Rajendra Shukla, 23rd July 2024.
- Dr Archana Singh, Principal Scientist, CSIR-AMPRI, Bhopal has been awarded prestigious WISER research grant by Indo German Science and Technology Center DST by Honrable Minister of Science and Technology, India for three years, 24th October 2024.
- Dr. Manoj Kumar Gupta, Senior Scientist at CSIR-Advanced Materials and Processes Research Institute (AMPRI), Bhopal has been awarded with the funding from prestigious Council of Scientific and Industrial Research (CSIR) – St. Petersburg State University (SPBU) Joint Research projects programme 2024 for his research proposal. Under this programme, Dr. Manoj Kumar Gupta will visit and carry out research at St. Petersburg State University, Russia for one month.
- Dr. Avanish Kumar Srivastava, Director, Dr. Dipen Kumar Rajak, Scientist, Dr. Pradip Kumar, Senior Scientist, Dr. Neeraj Dwivedi, Principal Scientist, CSIR-AMPRI listed in the top 2% scientist in 2024 in the world based on citations report of Stanfort University, US 2024
- Dr. Dipen Kumar Rajak Joined as Editor Board Members: Discover Mechanical Engineering-Springer Nature, SCI
- Dr. Dipen Kumar Rajak Joined as Editor Board Members: International Journal of Polymer Science-Wiley, SCI
- Dr. Dipen Kumar Rajak Awarded Early Career Editor Board Members: Materials Genome Engineering Advance-Wiley, SCI
- Dr. Dipen Kumar Rajak Joined as Editor Board Members: Editor Board Members: Advances in Polymer Technology-Wiley, SCI
- Dr. Dipen Kumar Rajak Edited Books "Advances in Sustainable Biomaterials: Bioprocessing 4.0, Characterizations, and Applications & Multi-scale and Multifunctional Coatings and Interfaces for Tribological Contacts" under Taylor and Francis Group.
- Dr. Venkat A N Ch got Best Oral presentation on subject "Effect of face sheet material on flexural deformation behaviour of aluminium hybrid composite closed-cell foam core sandwich panels" at an international symposium on transformational technologies in materials and manufacturing,

and Annual Technical Meeting of IIM" jointly organized by Jindal steel and Indian Institute of Metals, Kolkata held during 20-22 November 2024

- Dr. Dipen Kumar Rajak, listed consecutively in the third year (2022, 2023, 2024) in the World Top 2% Scientists by Stanford University.
- Dr. Shiv Singh granted honorary membership (MRSC) by the Royal Society of Chemistry, UK!
- Dr. Shiv Singh has been chosen to join Springer Nature, Scientific reports (IF=15.5) Journal's Editorial board member.
- Dr. Shiv Singh has been appointed as Editor of early career researchers editorial board of Wiley Energy & Environmental Materials (IF=15)
- Dr. Shiv Singh has been chosen to join the RSC Materials Horizons (IF=15.5) Journal's Community Board; a distinguished journal affiliated with the Royal Society.
- Dr. Shiv Singh has been selected as a Young Editorial Board member for Nano-Micro Letters Journal published by Springer (IF=26.6)
- Dr. Shiv Singh received Certificate of Achievement, from Shinshu University, Japan on 26th, Feb, 2024 for delivering lecture in IFES special lectures series from Internationally Recognized Scholars
- Dr. V. Sorna Gowri visited Shinshu University, Japan during (i) Feb15th to 29th, 2024 and (ii) October 15th to 26th, 2024 under Indo-Japan joint project sponsored by DST, India and JSPS, Japan.
- Dr. Asokan Pappu, participated as the Chief Guest of the National Workshop on Technology & Export on 24Feb. 2025 at Jalore, Rajasthan, which was organized by MSME-Development & Facilitation Office, Jaipur, Ministry of MSME, Government of India.
- Dr. Asokan Pappu, participated as esteemed guest as well as a distinguished speaker for the MSME Entrepreneurship Development Program sponsored by MSME Indore in association with IIT Indore and Oriental University, which was held in Oriental University, Indore on 10 Feb. 2025.
- Dr. Asokan Pappu participated in the Panel Discussion on AMPRI Hybrid Composite Technology in the MSME program and Symposium organised by ATIRA, Ministry of Textile and CII on Advancement in composites New Delhi on 09/05/2024.
- Dr. R K Bharilya, invited as BOS (Board of studies) of MANIT, Bhopal as R&D expert for 4th consecutive year.
- Ms. Medha Mili, Senior Scientist, CSIR-AMPRI, Bhopal: Awarded with The Institution of Engineers, "IEI Young Engineers Award 2024-25" for recognition of her contributions in the

field of Environmental Engineering on the occasion of Thirty-Eighth National Convention of Environmental Engineers, held at Kochi Local Centre, Kochi, 23-24 August 2024.

- Dr. H. N. Bhargaw is nominated as Principal Member of Wearable Electronic Devices and Technologies Sectional Committee, Bureau of Indian Standards (BIS), New Delhi.
- Dr. Sarika Verma was Selected and completed the programme entitled Women in Space and Allied Sciences Leadership Program (WiSLP) WISE-KIRAN Division by DST is collaborating with the British Council on the Women in Space and Allied Sciences Leadership Program (WiSLP) under UK-India Education and Research Initiative (UKIERI) from 28th Jan – 30th Jan 2025 at the Indian Association for the Cultivation of Science, Kolkata.
- Dr. Sarika Verma joined as Editor in the Journal Scientific Reports, Springer, Environmental Science.
- Dr. Deepti Mishra was an External expert for a contract faculty interview in chemistry at MANIT, Bhopal.
- Dr. Deepti Mishra was Subject expert in applied chemistry under faculty of engineering for Ph.D Degree of candidates at DAVV, Indore.

Top cited articles:

- Arpana Parihar, Avinash Kumar, Udwesh Panda, Rukhsar Khan, Dipesh Singh Parihar, and Raju Khan, Cryopreservation: A Comprehensive Overview, Challenges, and Future Perspectives, *Advanced Biology*, 2023, 2200285

- Arpana Parihar, Shalu Yadav, Mohd Abubakar Sadique, Pushpesh Ranjan, Neeraj Kumar, Ayushi Singhal, Vedika Khare, **Raju Khan,** N. Sathish, and Avanish Srivastava, Internet-of-medical-things integrated point-of-care biosensing devices for infectious diseases: towards better preparedness for futuristic pandemics, *Bioengineering & Translational Medicine,* 2023, e10481

- Manish Dhangar, Kamna Chaturvedi, Medha Mili, Shiv Singh Patel, Mohd Akram Khan, Hari N. Bhargaw, Avanish Kumar Srivastava, Sarika Verma, Polymer for advanced technologies.. Emerging 3D printed thermal insulating materials for a sustainable approach: A review and forward,2024.

Media Coverage in International Research Platform

- Manish Chauhan, Yashmeen Budania, Akshay Modi, Pradip Kumar, Sarvesh Kumar Pandey, S. Singh *(corresponding). Trifunctional nature of heteroatoms (B, N, S, O) doped waste diesel soot: Turning pollutants into potential energy catalysts for HER, OER and ORR. Carbon Neutralization, 4, e195 (2025) IF=~18*
  (Research highlighted in Nature India doi: https://doi.org/10.1038/d44151-025-00047-9*)*
  (Research highlighted in Science X/Phys.org https://phys.org/news/2025-03-pollution-power-method-carbon-nanoparticles.html *)*
- Yashmeen Budania, Manish Chauhan, Shraddha Mishra, S. Singh *(corresponding). N/NiO-Ornated Graphitic Fiber-Engrained Micro-Carbon Beads: Innovative Packed Bed Type Capacitive Electrodes for Microbial Fuel Cells. Chemical Engineering Journal 499, 156018 (2024) I.F.= 16.5
  (Research highlighted in Science X/phys.org https://phys.org/news/2024-09-pollution-power-merging-wastewater-treatment.html#google_vignette*)*

Invited Talks

- **Dr. Sarika Verma** delivered and coordinated a talk in the Webinar, on CSIR-integrated skill initiative programme and Viksit Bharat on 16th April 2024, titled " Technological Aspects of Bamboo with its Biological Features and Various Products towards Sustainability to PG students of Govt Holkar Science College, Indore.
- **Dr. Tamal Chatterjee** delivered a talk on "Artificial Photosynthesis: Present and the Future", in Jigyasha Program, CSIR-AMPRI, on April 29, 2024.
- **Dr. Sarika Verma** delivered a lecture entitled -Bamboo Centre and Bamboo Based Technologies during Jigyasa outreach programme under CSIR-Jigyasa & Viksit Bharat Programme, Popularization of Science among the students on 29th April 2024.
- **Dr. Dipen Kumar Rajak** delivered invited talk as *Guest Speaker* on "Career Opportunities", Jigyasha, CSIR-AMPRI, April 29, 2024.
- **Dr. Tilak Joshi** delivered talk on "Advanced techniques for the development of light weight energy absorbing materials", event- Shodh Shikhar-24, International research and innovation conference at RNTU, Bhopal, date- May 3-4, 2024.
- **Dr. Tamal Chatterjee** delivered a talk on 'Semiconductor–Molecular Catalyst Hybrid Materials for CO_2 Reduction Catalysis' at 3rd Indian Analytical Congress (IAC-2024), CSIR-IIP, Dehradhun, June 5-7, 2024.
- **Dr. Sarika Verma** delivered a Lecture in celebration of "World Environmental Day 2024" on June 5, 2024, in offline mode, at Saranjamshala.
- **Dr. Sandeep Singhai delivered an** invited expert lecture on "World Environment Day 2024: Points to Ponder" during World Environment Day celebrations on June 05, 2024 at CSIR-AMPRI, Bhopal.
- **Dr. Dipen Kumar Rajak** delivered talk as Guest Speaker on "Insights into Wind Energy Potential and Aspects", IEI Rourkela Chapter, Rourkela, Odisha, June 15, 2024.
- **Dr. Sarika Verma** delivered a talk " Sources, implementation and importance of successful Research Grant Proposal-A success story on Bamboo Composites" 26 June 2024 (online)as a Resource Person for the "2nd Faculty Induction Programme on Developing Successful Research Grant Proposals" from 24th to 30th June, 2024 at Central Agricultural University, Imphal, Manipur.
- **Dr. Sandeep Singhai delivered an** invited online lecture on "Overview of Research Methodology & Intellectual Property Rights" during FDP on research paper writing on June 26, 2024 at Chameli Devi Group of Institutions, Indore.
- **Dr. M. Chandra Shekhar Nayak** delivered a Keynote lecture on 'Wastewater Separation V/s Membrane Technology' at the 4th International Conference on Waste, Energy, and Environment

(ICWEE-2024) at Sathyabama Institute of Science and Technology, Chennai, Tamil Nadu, India, July 3-7, 2024.

- **Dr. Tamal Chatterjee** delivered a talk on 'Semiconductor–Molecular Catalyst Hybrid Materials for CO_2 Reduction Catalysis' at 30th International Conference on Organometallic Chemistry at Jaypee Palace, Agra, ICOMC-2024, July 14-18, 2024.
- **Dr. M. Chandra Shekhar Nayak** delivered an Expert Lecture at the Faculty Development Program 'Characterization of Nanomaterials', on 'Nanocomposites and its Engineering Applications', at National Institute of Technical Teachers' Training and Research (NITTTR), Bhopal, August 01, 2024.
- **Dr Venkat Chilla** delivered a presentation on "Aluminium- hybrid composite foams and foam core structures for automobile and defence applications" in one week one theme program held in CSIR-IMMT, Bhubaneswar on August 12, 2024
- **Dr Abhishek Pandey** delivered a presentation on "Advanced Manufacturing: Scope for strategic purposes and other applications" in one week one theme program held in CSIR-IMMT, Bhubaneswar on 12th August 2024.
- **Dr. Kirti Soni** delivered a talk on Space Exploration: A Captivating Journey Through the Beyond" during Space Day celebration, Touching Lives while Touching the Moon: India's Space Saga at Shramoday School, Bhopal on August 23, 2024
- **Dr. Kirti Soni** delivered a talk on Acoustical Metrology: An Overview of Acoustical Testing and Analysis in National Workshop on Legal Metrology (weights & measures), Legal Metrology, GoI on 24th August 2024
- **Dr. Sanjeev Saxena** delivered presentation of Wealth-to-wealth technologies of CSIR including CSIR-AMPRI technologies and also participated in panel discussion in One week one theme program held in CSIR-SERC, Chennai, September 5, 2024
- **Dr. Sandeep Singhai delivered an** invited talk on "Technologies of CSIR-AMPRI for Commercialization" during CSIR-OWOT-CIE & CIDC-ICC Conclave-2024 on September 05, 2024 in association with CIDC and ICC, New Delhi.
- **Dr. Sarika Verma** delivered a talk " Bamboo and Sisal Fiber Technology in a Technical session during the One WEEK One Theme (OWOT) "Empowering Future Infrastructure With Innovative Technologies & Brand Connect" Jointly organized by CSIR-Advanced Materials and Processes Research Institute, Bhopal (Ministry of Science and Technology, Govt of India) and Construction Industry Development Council (CIDC) and International Council of Consultants (ICC) on 5th-6th September 2024.
- **Dr Rajesh Patidar** delivered an invited talk at National Conference "Recent Innovations in Chemistry and Chemical Engineering" held at Maulana Azad National Institute of Technology

Bhopal M.P. on the topic “Analysis of Metal Ions by Cutting-Edge Analytical Techniques and Chemical Probes”, September 20, 2024.

- **Dr. Vandana** delivered a talk on “Silicon Photovoltaic Devices: Cells & Modules” in Student-Scientist Interactive and Popular lecture session 04 under Jigyasa Program on 24th September 2024.
- **Dr. Sandeep Singhai delivered an** invited online talk on “Intellectual Property Rights - From a Researcher Perspective” during AIU-sponsored FDP on September 24, 2024 at Desh Bhagat University, Punjab.
- **Dr. Sandeep Singhai presented** “CSIR-AMPRI: Potential and Capabilities” during the visit of Indo-Borax Limited CEO on October 01, 2024 at CSIR-AMPRI, Bhopal.
- **Dr. Sandeep Singhai delivered a talk on “**A Panorama of CSIR-AMPRI Research Activities” during the visit of Prestige Institute FDP participants on October 04, 2024 at CSIR-AMPRI, Bhopal.
- **Dr. Dipen Kumar Rajak** delivered talk as Guest Speaker on “Insights into Revolutionizing the Semiconductor Industry”, Prestige Institute of Management & Research, Bhopal, MP, October 05, 2024.
- **Dr.Venkat Chilla** has delivered a a lecture as eminent speaker on “Processing, properties and prospectus of metal foams”, National Conference on Advances in Manufacturing Technology (NCAMT)- 2024, 18 -19 October 2024, Department of Materials & Metallurgical Engineering, MANIT, Bhopal
- **Dr. Venkat Chilla** delivered invited talk on " Metal foams, past-present and future prospectus" at National conference on Advances in Manufacturing Technology (NCAMT)”, 18-19th October 2024 at MANIT, Bhopal
- **Dr. Vandana** delivered a talk on “ALD deposited HfOx/AlOx and ZnOx/AlOx films for Silicon surface passivation” atNational Conference on Sustainable Energy, Environment, Molecules, Materials, and Technologies (NCSEEMMT-2024) under DST-PURSE program on 22nd October 2024**.**
- **Dr. Sarika Verma** has participated and delivered a lecture in the inauguration programme in a workshop on the topic “Technical aspects of Scientific Paper writing and Publishing” on 22nd October 2024, organized by the Department of Microbiology, Barkatullah University, Bhopal, on the theme – Scientific Paper Writing".
- **Dr. Sandeep Singhai delivered an** invited talk on “Intellectual Property Rights (IPR) for Knowledge Protection” during student interaction on October 22, 2024 at IES University, Bhopal.
- **Dr Abhishek Pandey** delivered an invited lecture on “Additive Manufacturing: An introduction” under faculty development program on October 23, 2024 at NITTTR Bhopal.

- **Dr Gaurav Kumar Gupta** delivered an invited lecture on "Smart Materials" under faculty development program on October 23, 2024 at NITTTR, Bhopal.
- **Dr. Sandeep Singhai delivered an** invited talk on "CSIR-AMPRI: A Utopia for Engineering Materials Research" during FDP on October 24, 2024 at CSIR-AMPRI, Bhopal.
- **Dr. Dipen Kumar Rajak** delivered talk as Guest Speaker on "Surface Modification of Traditional Structural Steel by Functional Materials", IEI Rourkela Chapter, Rourkela, Odisha, October 26, 2024.
- **Dr. Sanjeev Saxena** delivered talk and act as Judge/Guest in Science Fair-The Vigyan Mela 3.0 held in Vidhyapeeth Group of Institutions, Bhopal on November 11, 2024
- **Dr. H. N. Bhargaw** delivered Expert lecture on Smart Material Actuators (SMAs) & Engineering Applications at BUIT, Bhopal, 27 November 2024.
- **Dr. Shabi Thankaraj Salammal** delivered a talk on Joint Free Gamma and Neutron Shielding Blocks for Nuclear Power Plants in National Conference on Net-zero Emission Technologies for Sustainable Development: Challenges and Opportunities (N0ET-2024) at IIT (ISM), Dhanbad on 6 & 7th December, 2024.
- **Dr. Sarika Verma** Participated and delivered a lecture as an Eminent speaker in a National Seminar on traditional and Innovative aspects of Skill development, organized by the Government. MVM, College Bhopal in title- R & D Skill-A case study The Bamboo Composites,17 December 2024.
- **Dr. Sandeep Singhai presented** "CSIR-AMPRI: Potential and Capabilities" during the visit of the BPCL R&D team on December 17, 2024 at CSIR-AMPRI, Bhopal.
- **Dr. H. N. Bhargaw** delivered invited talk in ATAL Academy Faculty Development Programme at Oriental Institute of Science and Technology, Bhopal on December 26, 2024.
- **Dr. H. N. Bhargaw** delivered Expert lecture on Smart Material Actuators (SMAs) & Engineering Applications at Oriental Institute of Science and technology under ATAL Faculty Development Program on December 26, 2024.
- **Dr. Kirti Soni** delivered a talk as a Chief guest during "वैज्ञानिक विद्यार्थी संवाद" on "My Journey as a Scientist: Challenges and Triumphs" at Bhopal Vigyan Mela, Bhopal, MP on 28th December 2024.
- **Dr. Vandana** delivered a talk on "Silicon PV Technology: progress and Advanced concepts" at 5-day Short Term Training Program (STTP- Online Mode) on "Advancements in Materials and Manufacturing Processes," Raipur and Madhyanchal Professional University on December 28,2024.
- **Dr Abhishek Pandey** delivered an invited lecture on "Additive Manufacturing: A tool of modern manufacturing" at TIT Bhopal on January 08, 2025.

- **Dr Gaurav Kumar Gupta** delivered an invited lecture on "Development of Al-graphene composites by ARB process" at TIT Bhopal on January 08, 2025.
- **Dr. Raju Khan** delivered a talk on "Nanomaterials based Point-of-Care (POC) Diagnostics for the Detection of Biomarkers in Healthcare Applications" in Joint CSIR-AMPRI, & SPBU, Russia in Virtual Mode on January 20, 2025.
- **Dr. Sandeep Singhai** delivered an invited talk on "Technologies for Atmanirbhar Bharat" during an international conference on January 25, 2025 at Radharaman College of Pharmacy, Bhopal.
- **Dr. Sandeep Singhai** delivered an invited talk on "Development of Technologies for Atmanirbhar Bharat" for skill trainees on January 28, 2025 at CSIR-AMPRI, Bhopal.
- **Dr. Dipen Kumar Rajak** delivered talk as Guest Speaker on "Insights into Next Generation Materials for Engineering Applications", FDP on Next Generation Engineering Practices: Materials, Design and Manufacturing, Marathwada Mitra Mandal's College of Engineering, Karvenagar, Pune, January 31, 2025.
- **Dr. Dipen Kumar Rajak** delivered talk as Keynote Speaker on "Insights into Multicomponent Alloy for Structural Applications" in 3rd Congress on Control, Robotics, and Mechatronics (CRM2025) organized by S R University, Warangal, February 01-02, 2025.
- **Dr. Sandeep Singhai presented** "Business Development & Technology Transfer @CSIR-AMPRI – An Octennial Saga" during 50th Research Council Meeting on February 05, 2025 at CSIR-AMPRI, Bhopal.
- **Dr. Sandeep Singhai Delivered** an invited lecture on "Research & Skill @CSIR-AMPRI" during the scientific lecture series on February 06, 2025 at the Government Geetanjali Girls PG Autonomous College, Bhopal.
- **Dr. Vandana** delivered a lecture on "Solar R&D activities in Silicon PV Technology: Progress and Advanced Concepts" in Global Women's Breakfast on held in conjunction with the International Day of Women and Girls in Science at PMCOE Govt. Madhav College, Ujjain. on February 11, 2025.
- **Dr. Deepti Mishra** delivered expert lecture in One-day International Conference organized by School of Studies in Chemistry & Biochemistry Vikram University, Ujjain (M. P.) India to Celebrate 2025 IUPAC Global Women's Breakfast "Accelerating Equity in Science" on 11 February 2025.
- **Mr. Samarth Singh** gave a lecture titled "Intelligent Actuation: Leveraging AI for Real-Time Self-Sensing in Smart Materials" at CSIR Integrated Skill Initiative Programme in association with INYAS, held on February 11, 2025, at CSIR-AMPRI, Bhopal.
- **Dr. Sarika Verma** delivered a Talk as an invited speaker in the XIIIth International Conference of the Indian Academy of Biomedical Sciences (IABSCON-2025) @ AIIMS, Bhopal, on

"Importance of additive manufacturing in 3d printed materials for the healthcare sector" on 11 February 2025, organized by and at AIIMS, Bhopal.

- **Dr. Sandeep Singhai delivered an** invited talk on "Innovations & Intellectual Property" during the workshop on 11/02/2024 at CSIR-AMPRI, Bhopal, with multi-institution participation.
- **Dr.Raju Khan** delivered a talk on "Nanomaterials in Biomedical Technologies: Pioneering Innovations for Biosensors based Point-of-Care Testing and Advanced Therapeutics" in XIIIth International Conference of the Indian Academy of Biomedical Sciences (IABSCON-2025) on "Multi-Omics in Health and Disease, AIIMS Bhopal on February 13, 2025
- **Dr. Shabi Thankaraj Salammal** delivered a talk on "Sustainable Gamma and Neutron Shielding Bricks for Building Radiation Based Establishments" in 8th National Science Teachers Workshop at CSIR-AMPRI, Bhopal on February 13 &14, 2025.
- **Dr. H. N. Bhargaw** delivered invited talk on RAPID PROTOTYPING of 3D SOLID MODELS under CSIR-Jigyasa at CSIR-AMPRI on February14, 2025.
- **Dr. H. N. Bhargaw** delivered Invited talk in 8th National Science Teachers Workshop, under Jigyasa on February 13-14, 2025.
- **Dr. M. Chandra Shekhar Nayak** delivered an Invited Expert Talk on 'Polymer Blended Advanced Nanomaterials for Wastewater Management' at the International Conference on Advancements in Material Science for Sustainable Development (AIMS-2025) at the Department of Physics & Astrophysics, Central University of Haryana, India, February 13-15, 2025.
- **Dr. Sarika Verma** delivered an expert talk on "Innovating the Sustainable Future". Innovative 3D Printing in the Biomedical Sector: Harnessing Additive Manufacturing for Sustainable Advancements and Future" in the 8th National Science Teachers Workshop 2024-25, 14th February 2025 organized by and at CSIR-AMPRI, Bhopal.
- **Dr. Sandeep Singhai delivered an** invited talk on "Scientific Innovations & Intellectual Property" during the National Science Teachers Workshop on February 14, 2025 at CSIR-AMPRI, Bhopal.
- **Dr. Dipen Kumar Rajak** delivered talk as Guest Speaker on "The process from Writing to Publication of Research Articles", in FDP on 'Empowering Research and Innovation through IPR, ICT, and RM for Academic Excellence', organized by Applied Science Department, SIRT Excellence, Bhopal, MP, February 17-21, 2025.
- **Dr. Sandeep Singhai delivered an** invited talk on "Innovations & IP in Science: A Perspective" during FDP on February 17, 2025 at SIRT Excellence, Bhopal.
- **Dr. Tilak Joshi** delivered talk on "Lightweight and hollow metal structures through lost core technique and sintering", International Conference on Powder Metallurgy & Particulate Materials and Exhibition (PM-25) at Navi Mumbai, February 19-21, 2025

- **Dr.Venkat Chilla** delivered an invited talk on "In-situ aluminium closed cell foam-filling of hollow profiles through powder metallurgy: Effect of process parameters on foam morphology" February 19-21, 2025, International conference on powder metallurgy and particulate materials, Mumbai.
- **Dr Rajesh Patidar** delivered an invited talk for faculty development program on "Advanced Analytical Techniques for Analysis of Metal Ion" at Vikram University Ujjain, M.P. February 25, 2025.
- **Dr. Sandeep Singhai delivered an** invited talk on "Empowering Indian Youth for Global Leadership in Science & Innovation for Viksit Bharat" during National Science Day on February 27, 2025 at IES College of Technology, Bhopal.
- **Dr. H. N. Bhargaw** delivered Invited talk on topic 'Smart Materials Actuators and Engineering Applications' at MANIT, Bhopal, February 28, 2025.
- **Dr. M. Chandra Shekhar Nayak** delivered an **Invited talk** on 'Advanced nanocomposites in clean water generation' at the International Conference on Advanced Materials and Technology (ICAMT) - 2025, at the Department of Materials and Metallurgical Engineering, Maulana Azad National Institute of Technology (MANIT), Bhopal, India, February 28 to March 2, 2025
  Sarika verma
- **Dr. Sandeep Singhai delivered an** invited talk on "Inventions & Innovations for Viksit Bharat" during a national seminar on 28/02/2025 at Government Geetanjali Girls PG Autonomous College, Bhopal.
- **Dr. Sanjeev Saxena** delivered Invited lecture titles, "Failure Analysis of Materials and Components using Fracture Mechanics Principles and Computer Simulation", in National conference on the topic "Failure analysis of metals and alloys (NCFAMA 2025)", held on March 27-28, ,2025, MANIT, Bhopal.
- **Dr. Gaurav Kumar Gupta** delivered Invited lecture titled, "Materials for orthopedic implants", in National conference on the topic "Failure analysis of metals and alloys (NCFAMA 2025)", held on March 27-28, 2025 in MANIT, Bhopal.

AcSIR-AMPRI (2024-2025)

CSIR_Advanced Materials and Processes Research Institute (AMPRI), Bhopal, under the aegis of AcSIR (Academy of Scientific & Innovative Research (AcSIR – AMPRI) offers an Opportunity to Students for Higher Education in Interdisciplinary Research Areas & to Work with World Class R & D Experts, in the following courses;

- Ph.D. in Engineering (Material Science & Technology)
- Ph.D. in Chemical Science
- Ph.D. in Physical Science
- Integrated Dual Degree Program (IDDP)

  M.Tech. + Ph.D. in Engineering (Material Science & Technology)

AcSIR-AMPRI, Bhopal is running PhD courses in Engineering Science since 2014. There are two semesters each year, starting from January and August and students are admitted in both the semester. The selection procedure is stringent, AcSIR invites applications and candidates are selected based on their credentials, for the written examination/ interview by the individual CSIR Institutions.

In 2024-2025 sessions, total 19 students got registered in AcSIR-AMPRI; Ph.D in Engineering: 7, Ph.D. in Chemical Science:9, Ph.D. in Physical Science : 1 and Ph.D under IDDP: 2 . 7 students took admission in August 2024, 12 students took admission in January 2024 .

Ten students were awarded Ph.D. this year and fourteen students submitted thesis. For the progress evaluation of students 13 DAC meeting were conducted.

Presently the number of faculties in AcSIR-AMPRI Bhopal is 47 (Engineering 28, Chemical Sciences 12 and Physical Sciences 7). The courses offered at AcSIR-AMPRI, Bhopal are 10 in Material science and Engineering, 09 in Chemical Sciences and 08 in Physical Sciences.

Pass out students of AcSIR Mr. Pushpesh Ranjan has joined IIT, Gandhi Nagar as Post Doctoral Fellow, Mr. Abhijeet Bijanu is appointed Asst. Professor, in MITS, Odisha, Mr. Simadri Badatya has appointed Asst. Professor, in MITS, Mr. Satendra Kumar joined USC Spain as Post Doctoral Fellow, Shashank Kumar Srivastava Joined RMIT as a researcher.

Staff list as on 31 March 2025

Scientific Staff

S.N.	Name	Designation
1	Dr. Avanish K. Srivastava	Director
2	Dr. P. Asokan	Chief Scientist
3	Dr. Md. Akram Khan	Chief Scientist
4	Sh. Hemant Kumar Shukla	Chief Scientist
5	Dr. Manish Mudgal	Chief Scientist
6	Dr. Deepti Mishra	Chief Scientist
7	Dr. Sanjeev Saxena	Chief Scientist
8	Dr. H.N. Bhargaw	Chief Scientist
9	Dr. Neeta V. M. Khalkho	Chief Scientist
10	Dr. J.P. Chaurasia	Chief Scientist
11	Sh. Prabhat Kumar Baghel	Sr. Principal Scientist
12	Dr. Vandana	Sr. Principal Scientist
13	Dr. Raju Khan	Sr. Principal Scientist
14	Dr. Sandeep Singhai	Sr. Principal Scientist
15	Dr. R.K. Bharilya	Sr. Principal Scientist
16	Dr. Gaurav Kr. Gupta	Sr. Principal Scientist
17	Dr. Sathish N.	Sr. Principal Scientist
18	Dr. Sarika Verma	Sr. Principal Scientist
26	Dr. Kirti Soni	Sr. Principal Scientist
21	Dr. Archana Singh	Principal Scientist
22	Dr. Neeraj dwivedi	Principal Scientist
20	Dr. Meraj Ahmed	Principal Scientist
19	Dr. S.K. Panthi	Principal Scientist
23	Dr. Rajesh Patidar	Principal Scientist
24	Dr. SatanandMisra	Principal Scientist
25	Dr. Alka Mishra	Principal Scientist
27	Dr. Venkat A.N.	Principal Scientist
28	Dr. Chetna Dhand	Principal Scientist
29	Dr. Pradip Kumar	Principal Scientist
31	Sh. Sriram Sathaiah	Sr. Scientist
33	Dr. Mohammad Ashiq	Sr. Scientist
34	Dr. Surender Kumar	Sr. Scientist
30	Dr. Samarth Singh	Sr. Scientist
36	Sh. Nikhil Rajendra Gorhe	Sr. Scientist
37	Dr. Manoj Kumar Gupta	Sr. Scientist
38	Dr. Shabi T.S.	Sr. Scientist
39	Sh. Abhishek Pandey	Sr. Scientist
40	Dr. SupriyaSaha	Sr. Scientist
32	Dr. Tilak Chandra Joshi	Sr. Scientist

35	Dr. Mohit Sharma	Sr. Scientist
41	Smt. MedhaMili	Sr. Scientist
42	Sh. Narendra Singh	Sr. Scientist
43	Sh. Shiv Singh Patel	Sr. Scientist
44	Dr. Shiv Singh	Sr. Scientist
45	Dr. Dipen Kumar Rajak	Scientist
46	Dr. M. Chandra Shekhar Naik	Scientist
47	Sh. Himanshu Sharma	Scientist
48	Dr. Ram Kumar	Scientist
49	Dr. Tamal Chatterjee	Scientist
50	Sh. Atul Kumar Chatter	Scientist
51	Dr. K. Karthikeyan	Scientist
52	Dr. Avinash Tiwari	Scientist
53	Dr. Sribalaji M.	Scientist

Technical Staff

S.N.	Name	Designation
1	Sh. T.S.V.C. Rao	Principal TO/Tech. Gr. III (7)
2	Sh. M.K. Ban	Principal TO/Tech. Gr. III (7)
3	Dr. R.K. Soni	Principal TO/Tech. Gr. III (7)
4	Dr. Edward Peters	Principal TO/Tech. Gr. III (7)
5	Dr. (Mrs.) Sorna Gowri	Principal TO/Tech. Gr. III (7)
6	Dr. (Mrs.) Prabha Padmakaran	PrincipalTO/Tech.Gr.III (7)
7	Smt. Sangeeta Gamad	Sr. TO (2)/ Tech. Gr. V (4)
8	Sh. O.P. Chourasia	Sr. TO (2)/ Tech. Gr. V (4)
9	Sh. Anwar Ahmed Bakhsh	PrincipalTO/Tech.Gr.III(7)/ Superintendent Engineer
10	Sh. Deepak Kr. Kashyap	Sr.Tech. Officer/Gr.III (4)
11	Sh. Balwant Barkhania	Sr.Tech.Officer/Gr.III (4)
12	Dr. Mohd. Shafeeq M	Sr.Tech.Officer/Gr.III (4)
13	Sh. Anup Kr. Khare	Sr.Tech.Officer/Gr.III (4)
14	Sh. K.K. Naktode	Tech.Officer/Gr.III (4)
15	Sh. Prasanth N.	Sr.Tech.Officer/Gr.III (4)
16	Sh. Arvind Kr. Asati	Sr. Tech (2)/ Gr. II (4)
17	Smt. Swagatika Pal	Sr. Tech (2)/ Gr. II (4)
18	Dr. Rahul Pippal	Tech. Officer
19	Sh. L.N. Sahu	Tech.Gr. I (4)
20	Sh. Santosh.K. Batham	Tech.Gr. I (4)
21	Sh. S.K. Raikwar	Tech.Gr. I (4)
22	Sh. Ramesh koluram	Tech. Gr. II
23	Smt. Aditi Chaturvedi	Tech. (1) Gr. II
24	Sh. Amit Wasnik	Tech. (I)
25	Dr. Satyam Saini	ARMO

Administrative Staff

S. N	Name	Designation
1	Sh. Somnath Mazumder	Controller of Administration
2	Sh. Shailendra Pratap Singh	Finance & Accts Officer
3	Sh. Sanjay Kumar Vinodiya	Finance & Accts Officer
4	Sh. Ashok Kumar Yadav	Stores & Purchase Officer
5	Smt. Mini Surendran	Principal Private Secretary
6	Sh. Vijay Shrivastav	Section Officer (Gen)
7	Sh. Vijay Kumar Nathiley	Section Officer(S&P)
8	Dr. Manisha Dubey	Senior Hindi Officer
9	Sh. Neelesh Jaiswal	Section Officer (Gen)
10	Sh. Vivek Khare	Section Officer (Gen)
11	Sh. Shailendra Singh Tomar	Section Officer(S&P)
12	Sh. Sourabh Sethia	Section Officer (Fin)
13	Sh Sanjay Kumar	Section Officer (Gen)
14	Sh. Anand Vinodarao Pandit	Asstt. Section Officer(G)
15	Sh. Praveen yadavrao Jagtap	Asstt. Section Officer(G)
16	Sh. Praveen Kumar	Asstt. Section Officer(F)
17	Sh. Rahul Singh Chouhan	Asstt. Section Officer(G)
18	Smt. Seema Singh Rauthan	Senior Secretariat Assistant (G.)
19	Smt. Asha Golait	Peon
20	Sh. Rahul Lakwar	Asstt. Section Officer(G)
21	Sh. Virendra Meena	Asstt. Section Officer(G)
22	Sh. Shivam Verma	Asstt. Section Officer(F)

AMPRI in Media

दैनिक भास्कर

आज नो निगेटिव अखबार

ज़िंदगी नो निगेटिव लाइफ | भोपाल, सोमवार 8 जुलाई, 2024 | आषाढ़ शुक्ल पक्ष- 3, 2081

भास्कर खास • रक्षा और अंतरिक्ष से जुड़े मिशनों के लिए अमेरिका-फ्रांस जैसे देशों पर खत्म होगी निर्भरता

अमेरिका-फ्रांस पर अब नहीं रहेंगे निर्भर, देश में पहली बार स्पेस व डिफेंस के लिए 3डी मेटल पार्ट्स भोपाल के एम्प्री में ही होंगे डेवलप

राहुल शर्मा | भोपाल

राजधानी में अब स्पेस, डिफेंस और मेडिकल से जुड़े कई ऐसे पार्ट्स तैयार किए जाएंगे, जिनके लिए अब तक अमेरिका, फ्रांस जैसे देशों पर निर्भरता रहती है। अब विभिन्न पेचीदा मशीनों से जुड़े कंपोनेंट भोपाल के सीएसआईआर-एडवांस मटेरियल्स एंड प्रोसेसेस रिसर्च इंस्टीट्यूट (एम्प्री) में तैयार होंगे।

इसके लिए यहां स्वीडन से मंगवाई गई लेजर बेस्ड मेटल एडेटिव मैन्युफैक्चरिंग और इलेक्ट्रॉन बीम मेटल एडिटिव मैन्युफैक्चरिंग मशीन लगाई जा चुकी है। एम्प्री को स्पेस और डिफेंस से जुड़े राष्ट्रीय स्तर के विभिन्न संस्थान अपनी डिमांड बताएंगे कि उन्हें किस तरह के कंपोनेंट या पार्ट्स चाहिए, उसे यहीं डिजाइन और डेवलप किया जाएगा। देश में पहली बार इस तरह का काम एम्प्री के द्वारा किया जाएगा।

खास बात यह है कि इंडियन नेवी, डीआरडीओ, हिंदुस्तान एयरोनॉटिक्स लिमिटेड जैसे संस्थानों के लिए यहां विभिन्न मशीनों के पार्ट्स बनेंगे। इसका एक सीधा फायदा यह होगा कि विदेशों पर निर्भरता नहीं रहेगी, दूसरा कम समय में इसे नए तरीके और डिजाइन से तैयार किया जाएगा। यह देश की तकनीक होगी जिसकी लागत भी करीब 30 फीसदी तक कम होगी। शेष | पेज 11 पर

नॉर्मल कंपोनेंट काम नहीं आते... 3500 डिग्री तक मेल्ट कर सकेंगे

▪ भारत में इस तरह का काम पहली बार होने जा रहा है। अब तक संस्थान विदेशों से मशीनों के कंपोनेंट मंगवाते थे, इसमें समय और धन भी बहुत लगता था। अब यहीं इसे डिजाइन और बदलाव जा सकेगा। **डॉ. अवनीश कुमार श्रीवास्तव,** डायरेक्टर, एम्प्री

एम्प्री के वैज्ञानिकों ने बताया कि स्पेस आदि की मशीनों में नॉर्मल कंपोनेंट काम नहीं करते। इसकी वजह यह होती है कि ऊपर तापमान माइनस 53 डिग्री तक भी होता है। कम तापमान में मटेरियल सिकुड़ता है। यह मटेरियल ऐसे होते हैं जिन पर तापमान का असर नहीं होता है। यह भी एक चुनौती है कि अंदर का तापमान सामान्य रहना चाहिए, बाहरी तापमान का इस पर असर नहीं होना चाहिए। इस वजह से यह चुनौतीपूर्ण कार्य होता है। इसकी स्ट्रेंथ मेंटेन रहना चाहिए। ऐसे में टाइटेनियम, ग्राफीन, स्टील सहित कई अन्य मटेरियल को मिलाकर इसे तैयार किया जाता है। जो बहुत हाई और लो टेंप्रेचर पर काम कर सके। इसी के साथ मटेरियल्स को 3500 डिग्री तक मेल्ट किया जा सकता है। इन मशीनों की लागत करीब 16 करोड़ रुपए है।

अमेरिका-फ्रांस पर अब...

इन मशीनों की ये खासियत... एप्लीकेशन के हिसाब से यूज : यहां के अधिकारियों ने बताया कि पहली बार एम्प्री यह काम करने जा रहा है। इन मशीनों के संचालन के लिए यहां के वैज्ञानिकों की ट्रेनिंग भी हो चुकी है। थ्रीडी डिजाइन हो सकेगी, पनडुब्बी और एयरस्पेस के लिए भी कंपोनेंट तैयार किए जा सकते हैं। अधिकारियों ने बताया कि कई बार निर्भरता की वजह से पार्ट्स को आने में काफी समय लगता है। यह उपलब्ध नहीं हो पाते हैं। ऐसे में अब इनका रिसर्च एंड डेवलपमेंट यहीं हो सकेगा। कोई भी इंडस्ट्री में इसका उपयोग किया जा सकता है। पनडुब्बी के लिए पार्ट्स, टाइटेनियम से ह्यूमन बॉडी के लिए पार्ट्स, रॉकेट लांचर, सेटेलाइट से जुड़े कंपोनेंट यहीं तैयार किए जा सकेंगे। हाल में यहां विभिन्न संस्थानों के अधिकारियों ने भी इस तकनीक को समझा है। एम्प्री के साइंटिस्ट डॉ. मनोज गुप्ता और प्रिंसिपल इन्वेस्टिगेटर डॉ. एन. सतीश ने बताया कि सुपर अलॉय के तहत अलग-अलग मटेरियल के कांबिनेशन से एक जैसे डिजाइन और बेहद मजबूत कंपोनेंट तैयार किया जा सकते है।

दैनिक भास्कर | भोपाल सिटी भास्कर 31-07-2024

एम्प्री में राष्ट्रीय हिंदी विज्ञान सम्मेलन

आदिति चतुर्वेदी, अर्चना सिंह, प्रमिला मैनी और अरुणा मोहन राव।

पहले महिला नेतृत्व पर बात, फिर विज्ञान पर कविता पाठ

सिटी रिपोर्टर | भोपाल

वर्ष 2005 में एमएससी की पढ़ाई करने के बाद मेरा एडमिशन आईआईटी कानपुर में हुआ। वहां मैंने देखा कि पूरे कॉलेज में लड़कियों की संख्या बेहद कम थी। जर्मनी में हुई कॉन्फ्रेंस में भी सिर्फ मैं एक मात्र महिला थी। लेकिन, आज मुझे यह बताते हुए खुशी हो रही है कि सीएसआईआर एम्प्री की किसी भी लैब में आप देखेंगे तो 10 में से 6 लड़कियां ही कार्य करते हुए मिलेंगी। यह कहना है सीएसआईआर एम्प्री की मुख्य वैज्ञानिक अर्चना सिंह का, जो मंगलवार से एम्प्री भोपाल में शुरू हुए दो दिवसीय राष्ट्रीय हिंदी विज्ञान सम्मेलन में शामिल हुईं। इस मौके 'महिलाओं का उभरता हुआ प्रभावी नेतृत्व एक सुखद परिदृश्य' विषय पर एक परिचर्चा का आयोजन किया गया। कार्यक्रम में एक्सीलेंस कॉलेज की पूर्व निदेशक प्रमिला मैनी ने कहा कि लोगों में यह धारणा है कि महिलाओं के लिए सबसे अच्छी नौकरी टीचिंग है। लेकिन, ऐसा नहीं है। एक महिला होने के नाते मैंने बतौर टीचर कई चुनौतियों को देखा है।

कविता पढ़ते पंकज प्रसून

महिलाओं का प्रतिनिधित्व बढ़ा है

इसी सत्र में उपस्थित अरुणा मोहन राव ने कहा कि मेरे जीवन की चुनौतियां तो परिवार से ही शुरू होती हैं। मेरे पिता सोचते थे कि मैं आईपीएस अफसर बनूं और मां पुलिस अफसर बनने की बात सुनकर इंकार कर देती थीं। लेकिन, मैं अपने गोल पर अडिग रही और रायपुर की पहली महिला पुलिस अधिकारी बनी। कार्यक्रम में शाम को विज्ञान पर आधारित काव्य गोष्ठी का भी आयोजन हुआ।

कार्यक्रम में पढ़ीं गईं प्रमुख कविताएं

- ये ब्लैक होल, आकाशगंगा, ये अभ्रो-जमीन, ये जो उलझे हुए विषय हैं अनुसंधान के हैं... रमन, रामानुजम, साहनी दुनिया भर के, न्यूटन, आइंस्टीन, प्लेटो हिन्दुस्तान के हैं... – मोहन सगोरिया, भोपाल
- सौ से गुणा करो तो वो परसेंट बनेगा, बेस फैट मिल कर डिटर्जेंट बनेगा... ओम सेम गर हो तो कहते हैं ओम ये, वोल्ट बढ़ाओगे तो करंट बढ़ेगा... – डॉ राजेश कुमार, इंदौर
- समंदर की है बेचैनी उसे साहिल नहीं मिलता, यहां तो आदमी का आदमी से दिल नहीं मिलता... जहां पर खून हिंदुस्तान का रग-रग में बहता है, वहां की पत्तियों में आज क्लोरोफिल नहीं मिलता... – पंकज प्रसून, दिल्ली
- विक्रम से प्रज्ञान उतरकर चंद्र सतह पर आया, सिंह शीर्ष, इसरो लोगो का चांद पे मुहर लगाया, और तिरंगे को लहरा, भारत का बढ़ाया मान... –बनवारी लाल मीणा, दिल्ली

दैनिक भास्कर | भोपाल 30-07-2024

एम्प्री में आज से राष्ट्रीय हिंदी विज्ञान सम्मेलन

सिटी रिपोर्टर | सीएसआईआर एम्प्री और विज्ञान भारती मध्य भारत प्रांत के संयुक्त तत्वावधान में मंगलवार से राष्ट्रीय हिंदी विज्ञान सम्मेलन शुरू होगा। विज्ञान के क्षेत्र में हिंदी भाषा के प्रचार-प्रसार और प्रोत्साहन के उद्देश्य से आयोजित इस दो दिवसीय सम्मेलन में देश के विभिन्न प्रतिष्ठित संस्थानों के विषय विशेषज्ञ और चिंतक शामिल होंगे। सम्मेलन का शुभारंभ एम्प्री सभागार में सुबह 9.45 बजे होगा। राष्ट्रीय हिंदी विज्ञान सम्मेलन के संयोजक और एम्प्री के मुख्य वैज्ञानिक डॉ. जेपी शुक्ल ने बताया कि 'अमृतकाल में राष्ट्रीय वैज्ञानिक चेतना का उन्नयन' थीम पर आयोजित सम्मेलन के शुभारंभ अवसर पर एएसआरबी आईसीएआर नई दिल्ली के अध्यक्ष डॉ. संजय कुमार, एम्प्री के निदेशक प्रो. अवनीश कुमार श्रीवास्तव, विज्ञान भारती के अध्यक्ष डॉ. अमोघ कुमार गुप्ता मुख्य रूप से उपस्थित होंगे। पहले दिन महिलाओं का उभरता हुआ प्रभावी नेतृत्व- एक सुखद परिदृश्य, सतत विकास में जल एवं पर्यावरण की भूमि, हिंदी में विज्ञान संचार और तकनीक के विभिन्न उन्नत आयाम जैसे विषयों पर परिचर्चा होगी।

सीएसआईआर एम्प्री में शुरू हुआ दो दिवसीय राष्ट्रीय हिंदी विज्ञान सम्मेलन

विज्ञान को मातृभाषा में समझना सरल : मुख्यमंत्री

नगर प्रतिनिधि. भोपाल

मुख्यमंत्री डॉ. मोहन यादव ने कहा है कि विज्ञान को समझना सरल है। इस दिशा में कार्य करते हुए ही मध्यप्रदेश में मेडिकल की पढ़ाई हिंदी में आरंभ की गई। हिंदी में विज्ञान संप्रेषण को प्रोत्साहित करने के लिए प्रत्येक स्तर पर वातावरण निर्मित करना आवश्यक है। विज्ञान भारती द्वारा इस दिशा में किए जा रहे प्रयास सराहनीय है। मुख्यमंत्री ने सीएसआईआर-प्रगत पदार्थ तथा प्रक्रम अनुसंधान संस्थान द्वारा आयोजित दो दिवसीय राष्ट्रीय हिंदी विज्ञान सम्मेलन के शुभारंभ अवसर पर यह बात कही। मुख्यमंत्री ने दीप प्रज्ज्वलित कर कार्यक्रम का शुभारंभ किया तथा

लोगों की अपनी आत्मीयता भी बढ़ेगी

मुख्यमंत्री ने कहा कि स्व-भाषा को जानने वाले विज्ञान अगर अपने रिसर्च को हिंदी में करते हैं और उसके तकनीकी शब्दों को हिंदी में अनुवाद करते हैं तो सहज रूप से उसे पूरे देश में लोकप्रियता मिलेगी। इससे आमजन की विज्ञान के प्रति जिज्ञासाएं बढ़ेंगी और लोगों की अपनी आत्मीयता भी बढ़ेगी। इस अवसर पर मुख्यमंत्री ने कहा कि ऐसे सभी रिसर्च को प्रोत्साहन देने के लिए कार्य किया जाये जो लोग पढ़े तो अधिक नहीं है लेकिन उनके पास अनूठे अविष्कार है ऐसे लोगों को भी प्रोत्साहन देने का कार्य किया जाना चाहिए। मुख्यमंत्री ने कहा कि हर साल अपनी प्रतिभा के बल पर जो होनहार लोग हैं, वो इस तरह के आयोजनों में अपनी प्रतिभा का प्रदर्शन करें तो बेहतर होगा। इस अवसर पर एम्प्री के अर्धवार्षिक प्रकाशन अनुसंधान संदेश तथा राष्ट्रीय हिंदी विज्ञान सम्मेलन-2024 की स्मारिका का विमोचन किया। इस अवसर पर राष्ट्रीय योग खिलाड़ी शुभम शर्मा ने योग के विभिन्न आसनों का प्रदर्शन किया। मुख्यमंत्री ने कवि, साहित्यकार तथा शिक्षाविद् डॉ. संतोष चौबे को आचार्य प्रफुल्ल चंद्र रे विज्ञान संवर्धन सम्मान से सम्मानित भी किया।

सीएसआईआर एम्प्री के निदेशक डॉ. अवनीश कुमार श्रीवास्तव, विज्ञान भारती के राष्ट्रीय संगठन सचिव डॉ. शिव कुमार शर्मा, विज्ञान भारती के अध्यक्ष डॉ अमोघ कुमार गुप्ता, मप्र पॉल्यूशन कंट्रोल बोर्ड के पूर्व अध्यक्ष डॉ. एनपी शुक्ला, मेपकॉस्ट के महानिदेशक डॉ. अनिल कोठारी, राष्ट्रीय हिंदी विज्ञान सम्मेलन के संयोजक और एम्प्री के मुख्य वैज्ञानिक डॉ. जेपी शुक्ल, भोज मुक्त विश्वविद्यालय के कुलगुरु डॉ. संजय तिवारी, हिंदी विश्वविद्यालय के कुलगुरु डॉ. खेम सिंह डहेरिया मुख्य रूप से उपस्थित हुए। अमृतकाल में राष्ट्रीय वैज्ञानिक चेतना का उन्नयन थीम पर आयोजित इस सम्मेलन के पहले दिन कई वैचारिक सत्र, परिचर्चा एवं विज्ञान कवि गोष्ठी आयोजित हुई।

पिछले एक दशक में महिलाओं की सहभागिता में हुई बढ़ोत्तरी

सम्मेलन के दौरान महिलाओं का उभरता हुआ प्रभावी नेतृत्व एक सुखद परिदृश्य विषय पर एक परिचर्चा का आयोजन किया गया। इस सत्र में पूर्व अतिरिक्त पुलिस महानिदेशक डॉ. अनुराधा शंकर, पूर्व अतिरिक्त पुलिस महानिदेशक श्रीमती अरुणा मोहन राव, अदिति चतुर्वेदी श्री., चांसलर रविन्द्रनाथ टैगोर विश्वविद्यालय, पूर्व निदेशक एक्सीलेंस कॉलेज भोपाल प्रो. प्रमिला मैनी, नेटलिंक रो सोनल श्रीवास्तव बतौर मुख्य वक्ता शामिल हुईं। इस दौरान लंदन से वर्चुअली जुड़ीं डॉ. अनुराधा शंकर ने कहा कि मैंने अपनी पूरी नौकरी एक शासकीय सेवक के रूप में नहीं बल्कि संविधान द्वारा दी गई जनसेवक की उपाधि के रूप में की है। यह मेरे लिये जनसेवा का एक बड़ा अवसर था। उन्होंने कहा कि आज जो लड़कियां विज्ञान व तकनीक के क्षेत्र में आगे आ रही हैं यह उनके लिये एक बड़ा संघर्ष का रास्ता है। लेकिन मुझे विश्वास है कि लड़कियां पूरे विश्वास के साथ आगे बढ़ेंगी और अपनी मंजिल पाकर ही रुकेंगी। इस दौरान मैनिट की असिस्टेंट प्रोफेसर प्रियंका पालीवाल ने कहा कि मैंने बचपन से अपने पिता को संघर्ष करते देखा है।

आज महिलाओं का प्रतिनिधित्व बढ़ा है

इस अवसर पर सीएसआईआर एम्प्री की मुख्य वैज्ञानिक अर्चना सिंह ने कहा कि वर्ष 2005 में एमएससी की पढ़ाई करने के बाद मेरा एडमिशन आईआईटी कानपुर में हुआ। वहां मैंने देखा कि पूरे कॉलेज में लड़कियों की संख्या बेहद कम थी। यही नहीं जर्मनी में जब एक कॉन्फ्रेंस के लिये गई थी पूरी कॉन्फ्रेंस में मैं एक मात्र महिला थी। लेकिन आज मुझे यह बताते हुए खुशी है कि आज सीएसआईआर एम्प्री की किसी भी लैब में आप देखेंगे तो आपको 10 में से 6 लड़कियां ही कार्य करते हुए मिलेंगी।

तथ्यों के साथ युवाओं को शिक्षा देना चाहिए

सम्मेलन के दूसरे सत्र में विक्रम विवि उज्जैन के कुलगुरु प्रो. अखिलेश कुमार पांडेय ने कहा कि केवल इतिहास ही नहीं हमारा विज्ञान भी बहुत गौरवशाली रहा है। उन्होंने कहा कि नालंदा विश्वविद्यालय को जलाने के समय हमारे इतिहास को जलाया गया है जिससे विज्ञान के बारे जो लिखा गया वा उसकी क्षति पहुंची। उसके बाद हमारे विज्ञान में थोड़ा परिवर्तन करके हमें ही परोसा गया है। उन्होंने कहा कि भौतिक और आध्यात्मिक चिंतन भारत में ही हुआ है। भोज विवि के कुलगुरु तिवारी ने कहा कि छात्रों को हर चीज को तथ्यों के माध्यम से समझाने जरूरी है। ताकि वो आने वाली पीढ़ी को वो बता सके कि भारत का विज्ञान का इतिहास कितना पुराना है। हमें जितना नुकसान मुगलों के शासन से नहीं पहुंचा उससे कहीं ज्यादा नुकसान ब्रिटिश सरकार पहुंचा। उन्होंने कहा कि हमें सिर्फ उठाकर जीने नहीं दिया। हमारे विज्ञान की चोरी की और उसको अपने नाम से परोसा। सत्र की अध्यक्षता कर रहे प्रो. एसपी गौतम ने कहा कि विज्ञान के संसार में काम करना है तो ज्ञान और विज्ञान दोनों का ज्ञान होना जरूरी है।

पहली बार हुई विज्ञान कवि गोष्ठी विज्ञानिका : सम्मेलन के दौरान विज्ञान कवि गोष्ठी विज्ञानिका का आयोजन किया गया। इस दौरान चंद्र प्रकाश पटसारिया (दतिया), मनीज शुक्ला (बैतूल), साहिया सिद्धकी (अलीगढ़), ओम यादव (इंदौर), डॉ. राजेश कुमार (आईआईटी इंदौर), बीएल मीणा (दिल्ली), डॉ. वीणा सिन्हा (भोपाल), मोहन सगोरिया (भोपाल) और राग तेलंग (भोपाल) ने काव्य पाठ किया।

हरिभूमि

epaper.haribhoomi.com
Bhopal Main - 31 Jul 2024 - Page 3

एम्प्री के राष्ट्रीय हिंदी विज्ञान सम्मेलन 2024 में मुख्यमंत्री डॉ. यादव ने कहा

विज्ञान को मातृभाषा में समझना आसान, हिंदी में विज्ञान संप्रेषण को ज्यादा प्रोत्साहित करें

- विज्ञान भारती द्वारा इस दिशा में किए जा रहे प्रयास सराहनीय
- शिक्षाविद् डॉ. संतोष चौबे को आचार्य प्रफुल्ल चंद्र रे विज्ञान संवर्धन सम्मान

हरिभूमि न्यूज ▶▶ भोपाल

मंगलवार को एम्प्री के राष्ट्रीय हिंदी विज्ञान सम्मेलन-2024 का आगाज हुआ। इसका शुभारंभ कुशाभाऊ ठाकरे सभागार में मुख्यमंत्री डॉ. मोहन यादव ने किया। इस दौरान सीएम ने कहा है कि विज्ञान को समझना सरल है।

इस दिशा में कार्य करते हुए ही मप्र में मेडिकल की पढ़ाई हिंदी में शुरू की गई। हिंदी में विज्ञान संप्रेषण को प्रोत्साहित करने के लिए हर स्तर ▶▶ शेष पेज 4 पर

सम्मेलन में 300 से ज्यादा शोध पत्र प्रस्तुत होंगे

यादव ने कहा कि व्यवहारिक ज्ञान के आधार पर किए गए नवाचार को भी सम्मानित किया जाना चाहिए। पराधीनता ने देशवासियों को अपने गुणों को पहचानने में ही असमर्थ बना दिया था, लेकिन अब बदलते परिवेश के साथ हिंदी की महत्ता न केवल देश अपितु दुनिया में स्थापित हो रही है। अपने संस्कार और परंपराओं के सम्मान स्वरूप ही विश्वविद्यालयों के कुलपति को कुलगुरु का नाम देकर युवा ▶▶ शेष पेज 4 पर

मुख्यमंत्री ने सुनाई कुलपति को कुलगुरु बनाने की कहानी

बोले- इंदौर में महिला कुलपति से मिला; वहां एक सज्जन ने कहा मैं उनका पति, सोचिए- मेरी हालत क्या होगी

भोपाल राजधानी भोपाल में आयोजित राष्ट्रीय हिन्दी विज्ञान सम्मेलन में मुख्यमंत्री डॉ. मोहन यादव ने कुलपति के पद को कुलगुरु करने की पूरी कहानी सुनाई...

भोपाल ● एजेंसी

मुख्यमंत्री ने कहा- 9वें देश का दुर्भाग्य है और चौथी पूर्ण लेकिन आरंभ का विषय है। हम गुलामी के लंबे काल में निकलकर गए हैं। गुलामी ने हमारे अंदर के गुणों को पहचानने के लिए कष्ट खड़ा कर दिया। कई बार दुखी कहीं मजाक हमारे से ही बनता है। जब मैं शिक्षा मंत्री था तब हिन्दी ग्रंथ अकादमी की बैठक में सभी वाइस चांसलर्स के साथ सीखा कि हमारी डिग्रियां, मेडिकल, इंजीनियरिंग की डिग्रियां का पाठ्यक्रम हिन्दी में क्यों नहीं होना चाहिए। मुझे अच्छा लगा कि कभी जिनको कुलपति कहा जाता था वो सब ग्रंथ अकादमी में आते थे। इनको हमने कुलगुरु कहा है। ये उस मानसिकता का ही फर्क है कि कुलपति और कुलपति में जो होती है।

सीएम ने कहा- मैं जब शिक्षामंत्री था तब हरि पूर्वनिर्मिती केरल में गया प्रोफेसर रेपु जैन अपने भी कुलगुरु ही मैं उनसे मिला संयोग से उनके पति मिले। उन्होंने कहा आपका मेरा परिचय नहीं है। मैंने कहा बाहर वो बोले मैं कुलपति का पति हूं। आप बताओ मेरी क्या हालत हुई होगी। उन्होंने कोई आंकड़ा में नहीं बोला। लेकिन, वो यथार्थ भी था। लेकिन, भाषा में क्या बोल गया उसका असर कैसे होगा। ये उस समय संघर्ष के लिए पर्याप्त था। मैंने कहा ये नहीं चलेगा। हमने खोजबीन की तो बताया गया कि कुलगुरु रख सकते हैं। हमने कहा इसमें अच्छी क्या बात हो सकती है। कुलपति के बजाय कुलगुरु कहते हैं।

मुख्यमंत्री डॉ. मोहन यादव ने आज भोपाल में सीएसआईआर-एम्प्री (एडवांस मटेरियल एंड प्रोसेसेस रिसर्च इंस्टीट्यूट) में दो दिवसीय राष्ट्रीय हिंदी विज्ञान सम्मेलन का शुभारंभ किया। इस अवसर पर विज्ञान भारती के राष्ट्रीय संगठन मंत्री डॉ. शिव शर्मा, अवनीश श्रीवास्तव, अनिल कोठारी, जेपी शुक्ला मौजूद थे।

अंतर्राष्ट्रीय शिखरों को गुरुजी कहा जाने लगा

सीएम ने कहा- जब कुलगुरु कहा तो हमारे यहां आजादी के बाद कुछ परंपरा अच्छी हुई लेकिन कुछ परंपरा अटपटी भी चाहे हो गई। शिक्षक दिवस पर डॉ. राधाकृष्णन जी की स्मृति में होना अच्छी बात है लेकिन, गुरुपूर्णिमा जैसे हमारे त्योहारों को मनाने के लिए बड़ा संकोच होता है। गुरुजी कहते-कहते राजनीति में कुछ गड़बड़ हो ही जाता है। आंकलिक शिक्षक लगा दिए तो उनका नाम गुरुजी कर दिया। तो गुरु पूर्णिमा में कौन जाएगा ये बड़ा संकट है उनके लिखे वाले कहते हम नहीं आएंगे ये शिक्षकों में आ जाएंगे। शिक्षकों के पास जाओ तो वो कुछ और बात बताते।

शिक्षकों को अपने प्रभाव से दबाना, डराना नहीं चाहते

सीएम ने कहा- ये बात सच है कि हम सब इस उच्चतम परंपरा से जुड़े हैं। गुरु को रेखांकित किया गया है जिसमें अंधकार से प्रकाश की ओर ले जाने वाले परंपरा का नाम गुरु है। हमारी हजारों साल से परंपरा रही है। हम किसी को रचना, ढ़ाना नहीं चाहते। किसी को गिराना नहीं चाहते। किसी को अपने प्रभुत्व में लाकर अपने नीचे नहीं बिठाना चाहते। लेकिन, ये चीजें करने की बात करेंगे तो सब क्षेत्रों की माला बनेगी। उसमें विज्ञान सबसे पहले आता है। विज्ञान में हमारी ये कहानियां है पढ़कर आपको भी जिज्ञासा मिलती है। लेकिन, अपनी सब भाषा में जो बात समझ सकती है दोनों भाषा से वैसे ही हम विदेशी भाषा में जाने में आ जाएंगे। शिक्षकों के पास जाओ तो वो कुछ और बात बताते।

बिना पढ़े लिखे लोगों को अपने अविष्कारों को मिलेगा मंच

सीएम ने कहा- विज्ञान में हिंदी को प्रोत्साहन देने का बड़ा अभियान शुरू हुआ। ये चौथे सम्मेलन है। हमने तो कहा है कि ये अगले सत्र में अंतर्राष्ट्रीय स्तर पर होना चाहिए। क्योंकि सब भाषा को जानने वाले विज्ञान अगर रिसर्च का हिंदी में अनुवाद करते हैं तो पूरे देश में वो सहज रूप लोकप्रिय होगा। लोगों को विज्ञान भारती के प्रति बढ़ेगी। ऐसे सभी रिसर्च को बढ़ावा देने के लिए हमने कहा है कि यदि कोई पढ़े लिखे नहीं है वो भी अगर कोई अनूठे अविष्कार लेकर आते हैं तो मैं विज्ञान भारती से आह्वान किया है कि वो इसका प्रयास करें कि अपनी प्रतिभा के बल पर जो भी होनहार लोग है वो इस तरह के आयोजन में परोसा करें।

पत्रिका

#Research आठ साल की रिसर्च के बाद एप्री को मिली सफलता

पराली से बनेंगे ज्वेलरी बॉक्स और प्रोडक्ट्स

एक्सक्लूसिव

उमा प्रजापति
patrika.com

भोपाल. भारत में पराली जलाने के कारण होने वाले प्रदूषण के संकट से निपटने के एक बड़ी कामयाबी मिली है। देश की पहली रिसर्च के परिणामस्वरूप अब पराली से बनीं नई तकनीकी सामग्री तैयार की जा रही हैं, जिनमें प्लाई, डिजाइनर बॉक्स, फोटो फ्रेम, ज्वेलरी बॉक्स और कई अन्य आकर्षक आइटम शामिल हैं। यह शोध भारतीय विज्ञान संस्थान, एमपीआरआइए (एडवांस मटेरियल्स एंड प्रोसेस रिसर्च इंस्टीट्यूट) द्वारा 8 साल की कड़ी मेहनत के बाद सफल हुआ है। इस तकनीक में धान, गेहूं और सोयाबीन की पराली से 30 प्रतिशत रासायनिक पॉलीमर और 70 प्रतिशत पराली के मिश्रण से प्लाई तैयार की जाती है। यह सामग्री इतनी टिकाऊ होती है कि इसका इस्तेमाल विभिन्न घरेलू उत्पादों के निर्माण में किया जा सकता है।

2017 में शुरू किया था काम

एप्री के निदेशक अवनीश कुमार श्रीवास्तव ने बताया कि सीएसआइआर और एमपीआरआइ ने 2017 में इस शोध का कार्य शुरू किया था। इसके बाद कई राज्यों के किसानों और पंचायतों से बातचीत के बाद, रिसर्च में सफलता प्राप्त हुई। छत्तीसगढ़ के भिलाई स्थित एक कंपनी एवं भोपाल की दो कंपनियों को इस तकनीक का पहला लाइसेंस भी दे दिया गया है।

किसानों की आय में भी होगी वृद्धि: इस रिसर्च के बाद किसानों को पराली की बिक्री से अतिरिक्त आए हो सकेगी। चूंकि पराली से बने उत्पादों की बाजार में बड़ी मांग है। इसके चलते उत्तर भारत में पराली की खपत में भारी वृद्धि होने की संभावना है। इससे प्रदूषण कम होने के साथ-साथ किसानों की आय में भी वृद्धि होगी। भारत में हर साल लगभग 635 मिलियन टन पराली निकलती है, जो प्रदूषण का मुख्य कारण बनती है। इस शोध से अब इस पराली का उपयोग व्यावसायिक और पर्यावरणीय दृष्टिकोण से बेहद फायदे का साबित होगा।

यह कदम न सिर्फ पर्यावरण को बचाएगा, बल्कि भारतीय किसानों को भी नए अवसर प्रदान करेगा, जिससे देश में एक नई हरित क्रांति की शुरुआत हो सकती है।

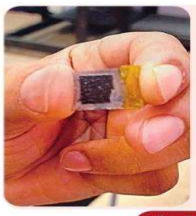
31/01/2025 | Bhopal | Page : 5
Source : https://epaper.patrika.com/

भोपाल : एम्प्री ने बनाया 'पीजो इलेक्ट्रिक नैनो जनरेटर'

अब बोलने और चलने से भी बनेगी बिजली

शिवाशीष तिवारी
patrika.com

भोपाल. कोयले, हवा और सौर से बिजली तो बनती है। अब बोलने, मोबाइल चलाने और पैदल चलने से भी बनेगी। सीएसआइआर-एम्प्री की 'पीजो इलेक्ट्रिक नैनो जनरेटर' से यह हो सकेगा। दावा है, गाड़ी चलने व कम्प्यूटर पर काम करने जैसे काम से उत्पन्न होने वाली ऊर्जा को विद्युत में बदला जाएगा। एम्प्री की तकनीक का सफल परीक्षण हो चुका है। इसे टेक्नोलॉजी ट्रांसफर से बाजार में लाने की तैयारी है। यह ऊर्जा का सबसे सस्ता स्रोत साबित होगा।



ऐसे बनेगी बिजली कुछ पदार्थों जैसे जिंक ऑक्साइड, 2डीएमओएस-2, पीवीडीएफ, ग्राफीन, बोरोफिन आदि में दबाव और घर्षण से निगेटिव व पॉजिटिव चार्ज पैदा होता है। एम्प्री ने इन पदार्थों से नैनोकंपोजिट (मटेरियल) बनाया है। इसी मटेरियल से मोबाइल स्क्रीन, कम्प्यूटर की-बोर्ड, जूते के लिए चिप बनेंगे। फिर जैसे ही कोई की-बोर्ड पर काम करेगा, यह उसे विद्युत ऊर्जा में बदल देगा।

नैनोकंपोजिट से बना जनरेटर

डारेक्टर डॉ. अवनीश कुमार श्रीवास्तव, वैज्ञानिक डॉ. मनोज कुमार गुप्ता और देश भर के 10 शोधार्थी छात्रों ने 2017 में रिसर्च शुरू किया। डॉ. अवनीश ने बताया, पीजोइलेक्ट्रिक नैनोजनरेटर ऊर्जा-संचय उपकरण है। यह नैनो-संरक्षित पीजो इलेक्ट्रिक सामग्री से प्रक्रिया कर बाहरी गतिज ऊर्जा को विद्युत ऊर्जा में परिवर्तित करता है।


पत्रिका

पत्रिका बना 'कवच', ठगों को ठेगा...इस साल इंदौर-भोपाल में कोई ठगी नहीं

'दिमाग में गंदगी... माता-पिता और बहनें ही नहीं, पूरा समाज शर्मसार'

पढ़े-लिखे हैं पर काम नहीं आता, 57.4 फीसदी ग्रेजुएट बेरोजगार

नई दिल्ली और मुंबई में खुलेंगे टेस्ला के शोरूम, हायरिंग को दिए विज्ञापन

ग्रोक-3' करेगा तर्क और गहराई से रिसर्च, देगा सटीक जवाब

अब बोलने और चलने से भी बनेगी बिजली


पत्रिका

साक्षात्कार

बायोसाइंस में पीएचडी प्रवेश प्रक्रिया शुरू करने का फैसला

म पर बौर-टेसू
गर्मी की तासीर

न माह से नहीं मिला वेतन, जेपी
कर्मचारियों ने किया प्रदर्शन


ता ने रचा नया कीर्तिमान
मिली नई पहचान
दैनिक भास्कर
दौरान दैनिक भास्कर मध्यप्रदेश के स्टेट एडिटर श्री सतीश सिंह एवं भोपाल यूनिट हेड श्री अभिक सुर भी उपस्थित रहे।
डॉ. लता सिंह मुंशी
अंतरराष्ट्रीय भरतनाट्यम नृत्यांगना
डॉ. सारिका वर्मा
वैज्ञानिक सीएसआईआर - एम्प्री