# CSIR-Central Glass & Ceramic Research Institute

A Profile





## **Foreword**

CSIR-CGCRI is one of the premier labs in the country engaged with R&D in materials science & engineering. Covering a total of eight intercalating domains namely advanced ceramics & composites; bio-ceramics & coatings; energy materials; functional materials; fibre optics & photonics; membrane separation; refractories; and specialty glasses; the activities encompass the broad ambit of basic, applied and translational research. R&D outcomes of the institute has helped the country to address the issues of technology denial in critical sectors; deliver affordable innovations; facilitate import substitution; leverage industries through new innovations; and aid in inclusive growth through technological enablement. Outreach and human resource development also constitute key focus of the institute.

In this brochure, the reader can have a bird's eye view of these wide ranging activities and the sectors being catered to by CSIR-CGCRI.

Dr (Mrs) S.K. Mishra

Director

## Overview of CSIR-CGCRI

CSIR-CGCRI is one of the first four laboratories set up under the Council of Scientific & Industrial Research. The Foundation Stone of the Institute was laid by the Hon'ble ArdeshirDalal on 24<sup>th</sup>December 1945 after which it started functioning in a limited way. The Institute was formally inaugurated on 26<sup>th</sup> August 1950 by Dr. Bidhan Chandra Roy, the-then Chief Minister of West Bengal.

Headquartered at Kolkata, West Bengal, there are regional/outreach centres at Naroda, Gujarat and Khurja, Uttar Pradesh It is a multi-disciplinary and multi-dimensional institution dedicated to research, design and development in the area of glass, ceramics, fiber optics and photonics, refractories, bio-ceramics, water technologies and allied strategic materials to cater the country's need and also to provide economic, environmental and societal benefit for the people of India. It is powered by close to 300 scientific, technical and Administrative staff members.

## Vision

Enduring innovation in science and technology for materials to attains the status of an ultimate centre of excellence in glass and ceramics

## **Mission**

To provide scientific and industrial R&D in the area of glass, ceramics and related materials that maximizes the economic, environmental and social benefit for the people of India

The brochure aims to provide a glimpse of the current technological advances made by CSIR-CGCRI in several domains catering to Strategic Sector, Green Energy, Affordable healthcare, Advanced Smart materials while aligning to National Missions and Sustainable Development Goals.



# STRATEGIC SECTOR: MYRIADS OF APPLICATIONS





- Development of specialty glasses for strategic applications
- · Indigenous process technology development and pilot scale glass production
- Nd: Laser Glass Blocks, Chalcogenide Glass, Cladding



nuclear hot cell applications



Specialty Glass Bead Technology: Borosilicate Glass Frit and Glass bead (top and bottom waste immobilization



- Reaction Bonded Silicon Nitride
- Missile Radome

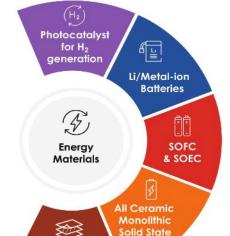


## **GREEN ENERGY**

Generation

Storage Conversion





MIEC

Membrane

**Batteries** 

Cell Components and SOFC Stack Testing at CSIR-CGCRI



Planar anode-supported single cells (TRL 4 -5) SOFC



1kW SOFC Stack



1kW SOFC Stack Demonstration

Lithium Battery Components & Cell Design

CGCRI designed Lithium Paper separator for:



Battery Ceramic Separator fabricator (TRL-4)



Lithium Battery (TRL-4)

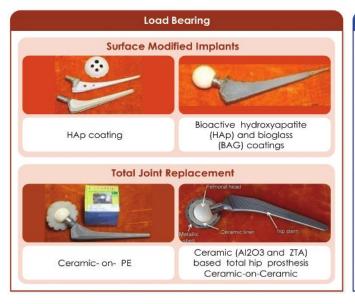


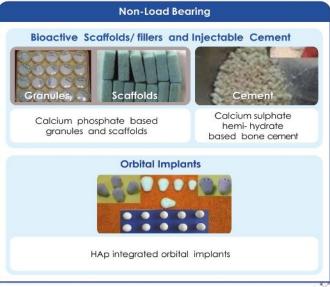




# AFFORDABLE HEALTHCARE: BIOMEDICAL IMPLANTS



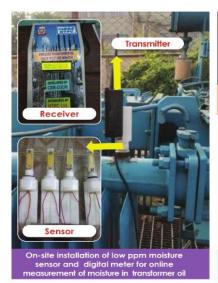






# ADVANCED FUNCTIONAL MATERIALS, COATINGS & DEVICES







Diabetic Breath Analyzer











Coated **PPE fabric** 



TRL (3-5)



## SPECIALTY OPTICAL FIBRES, FIBRE LASERS AND FIBRE **OPTIC SENSORS**

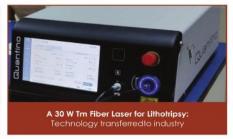








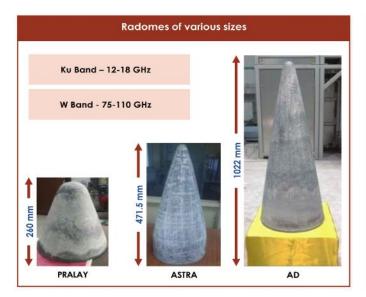


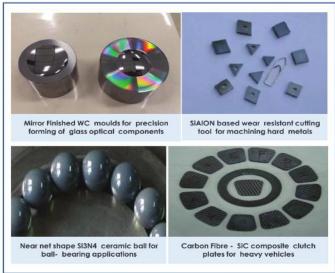




# NON- OXIDE CERAMICS









## CERAMIC MEMBRANE: SOCIETAL INTERVENTIONS







Membrane based technology for liquid filtration









# RURAL INDUSTRIALIZATION



Skill Development & Dissemination Activities at our Outreach Centres: KHURJA, UP & NARODA, GUJARAT







## **Refractory and Traditional Ceramics**





Al-Mg-O-C Refractory Commercialised at SAIL Refractory Co.





**Concast Refractory** 



Refractory aggregates form **Indigenous minerals** 



Tiles from ISW



MgO-C Refractory in application at Vizag Steel Plant



High temperature

crucibles



Mullite





## SDG ALIGNMENT OF INSTITUTIONAL PROGRAMMES



## SDG-17: PARTNERSHIP FOR THE GOALS

 Collaborative R&D/ CSIR Mission Projects

## SDG-11: CLIMATE ACTION

· Anti-reflective coatings on glass

## SDG-10: REDUCED INEQUALITIES

 Facilities for material characterization and testing services

## SDG-9: INDUSTRY, INNOVATION & INFRASTRUCTURE

- FBG Sensors
- · Yb doped fibre lasers



## SDG-8: DECENT WORK & ECONOMIC GROWTH

- · Superior ramming mass refractory
- Value added high alumina aggregate

## SDG-3: GOOD HEALTH AND WELL BEING

- · Antibacterial bioactive glass
- · Acetone Breath Sensors
- Tm-doped lasers

## SDG-4: QUALITY EDUCATION

 Higher training in glass and ceramics science and engineering

## SDG-6: CLEAN WATER & SANITATION

 Ceramic membrane technologies for arsenic and iron removal

## SDG-7: AFFORDABLE & CLEAN ENERGY

- Anode supported SOFC
- Paper based ceramic separators



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