INDO-AUSTRALIAN
CONFERENCE & WORKSHOP

ON

BIOMIMICRY:

NATURE'S PERFECT INNOVATION SYSTEM TO DESIGN SUSTAINABLE FUTURE

LECTURE SERIES & HANDS-ON EXPERIMENTS
ON
MODIFICATION OF BIOMASS-DERIVED NANOMATERIAL AS ROBUST & EFFICIENT INTERFACES FOR INDUSTRIAL & THERAPEUTICAL APPLICATIONS

31st Jan - 7th Feb 2025

ORGANISED BY
DEPARTMENT OF CHEMISTRY
JAMIA MILLIA ISLAMIA
IN COLLABORATION WITH
RMIT UNIVERSITY, AUSTRALIA

UNDER THE AEGIS OF
MHRD-SPARC
GOVERNMENT OF INDIA

“THE AIM OF BIOMIMICRY IS NOT TO CREATE A REPLICA OF A NATURAL FORM, PROCESS, OR ECOSYSTEM; INSTEAD, IT IS TO DERIVE DESIGN PRINCIPLES FROM BIOLOGY AND USE THOSE PRINCIPLES AS A STIMULUS FOR IDEATION.”

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Director
CSIR NIScPR

CHIEF PATRON

PROF. MAZHAR ASIF
Vice Chancellor
Jamia Millia Islamia

GUEST OF HONOR

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Vice Chancellor
Indira Gandhi Delhi Technical University For Women
Delhi

GUEST OF HONOR

PROF. ASHU RANI
Vice Chancellor
Dr Bhimrao Ambedkar University
Agra

Workshop is organized on the recent developments of Bionanocomposites. The hands-on experiments and the themed lectures about the meaning of Bionanocomposites, methods of their development and recent application of Bionanocomposites will be taken care. The immediate hand on green syntheses and characterization by UV-Vis spectrophotometry for nanoparticles and the modifications of biopolymer (oxidation, blending, crosslinking) following the Infra-Red characterization for validation will also be taught as real experiments. In this workshop, we are focused on the applications of different polymer bionanocomposites particularly in biomedical and pharmaceutical field to get desired interfaces for Industrial and therapeutical applications.

The purpose of the 8-days workshop at the Department of Chemistry, Jamia Millia Islamia is to provide the key knowledge base and laboratory resources to prepare students for careers as professionals in the field of chemistry, for research graduate study in chemistry, biological chemistry and related fields, and industrial purposes.

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HANDS ON ACTIVITIES

Demonstration & Hands on Training of Instruments

Formulation of Nanoparticles via Green Chemistry Principles (GCP) Single/Binary)

Modification of Polymer Matrix (Chitosan, Cellulose & their derivatives)

Films castings & Coatings (Solvent Casting & Mechanical)

Structural / Morphological / Chemical Characterisation of Nanoparticles / Matrix / Bio-nanocomposites

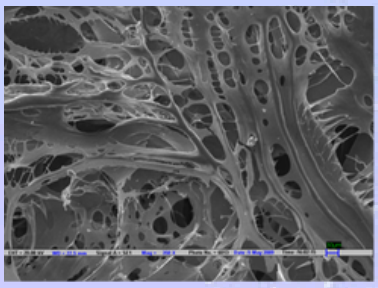
Physico – Mechanical and Thermal Characterisation of Nanoparticles / Matrix / Bio-nanocomposites

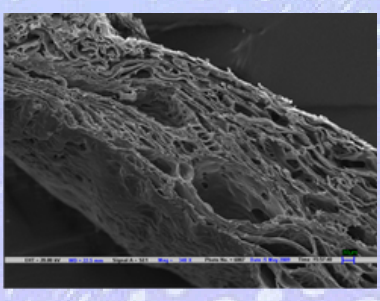
Goal of solving Research problems - Industrial and Therapeutical Applications

- **Publication of Manuscript**
- **Environmental Application (Identification & Mitigation of the Pollutants: Adsorption & Photocatalysis)**
- **Biomedical (Scaffolds for wound management & Enzyme Immobilization etc.)**

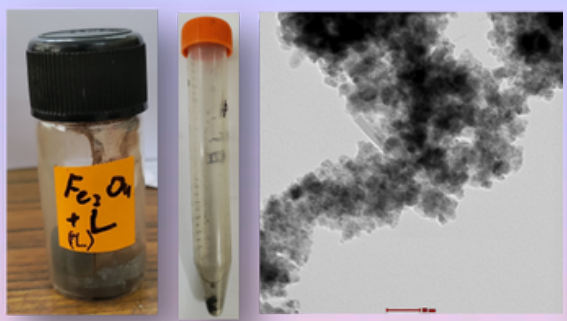
Freeze dried hydrogel membranes

Nanosilver immobilized membrane

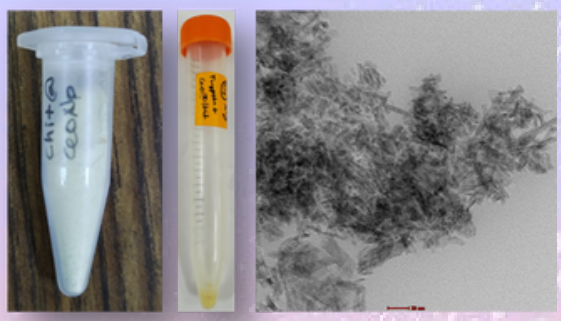




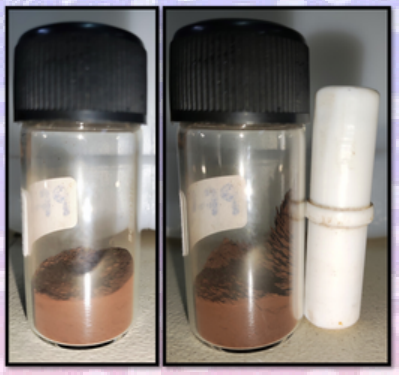
SEM of Freeze-Dried membrane CS-OCMC



Iron Oxide nanoparticles impregnated with Schiff's base



Cerium oxide nanoparticles impregnated Chitosan matrix



Magnetic Iron Nanoparticles

Salient Instruments available for Hands-On handling at Central Instrumentation Facility (CIF-JMI)

Instrument	Make
Atomic Force Microscope	Bruker; Multimode- 8
FT-IR	Bruker; Tensor 37
UV-visible spectrophotometer	Hitachi; U3900
Contact angle analyzer	SEO Optics
DLS	Dynamic Light Scattering
Incubator/Shaker	Bacterial culture and growth at the desired temperature (37°C)
Robotic Crystallization system	The machine is used for the purpose of high-throughput protein crystallization
RT-PCR	Applied Biosystems; 7900HT sequence Detection System with TaqMan Low Density Array.
Spectrofluorimeter	Agilent; Carry Eclipse
Potentiostat	IVIUM; Vertex DC
Inductively Coupled Plasma Enhanced Optical Emission Spectroscopy (ICPE-OES)	Perkin Elmer; AVIO-200
Erbium Doped Fiber Amplifier with Optical Fiber System	Benchmark Electronic Systems; ETS
Fluorescence Activated Cell Sorter System (FACS)	Becton Dickinson; Aria III
Stopped-Flow Reaction Analyzer, Double mixing system with Abs and Fluorescence Detection	Applied Photophysics; SX20
Zeta Potential Analyzer	Malvern; Zetasizer Nano ZS
TG-DTA / DSC	Setaram Instrumentation, France; LABSYS EVO 1150°C DSC131 EVO analyzer
Time Resolved Fluorescence Lifetime Measurement Spectrometer	Horiba; Delta Flex- 01-DD
LC MS/MS	Waters; Xevo TQD System
Electrical Power System Simulator	OPAL-RT

CIF-JMI: https://www.jmi.ac.in/Central-Instrumentation-Facility/Facilities/Instruments