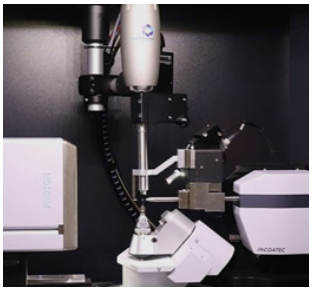
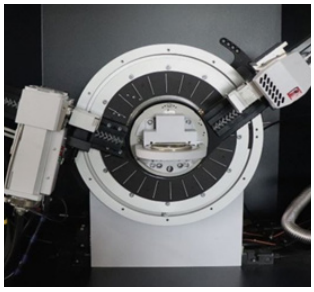
CENTRAL INSTRUMENTATION FACILITY

INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

INSTRUMENTS

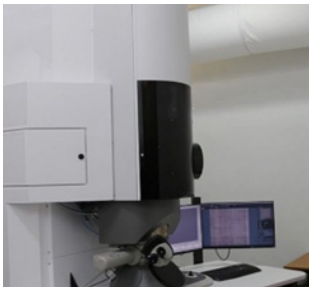


Single Crystal XRD

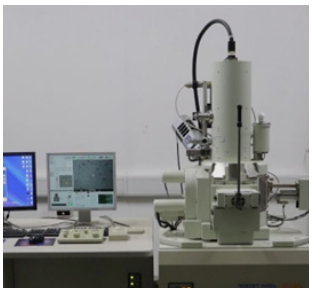


Powder XRD

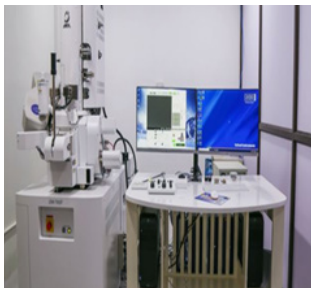
Multipurpose XRD



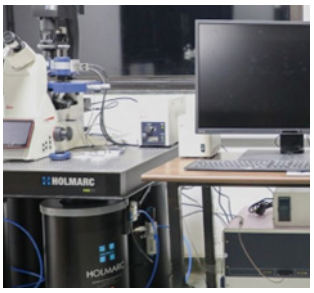
TEM



FE-SEM

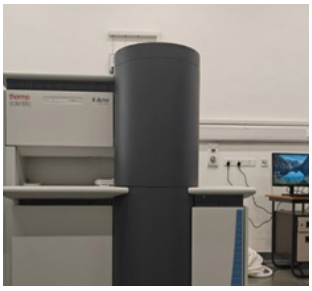


Analytical SEM

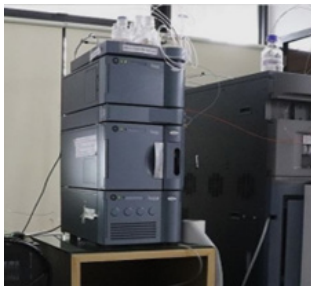


Bio-AFM

Confocal Microscope



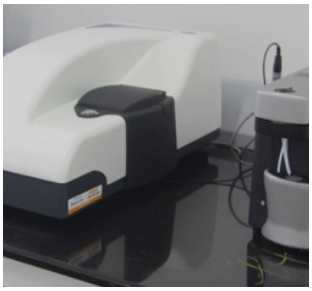
XPS



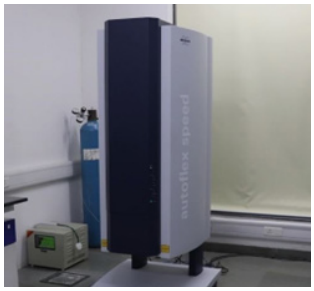
LC-MS

ICP-MS

CD-Spectrometer



DLS

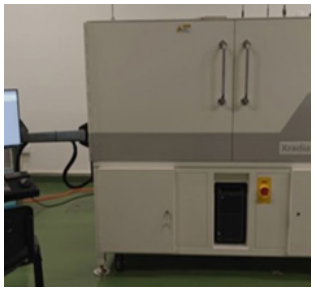


MALDI-ToF

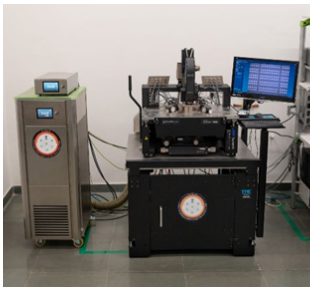
Flow Cytometer

PPMS

NMR



Micro-XCT



Probe Station

Nanoparticle Tracking Analysis (NTA)

APPLICATIONS

Instruments	Application
SCXRD (Single Crystal X-Ray Diffractometer)	• X-RAY crystallography of proteins • Structural evaluation of compounds • Lattice information
PXRD (Powder X-Ray Diffractometer)	• Lattice parameters, phase identity and phase purity. • Crystallinity, crystal structure, and percent phase composition.
MPXRD (Multipurpose X-ray Diffractometer)	• Phase identification, crystallite size and lattice parameter determination • Stress and texture estimation • Determination of film thickness, density, roughness and composition of thin films • Reciprocal space maps to access wide reciprocal lattice map in a short time spans
TEM (Transmission Electron Microscope)	• Characterization of various materials. • Process optimization. • High resolution imaging of various molecules.
FE-SEM (Field Emission Scanning Electron Microscope)	• Estimation of particle morphology, particle size and size distribution. • Elemental analysis using EDX mode. • Estimation of morphology of micro-crack & fracture. • Estimation of thickness of Thin-film & Oxide layer.
Analytical SEM (Advance Analytical Scanning Electron Microscope)	• Surface microstructure and feature analysis • High-speed elemental and crystallographic mapping
Bio-AFM (Biological Atomic Force Mirocsope)	• Solution based imaging where membranes, cells etc. can be imaged simultaneously in fluorescence and AFM mode. • Viewing live events like protein folding, aggregation, self-assembly, etc. • Cells and tissue imaging.
Confocal Microscope	• Live cell imagining • FRET assays • Expression analysis using fluorescent probes
XPS (X-ray Photoelectron Spectroscopy)	• Elemental composition of surface and quantification of there relative concentrations with some limitations • Chemical states of elements • Sputter depth profiling • High resolution chemical state spectroscopy
LC-MS (Liquid Chromatography Mass Spectrometer)	• Confirmation of elemental composition • Much more precise then electron absorption spectroscopy • Molecular weight information about each chromatographic peak
ICP-MS (Inductively Coupled Plasma Mass Spectrometer)	• Heavy metal detection in various samples • Detection of metals in the blood. • Detection of Metal-based nanoparticles in aqueous solution
CD-Spectrometer	• Characterization of secondary structure (α-helix, β-sheet). • Detection of changes in structure upon mutagenesis. • Detection of Changes in the confirmation of a protein upon protein: protein interaction. • Studying conformational stability of proteins in various conditions such as pH, Temperature, denaturing agents, etc.
DLS (Dynamic Light Scattering)	• Particle size and size distribution • Molecular weight • Hydrodynamic size & Zeta potential of colloids. • Can be used to study the stability, flocculation and polydispersity of nanoparticles • Isoelectric points of colloidal suspensions
MALDI-ToF	• Proteomics research, Bio-marker discovery. • Analysis of biotherapeutics, Bio-assay development, and metabolite distribution. • Intact protein sequencing

Flow Cytometer	• Cell counting • Multicolour cell sorting • Fluorescence based Cell cycle analysis • Cell proliferation/ Cell viability assays • Immuno-phenotyping • Intracellular protein staining • Determining cell characteristics and features such as total protein, lipid content, surface charge, etc. • Biomarker detection
PPMS	• Variable temperature DC and AC Electrical Measurements with(out) Magnetic Field. • Resistivity Measurements with(out) Magnetic Field, under Single Axis rotation. • Variable temperature Magnetic property measurements for high and low magnetic moment samples.
NMR (Nuclear Magnetic Resonance)	• For Structural Analysis of Molecules • Quantification and purity of the drug sample • Detection of fractions of petroleum products • To assess the purity of the samples
Micro-XCT	• Non-destructive inspection of internal structure of solid material • Internal crack detection, crack propagation checkup • Porous structure analysis • Reverse engineering of mechanical tools
Probe Station	• Current - Voltage, Capacitance - Voltage Measurement • Semiconductor Device Electrical Characterization • Reliability Measurement • Failure Analysis
Nanoparticle Tracking Analysis (NTA)	• Particle and molecular size, particle charge • particle concentration • Zeta potential

About CIF

The **Central Instrumentation Facility (CIF) at IIT Gandhinagar** has been established with an aim to facilitate cutting-edge research by enabling high-quality data acquisition using sophisticated instruments. This state-of-the-art facility houses several high-end analytical instruments. The CIF at IIT Gandhinagar aims at helping researchers, scientists, students and faculty from academic institutions, universities, R&D laboratories and industries by providing them an access to sophisticated analytical instruments.

For additional details related to the facility and to book slots for analysis, please write to "cif@iitgn.ac.in", "Landline: 07923952200". Please scan the QR code for more details:

Terms & Conditions for sample analysis:

- Requests will be accepted on "first come-first serve" basis.
- Payment should be made through online transaction (NEFT) + 18% GST, in favor of "The Registrar, IIT Gandhinagar".

For any instrument-related queries, please write to us at "cif@iitgn.ac.in"

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