



# INSTITUTE OF CHEMICAL TECHNOLOGY, MUMBAI MARATHWADA CAMPUS, JALNA

Category I Deemed to be University (MHRD/UGC)  
First Elite Status and Centre of Excellence-Govt. of Maharashtra  
A++ Grade by NAAC (CGPA 3.77)

## Research Facility Brochure



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# X-Ray Diffractometer (XRD)

- Make** : Bruker, Germany
- Model** : Bruker D8 ADVANCE DA VINCI fully Automatic Powder X-ray Diffractometer System
- Specifications** : Traditional X-ray powder diffraction (XRPD)  
Grazing incidence diffraction  
Rotating sample stage  
Accuracy in peak positions  $\leq 0.01^\circ 2\theta$   
LYNXEYE XE-T detector  
TRIO and TWIN optics  
Dynamic Beam Optimization  
Anton Paar HTK 16N for non-ambient conditions (25 to 1600 °C)

## About Equipment:

The D8 ADVANCE is based on the unique D8 diffractometer family platform and is perfectly designed for all X-ray powder diffraction and scattering applications.

## Applications:

- Identification of both crystalline and amorphous phases and determination of specimen purity
- Quantitative analysis of both crystalline and amorphous phases in multi-phase mixtures
- Microstructure analysis (crystallite size, microstrain, disorder)
- Texture (preferred orientation) analysis
- Indexing, ab-initio crystal structure determination and crystal structure refinement



# Fourier Transform Infrared Spectrophotometer

<b>Make:</b>	: JASCO
<b>Model</b>	: JASCO FT/IR 6600
<b>Specifications</b>	: Range: 7800-0 $\text{cm}^{-1}$
	Accessories: ATR Pro One, Pellet Holder
	Resolution: 0.4 $\text{cm}^{-1}$
	Scanning rate: 8-64 cycles
	S/N ratio: 45,000:1



## About Equipment:

The FT/IR-6600 offers the absolute highest level of performance in the industry with the highest signal-to-noise specifications.

The FT/IR-6600 provides a high level of functionality and high accuracy measurement capability.

## Applications:

- Chemical Compositions
- Functional group identification

# UV-Visible Spectrophotometer

- Make** : Wensar
- Model** : LMSP-UV1900 UV-Vis. Double Beam Spectrophotometer
- Specifications** : Optical system: Double beam  
Wavelength range: 190-1100 nm  
Detector: silicon photodiode  
Lamps: D2 Lamp & Tungsten Halogen Lamp (W Lamp)  
Wavelength accuracy:  $\pm 0.3$  nm  
Wavelength Repeatability:  $\pm 0.2$  nm  
Resolution and bandwidth : 0.5nm  
Curve and Data: wavelength scanning, standard curve, multi wavelength scanning



## About Equipment:

The two detectors are used to measure sample and reference respectively and simultaneously for optimizing measurement accuracy. Lamp selection enables conserving the life of D2 & Tungsten lamps with real-time clock for date & time stamping of results

## Applications:

- Qualitative and Quantitative Analysis
- Chemical Kinetics
- Protein/ RNA/DNA quantification
- Metal concentration
- Validation



# UV-VIS NIR Differential Reflectance Spectroscopy

**Make** : Shimadzu  
**Model** : UV-2600i  
**Specifications** : Wavelength range – 185- 900 nm  
UV 100 mm cell GS Kit  
Integrating Sphere Attachment ISR 2600  
Film Holder  
Multi-cell sample compartment unit  
Thermoelectric single cell holder



## About Equipment:

UV-2600i is a single monochromator system, whose wavelength range can easily be expanded to the near-infrared region of 1400 nm using the optional integrating sphere. The UV-2600i is also equipped with Shimadzu's proprietary Lo-Ray-Ligh grade diffraction grating, which achieves high efficiency and low stray light levels giving significant noise reduction.

## Applications:

- Measurements of Solar cell anti-reflective films and polycrystalline silicon wafers
- Transmittance & Absorbance of films
- Quantification of organic compound

# BET Surface Area and Porosity Analyzer

- Make** : Microtrac MRB
- Model** : BELSORP MAX II
- Specifications** :
- Measurement method: Volumetric method + AFSM™
  - Pre-treatment/de-gassing system: 50 - 450 °C
  - Adsorptive gas: N<sub>2</sub>, Ar, Kr, CO<sub>2</sub>, H<sub>2</sub>, O<sub>2</sub>, CH<sub>4</sub>, NH<sub>3</sub>, Butane
  - Measurement range (specific surface): 0.01 m<sup>2</sup>/g and above
  - Pore size distribution (Diameter): 0.35 - 500 nm
  - Analysis programme: NLDFT for pore size distribution/ Adsorption/desorption isotherms/ Specific surface area
  - Analysis software: BELMaster™ 7
  - Solid/porous/powder samples



## About Equipment:

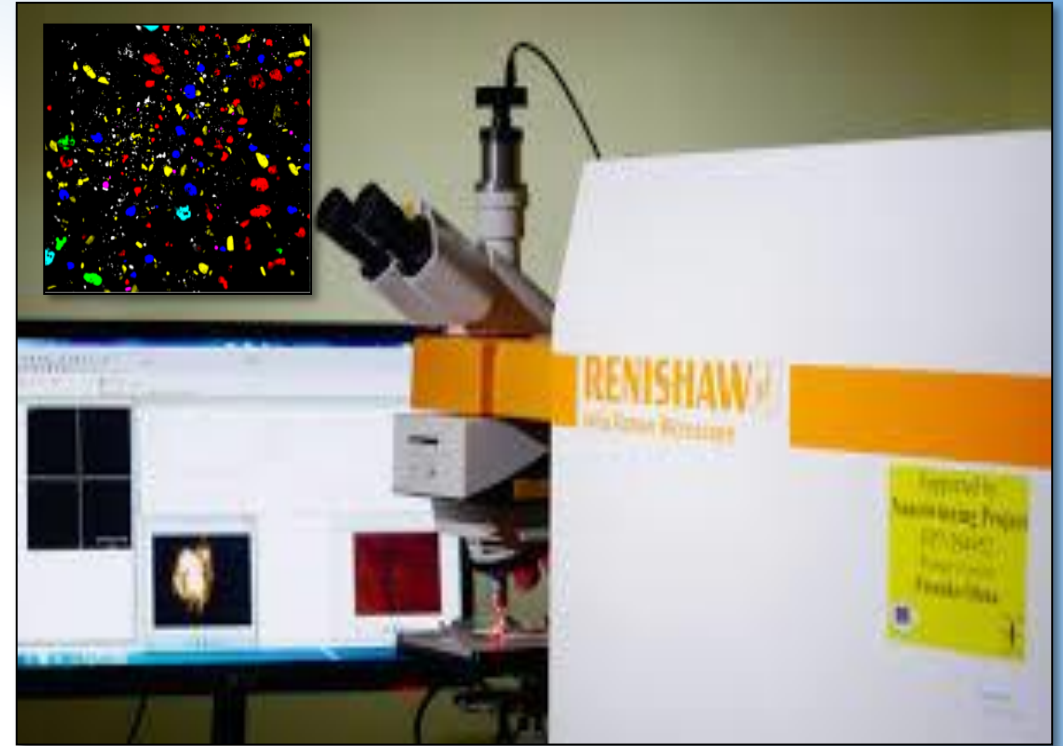
The BELSORP MAX II is a versatile instrument which measures specific surface area/pore size distribution, adsorption/desorption isotherms, pore size (BJH method) and pore volume of the sample.

## Applications:

- Heterogeneous Catalysis
- Surface Kinetics

# Micro-Raman Spectroscopy

- Make** : Renishaw
- Model** : InVia Raman Microscope
- Specifications** : Raman Spectral Analysis using Visible Excitation at 532 and 785 nm  
Laser: DPSS 532 nm laser, 100 mW, with External mounting on a kinematic laser baseplate  
High Power Near IR Diode Laser, 300 mW at 785 nm (air cooled)  
Integral narrow bandpass filter with external mounting on laser kinematic baseplate



## About Equipment:

InVia Raman Microscope comprises a research-grade microscope coupled to a high-performance Raman spectrometer. It delivers outstanding performance – high signal throughput, combined with high spectral resolution and stability—giving reliable results, for even the most challenging measurements

## Applications:

- Qualitative Molecular Analysis
- Quantitative Molecular Analysis
- Investigating Pharmaceutical Compounds
- Polymer Characterization



# Inductively Coupled Plasma – Mass Spectrometry (ICP-MS)

- Make** : ThermoFisher Scientific
- Model** : iCAP RQ Quadrupole ICP-MS (ICAPQNOVAS)
- Specifications** : Digital, solid-state RF-generator with dynamic frequency  
impedance matching to the plasma at ~27 MHz  
Full PC control gives continuously variable power from 380 W to 1600 W.  
One 1000 mL/min additional MFC controller  
Borosilicate glass concentric nebulizer with 400 $\mu$ L/min flow rate at default peristaltic pump rate  
Peltier cooling (-10 °C to +20 °C) of the quartz cyclonic spray chamber  
Close-coupled, compact, low pulsation, 12 rollers, 4 channel mini-pump with metal-free rollers and bubble sensor



## Applications:

- Metal Concentration Detection
- Elemental Analysis
- Wastewater Treatment
- Catalysis

## About Equipment:

ICAPQNOVAS atomizes the sample and creates atomic and small polyatomic ions, which are then detected. It is versatile and used for its ability to detect metals in liquid samples at very low concentrations with dynamic range of  $10^9$  cps. It can detect different isotopes of the same element, which makes it a versatile tool in isotopic labeling.



# Ultra High-Performance Liquid Chromatography

- Make** : ThermoFisher Scientific
- Model** : Thermo scientific Vanquish System
- Specifications** :
- Pump – Quaternary Pump F
  - Detector – (a) Variable Wavelength Detector F, (b) Fluorescence Detector F, (c) Refractive index Detector (RefractoMax 520)
  - Column – COSMOSIL C<sub>18</sub>-MS-II (4.6 mm I.D. x 250 mm)
  - Data Processor - Chromeleon 7.2

## About Equipment:

The Vanquish UHPLC system is an integrated, fully biocompatible, state-of-the-art binary UHPLC system with ultra-low gradient delay volume, designed to provide unrivaled performance for high resolution and high-throughput LC applications

## Applications:

- Separation of Naturally Occurring Compounds
- Dissolution Studies
- Pollutant monitoring in liquid phase
- Quantitative Analysis



# List of Instruments

To avail the instrument facility, complete the registration using below link:

**Registration link:** <https://forms.gle/epa29av7y65X6kbC7>

**For queries:** [instruments@marj.ictmumbai.edu.in](mailto:instruments@marj.ictmumbai.edu.in)

Sr. no.	Facility	Service charges for Academics	Service charges for Industry
1.	XRD (Powder) Bruker D8 Advance	Rs. 300/-normal mode	Rs.1200/-per sample
2.	FT-IR Spectroscopy (Jasco)	Rs. 200/- sample/per scan	Rs.800/-per sample/per scan
3.	UV-Vis Spectroscopy	Rs. 200/- sample/per scan	Rs.500/-per sample/per scan
4.	UV-Vis-NIR Differential Reflectance Spectroscopy (for solid samples)	Rs. 250/- per sample/per scan	Rs.1000/- per sample/per scan
5.	BET Surface Area and Porosity Analyzer (Belsorp Max II)	Rs. 1000/- per sample	Rs.2500/- per sample
6.	Raman Spectroscopy (RENISHAW)	Rs. 250/- per sample	Rs.1000/- per sample
7.	Inductively Couple Plasma – Mass Spectrometry (ICP-MS)	Rs. 1500/- per sample + Sample preparation charges	Rs.3000/- per sample+ Sample preparation charges
8	Ultra High-Performance Liquid Chromatography(uHPLC)	Rs. 700/ injection	Rs. 1500/injection
		Method development and validation Rs. 12500	For an industry sample, pls contact to below email ID, <a href="mailto:mm.jadhao@marj.ictmumbai.edu.in">mm.jadhao@marj.ictmumbai.edu.in</a>