

## Sophisticated Analytical Instrument Facility, IIT-Madras, Chennai

Sl. No.	Instrument	Make/ Model	Major Specifications/ Accessories available	Type of measurement/analysis available
1.	High Resolution Scanning Electron Microscope	FEI Quanta-200 MK II	EDS, WDS	Secondary Electron/Back Scattered Electron/Environmental secondary electron Micrograph images with EDS/WDS spectra.
2.	X-ray Diffractometer (single crystal)	Enraf Nonius CAD-4	Cu ( $K\alpha$ ) source; Polarising Microscope	Single crystal X-ray diffraction data to obtain unit cell parameters, space group, morphology, 3-dimensional molecular structure and molecular packing.
3.	X-ray Diffractometer (single crystal)	Bruker aXS KAPPA APEX-II	Mo ( $K\alpha$ ) source; shutter assembly (repair kit)	Obtaining intensity data for three dimensional molecular structure analysis
4.	X-ray Fluorescence Spectrometer	Bruker S4 Pioneer aXS	Sequential XRF spectrometer with 4 KW X-ray tube; Analysing crystals: LiF 200, PET, OVO55, OVOC and OVOB; Hydraulic press; Ball mill	Qualitative, semi-quantitative analysis of powder, solid and liquid samples for all elements in the periodic table from Be to U.
5	Vibrating Sample Magnetometer	LakeShore 7410	Low temperature with Close cycle Refrigeration (20-300 K); High temperature oven (27-1000 °C)	Magnetisation studies on metal, thin film, amorphous magnetic samples at Room Temperature/Low Temperature/High Temperature; M-H; M-T; ZFC/FC are included.
6.	FT-NMR Spectrometer (500 MHz)	Bruker Avance III 500	11.7 Tesla Magnet; 5mm BBO probe and 5mm QXI probe with gradient facilities; auto-sampler	1D NMR, 2D NMR, Multi-nuclear NMR; Variable temperature measurements.
7.	EPR Spectrometer X/Q Band	Varian E 112	X-band & Q-band; Magnetic field up to 2 Tesla; Room/liquid nitrogen/variable temp. accessories.	Room temp., liquid nitrogen temp., crystal rotation related ESR measurements.
8.	Mossbauer Spectrometer	Canberra S-100	Fe-source; Liquid He cryostat compatible for liquid nitrogen also	Mossbauer spectroscopic studies/ measurements at room temperature/ variable temperatures.
9.	GC-Mass Spectrometer	Jeol GCMS GC-Mate II	High resolution GC-MS/ MS system	HR-MS and GC-MS measurements.

10.	ICP-OES	Perkin Elmer Optima 5300DV	Range: 165-782 nm; 40 MHz RF generator; Detection limit: Upto ppb level using SCD detector	Qualitative and Quantitative analysis of metals and metalloids in water, soil, rock, effluents, biological, metallurgical and environmental samples in solution.
11.	FT-Raman Spectrometer	Bruker RFS27	Range : 5000 – 50cm <sup>-1</sup> Resolution: upto 2.0 cm <sup>-1</sup>	Spectra of liquid/solid, spectral averaging, peak position band with area analysis
12.	UV-VIS-NIR Spectrometer	Varian Cary-5	Range: 200-3000 nm; Accessories for: Diffuse reflectance, Specular reflectance, Variable temperature and Polarization studies	Absorbance, Transmittance and Reflectance spectra; Polarization studies.
13.	FT-IR Spectrometer	Perkin Elmer Spectrum-1	Range: Range: 4000-450 cm <sup>-1</sup> ; Resolution: upto 1.0 cm <sup>-1</sup>	Spectra of liquids/solids; spectral averaging; peak position band width, area analysis.
14.	Fluorescence Spectrometer	Jobin Yuon Fluorolog 3	Range: 180-1550 nm; Resolution: 0.2 nm Polarization accessory	Fluorescence studies of biological samples, dissolved solids, polymers, membranes, low-dimensional structures, liquid crystals and thin films.
15.	Fluorescence (Life Time Attachment)	Hariiba Yvon 1 BH	Solid sample holder for solids	Fluorescence decay measurements UV-VIS (200-800 nm)
16.	Thermal Analysis System (TG/DTA)	Netsch STA 409 TGA/DTA	Temperature range: 25°C to 1400°C	Thermal studies including thermal stability, decomposition temperatures, oxidative stability etc..
17.	Thermal Analysis System (DSC)	Netsch DSC 204	Temperature range: -170° C to 700°C	Study of phase transition, glass transition etc.