

About CAFMC

Central Advanced Facilities for Material Characterization (CAFMC) is a constellation of Advanced and sophisticated research equipments enabled with new horizon of cutting-edge technologies at a single platform. The motivation behind establishing world class research facilities is to provide advance infrastructure in hand our students for drawing and exploring new dimensions of modern science. This facility is open for all students of VBS Purvanchal University Jaunpur and their affiliated colleges to carry out their research activities under single umbrella. As well as this facility would be also open for scientists and students of other academic institutions and industries on payment basis.

Objectives of the CAFMC

- To facilitate the Faculties and PhD & Masters student with world class research facilities under single umbrella for executing their hurdle free research goals.
- To promote inter disciplinary research environments among the researchers of the University.
- Development of proto type devices using sophisticated research equipments.

Equipments under facility

Field Emission Scanning Electron Microscope (FE-SEM):

Model: TESCAN MAIA3 (with EDX)

The TESCAN MAIA3 is an ultra-high-resolution SEM with excellent imaging capabilities in the whole range of beam energies. A versatile detection system and high spatial resolution allows the observation of even the finest surface details. This is an essential feature for comprehensive characterization of nanomaterials, for observation of beam-sensitive samples common in the semiconductor industry.



Features:

- I. State of sample: Powder, thin films
- II. Types of samples: conducting, non-conducting, semiconducting
- III. Electron Gun: Schottky field emission gun
- IV. Resolution: At 1 kV is 1.4 nm using secondary electrons
- V. Fast imaging rate up to 20 ns.
- VI. EDX attachment for elemental analysis and elemental.

Instrument: X-Ray Diffractometer (XRD) (Rigaku Smartlab 9kW)

Rigaku SmartLab 9 kW is a general purpose XRD system which can be used in diffraction studies of powders, thin films, and solid objects with various sizes. System has a unique five-axis θ - θ goniometer which enables many kinds of diffraction experiments.



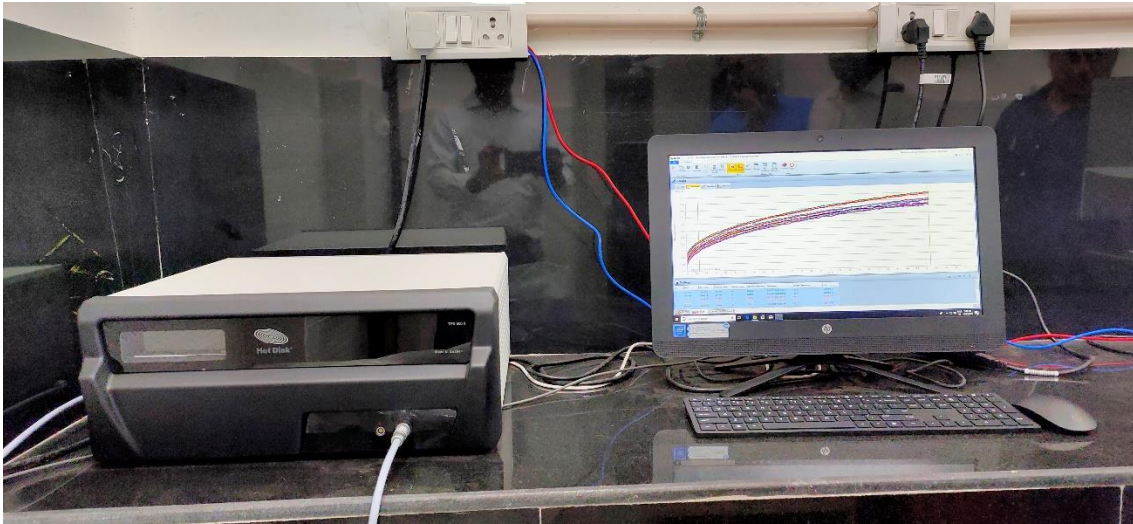
Features:

- I. Types of sample: Powder, thin films
- II. Types of analysis: Powder XRD, thin film XRD, Grazing incidence, Small angle X-ray scattering (SAXS), Wide angle X-ray scattering (WAXS), HR-XRD
- III. JCPDS files (upon request)

Thermal Constant Analyzer

Model: HOT-DISC TPS 500S

The Hot-Disc TPS 500S Thermal Constant analyzer quickly and accurately measures thermal conductivity, thermal diffusivity and specific heat capacity of a wide range of materials. The economical TPS 500S condenses the patented TPS technology with next-generation analysis software, resulting in an efficient, simple-to-use thermal conductivity apparatus.



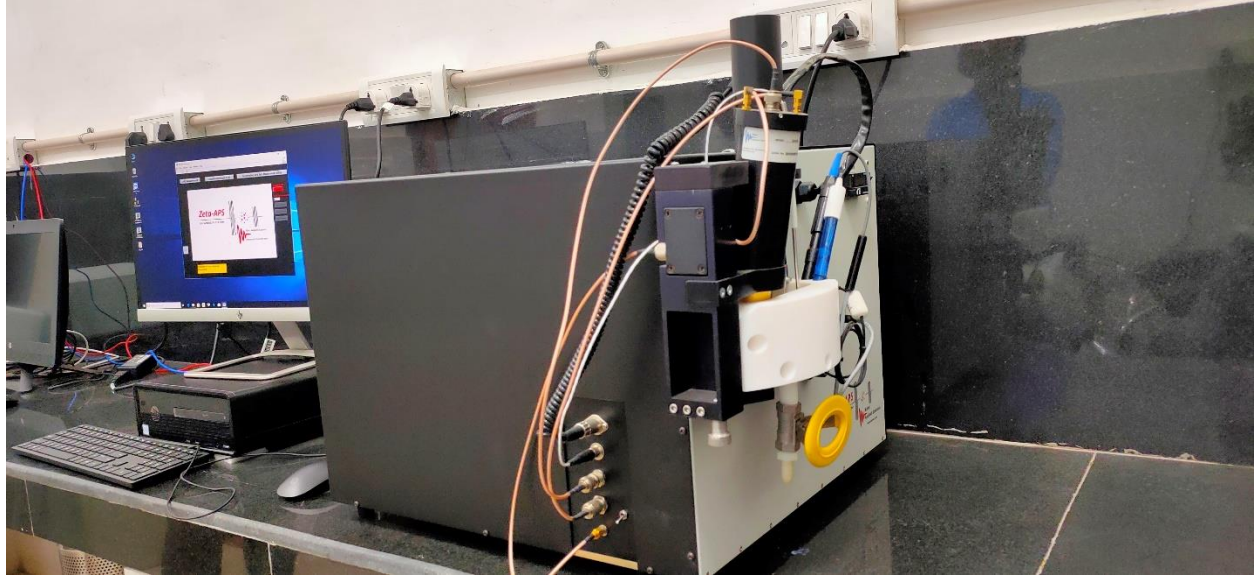
Features:

- I. Sensors-Kapton with Cable
- II. Types of Materials – solids, liquids, nanofluids, powders (Pallet form).
- III. Temperature range: -35 °C to 180 °C
- IV. Minimum Sample dimensions (for solid samples):
 - 2mm X 8mm diameter or square for bulk testing
 - 0.1mm X 12mm diameter or square for slab testing
 - 10mm X 5mm diameter or square for one-dimensional testing
 - at least 25 ml liquid sample is required (for liquid samples)
- V. Maximum sample thickness: Unlimited

Acoustic Particle size analyzer

Model: Zeta-APS

The patented, unique Zeta-APS performs simultaneous Particle Size and Zeta Potential measurements on undiluted and/or opaque samples! Better yet, unlike other particle size analyzers, you do not have to know a priori - or guess- the PSD shape of your samples.



Features:

- I. By combining Acoustic-Attenuation Spectroscopy and Electro-acoustic techniques, simultaneous Particle Size Distribution (PSD) measurements are made without the need for sample dilution which can lead to errors, be time consuming, and change the sample's actual PSD.
- II. Wide particle size range of analysis: 10 nm to over 100 microns.
- III. Can measure ultrasonic Attenuation of the various liquid samples (Frequency range 1-100 MHz)
- IV. Measurements can be made on a wide variety samples, including aqueous, as well as, non-aqueous samples such as pigments (organic or inorganic), inks, minerals, emulsions, metal oxides, catalysts, nanoparticles, pharmaceuticals, biodispersions, and many others.
- V. Minimum volume of sample requirement (for liquid samples): 100 mL

Fourier Transform Infrared (FT-IR) Spectrometer
Model: BRUKER ALPHA-II FTIR with ATR



Accessory

ALPHA-II FT-IR spectrometer with universal QuickSnap sampling module ALPHA II is a very compact FT-IR spectrophotometer for quick, easy and reliable FT-IR analysis. The permanently aligned RockSolid interferometer and the reliable diode laser guarantee an accurate and precise data acquisition.

Experimental Features:

- I. Types of sample: solid pellets
- II. Spectral range: 350 cm^{-1} to 8000 cm^{-1}
- III. Dehumidifier controlled chamber ensuring the absence of unwanted hydroxyl signatures

The Eco-ATR sampling module is a single reflection ATR sampling module that allows one to analyze most solids and liquids without any sample preparation. It is equipped with a versatile high throughput ZnSe ATR crystal.

Experimental Features:

- I. Types of sample: solids and liquid
- II. Range of pH for liquid samples: pH 4 to pH 8
- III. Spectral range: $600 - 8000\text{ cm}^{-1}$

UV-Vis Spectrophotometer

Model: Motras Double Beam Uv-Vis Spectrophotometer Model: UV Plus

This equipment helps in analyzing the UV-Vis absorption spectra of liquid samples.



Features:

- I. Types of samples: liquid, liquid dispersions
- II. Spectral range: 200 – 1000 nm
- III. Wavelength accuracy ± 0.1 nm

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