



Existing Facilities of IGCRT

X-ray Photoelectron Spectrometer (XPS)



XPS is a technique for analyzing the surface chemistry of material. XPS is used to measure

- Elemental composition
- Empirical formula
- Chemical state and electronic state of the elements within a material

1st XPS System in Bangladesh

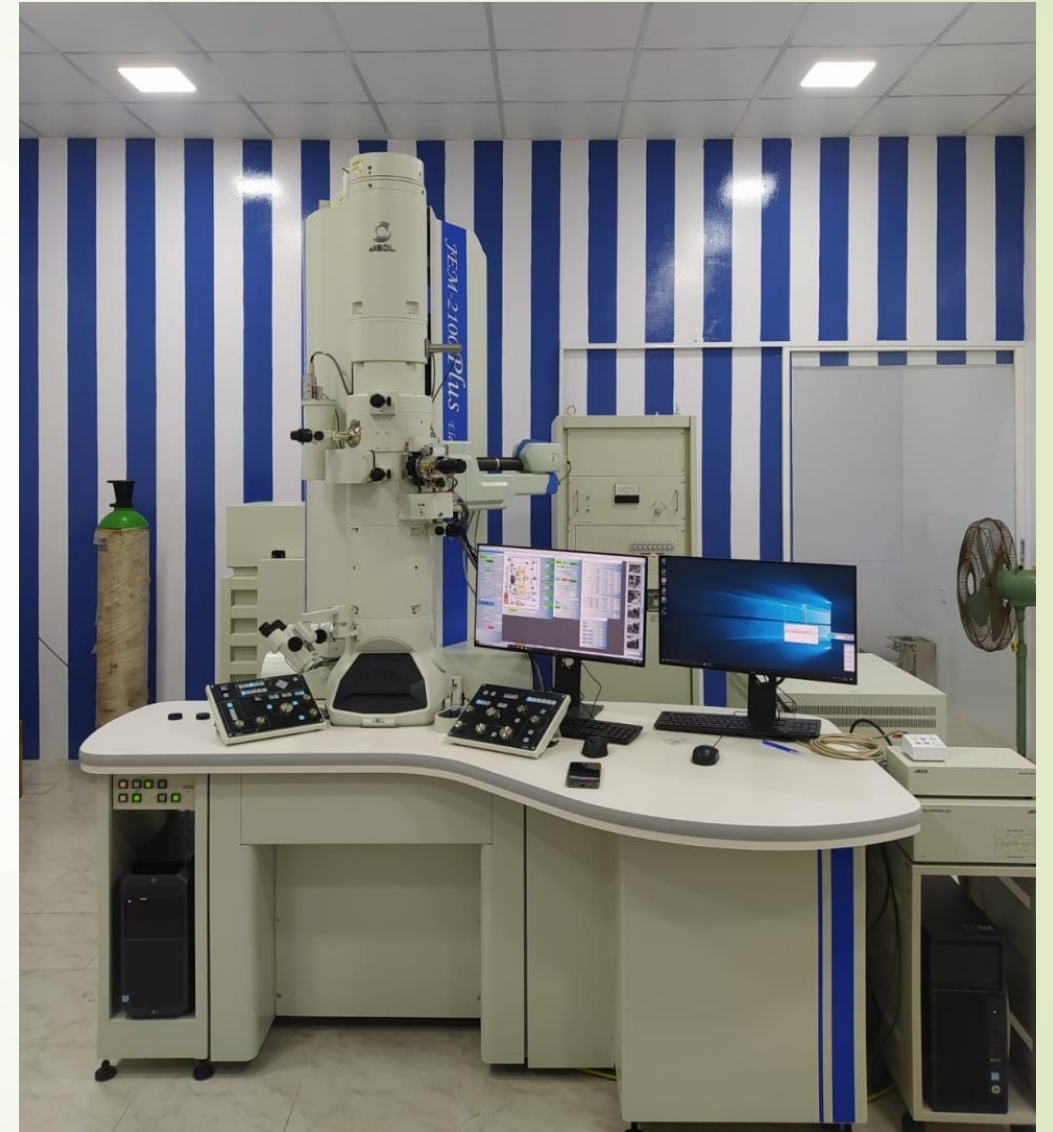


Transmission Electron Microscope (TEM)

Transmission Electron Microscopy (TEM) creates high magnification images of the internal structure of a sample being studied

TEM determines

- ✓ Morphology (Nanomaterials)
- ✓ Crystalline structures
- ✓ Internal fractures and contamination



Wavelength Dispersive X-Ray Fluorescence Spectrometer (WD-XRF)



- WD-XRF identifies
- ✓ Elemental analysis
 - ✓ ppm to percent Composition



Vibrating Sample Magnetometer (VSM)



The VSM is the instrument used to measure the magnetic moment, the most fundamental quantity in magnetism, of solid samples.

VSM identifies

- ❖ Hysteresis loop
- ❖ FORC measurement
- ❖ magnetic moment information of entire samples

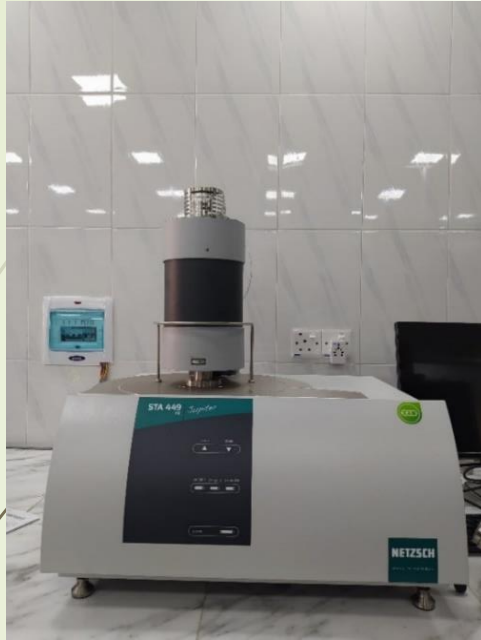
XRD is a non-destructive technique used for

- ❑ Phases identification
- ❑ Quantitative analysis of the phases
- ❑ Crystal structure, Lattice parameter, Size, shape and stresses in the material



X-Ray Diffractometer (XRD)

Simultaneous Thermal Analyzer (STA/TG-DSC)



STA gather information on

- ✓ Melting and crystallization behavior of solids
- ✓ Glass transition temperature
- ✓ Specific heat capacity, kinetic study, reaction enthalpies etc.

Dilatometer



Dilatometer identifies

- ✓ thermal expansion and coefficient of thermal expansion
- ✓ sintering temperature and shrinkage steps
- ✓ optimizing of firing process
- ✓ glass transition temperature

Nano Particle Size (DLS based) & Zeta Potential Analyzer



Nano Particle Size & Zeta Potential Analyzer

- ✓ Particle size distribution
- ✓ Zeta potential measurements

UV-Vis-NIR Spectrophotometer



UV-Vis-NIR Spectrophotometer-

- ✓ Materials identification
- ✓ Measures transmittance, reflectance, absorbance
- ✓ Color properties determination

Thermal Conductivity Meter



TCM measures
✓ Thermal conductivity

Impedance Analyzer

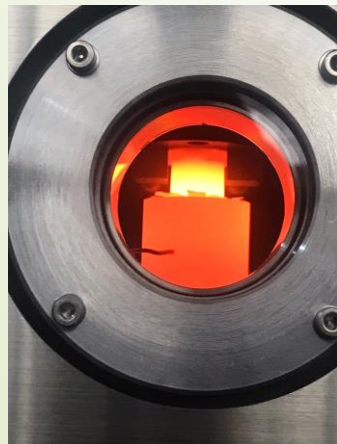


Impedance Analyzer measures
✓ Capacitance, conductance, resistance, inductance and impedance

Spark Plasma Sintering (SPS) Furnace

SPS method used to manufacture

- ✓ Functionally graded materials (FGM)
- ✓ Thermoelectric semiconductors
- ✓ Biomedical materials, and
- ✓ Various advanced new materials, at shorter sintering times



Mercury Intrusion Porosimeter



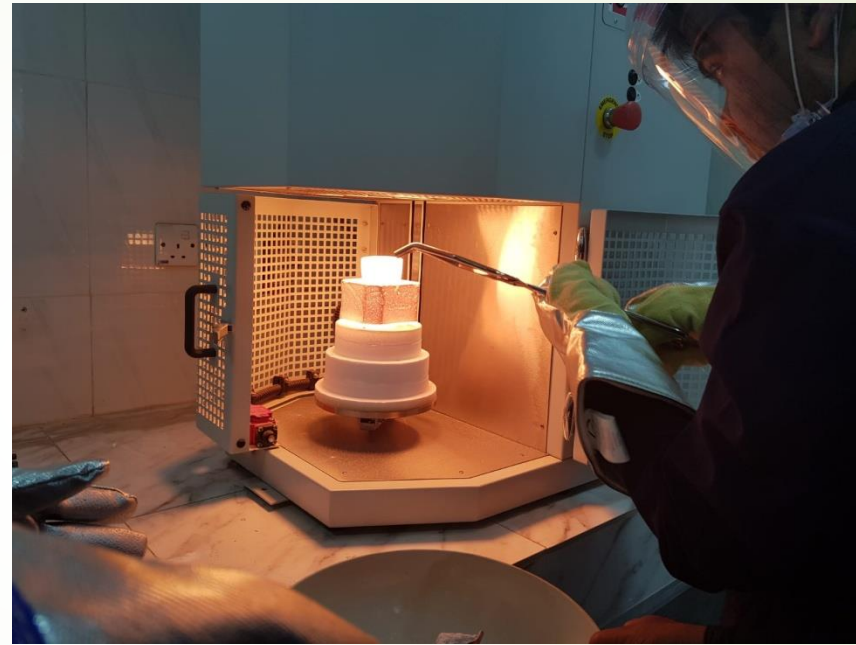
Capillary Flow Porometer



MIP and CFP measures

- ✓ Pore size distribution, pore volume, surface area

Glass Melting Furnace 1800°C



Glass Melting Furnace used for production of glass, glass-ceramics

Furnace 1200°C



Furnace 1600°C



Furnace 1800°C



Furnace used for

- ✓ Calcining, tempering, annealing, sintering
- ✓ Production of refractories