CENTRAL RESEARCH FACILITY

A HEFA FINANCED FACILITY, DEDICATED TO THE SERVICE OF THE NATION

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ABOUT
CENTRAL RESEARCH FACILITY

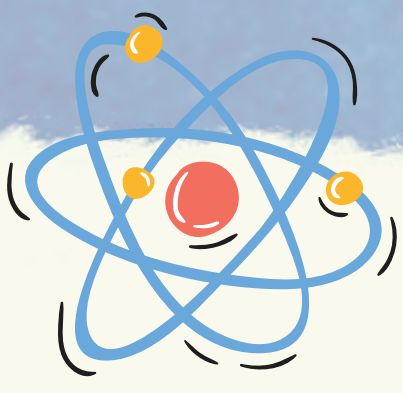
The Central Research Facility (CRF) at the National Institute of Technology Karnataka (NITK), is established with a Higher Education Financing Agency (HEFA) loan of Rs. 80 crores towards equipments. CRF has 100% power backup and centralized HVAC and fiber optic connectivity. The total floor area being used is approximately 9300 sq. mt.

The center shall be a one stop facility for:

- **Centralized Production Facility with state of the art Manufacturing Equipment.**
- **Materials Characterization Facility with state of the art Equipment for Characterization of Metals / Semiconductors / Ceramics / Elastomers / Glass Composites, etc.**
- **Discussion / Meeting rooms and training halls.**
- **Laboratories (CoEs) setup by Major Industries.**







MATERIAL CHARACTERIZATION

1. Field Emission Gun Scanning Electron Microscope (FEGSEM)

DESCRIPTION

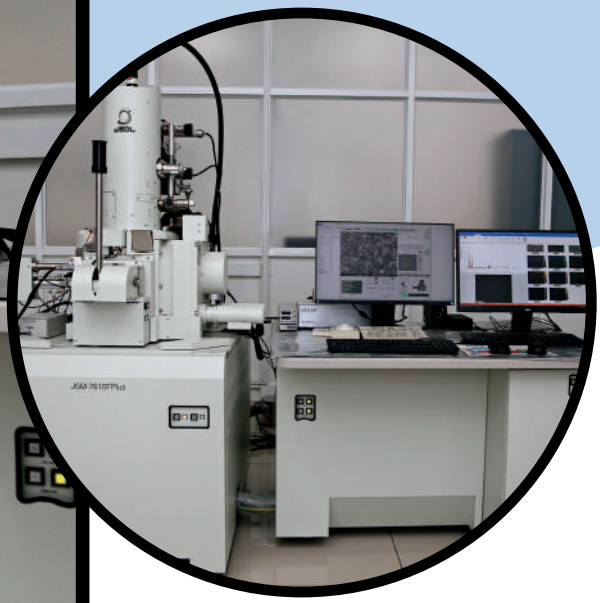
Surface Topography, Crystallography, Elemental Composition

FEATURES

High efficiency annular in-lens SE detector system, Energy selective back scattered detector for pure SE, pure BSE, and a mixture of SE+BSE signals, Everhart-Thornley detector, Six segment back scattered detector for Z contrast and crystal orientation, Quorum coater with gold, carbon and platinum source, PV 7600 SU A EDAX Octane super EDS System-SDD 70mm, EDAX Team EBSD system with Hikari plus, EDAX TEAM WDS-Texas HP stand alone system, aSTEM detector with tilt tomography holder with 0.6 nm @ 30 kV- Dark field (DF), Bright field (BF), Oriented dark field (ODF), annular dark field (ADF), High angular dark field (HAADF), 12 numbers of 3 mm TEM grids.

SCAN TO KNOW MORE

2. Field Emission Scanning Electron Microscope (FESEM)

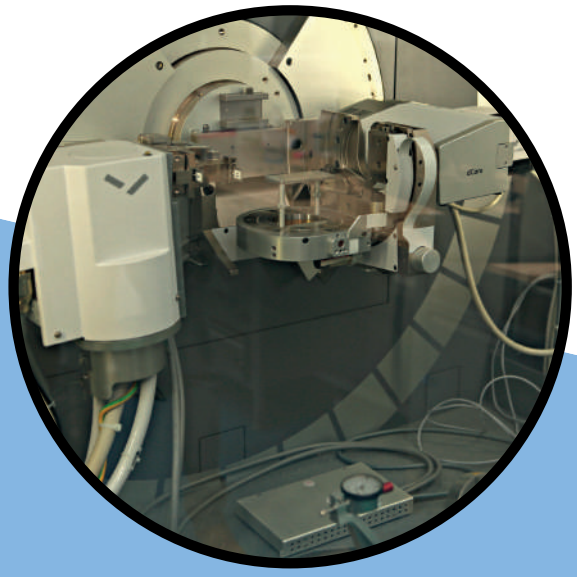


DESCRIPTION

Imaging, Composition, In-Situ Heating, Micro-Tensile tests

SCAN TO KNOW MORE

3. X-ray Diffractometer



DESCRIPTION

Determination of crystalline structure of materials

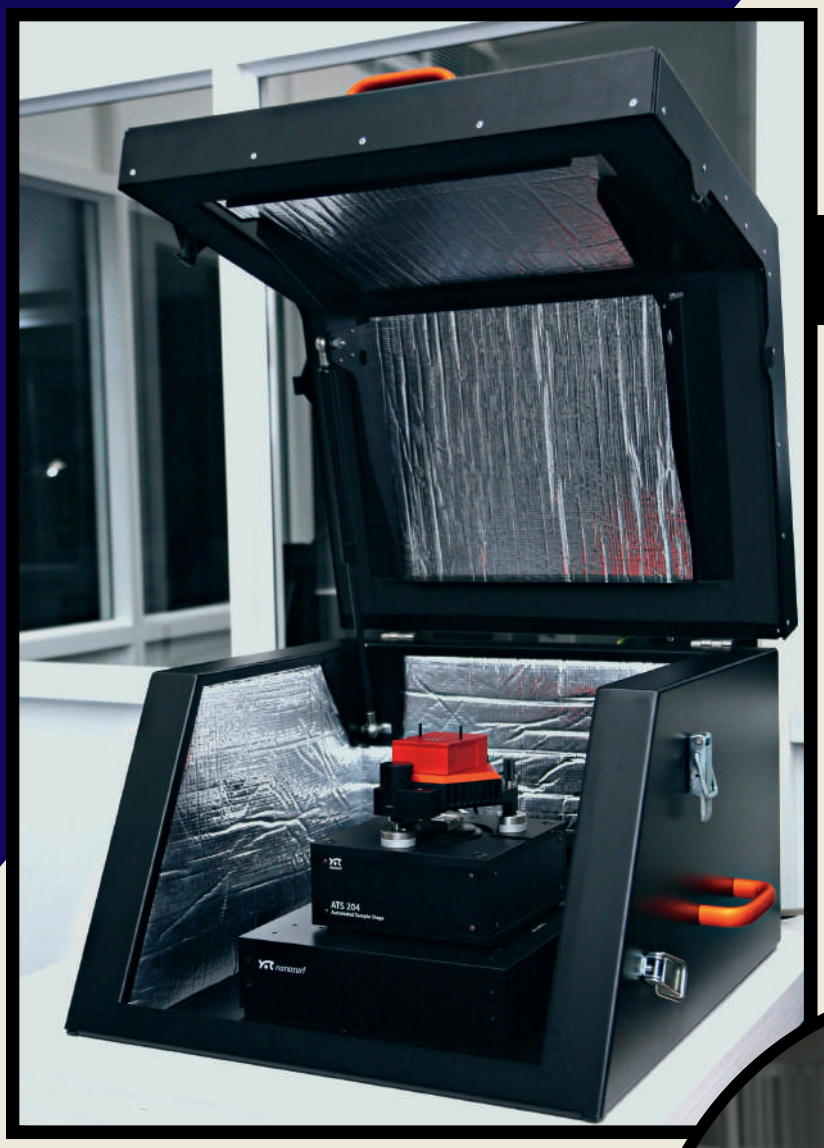
FEATURES

Line & Point focus using Cu Kα, Co Kα; 0D, 1D & 2D detector using PIXcel 3D Detector

APPLICATIONS

- **Powder Diffraction**
- **Transmission Diffraction**
- **Solid Samples XRD**
- **SAXs & WAXs (nano-materials)**
- **Micro-diffraction (small solid samples)**
- **Liquid Suspension samples**
- **Polycrystalline thin films (GIXRD)**
- **Residual Stress and Texture**

SCAN TO KNOW MORE



4. Atomic Force Microscope

DESCRIPTION

High resolution surface morphology of sample

FEATURES

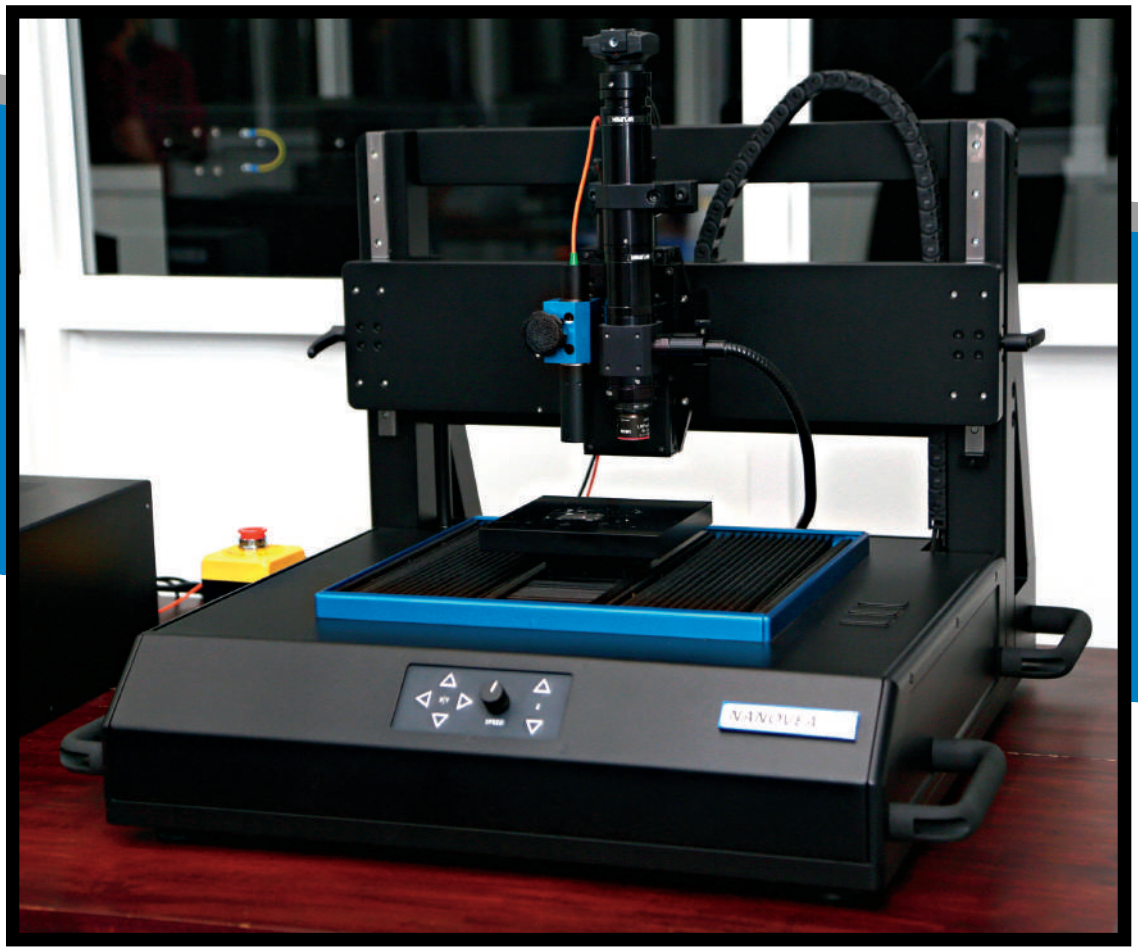
- **Flat and linear scanning**
- **Measurement versatility - scanning in liquid and a multitude of measurement modes**
- **Flexible stage and exchangeable cantilever holders**

APPLICATIONS

- **Biomaterials**
- **Lithography**
- **Tribology**
- **Nanomechanical and nanoelectrical characterization**
- **Thin films and coatings**
- **Polymers**
- **Graphene and 2D materials**

SCAN TO KNOW MORE

5. 3D Non Contact Confocal Profilometer



DESCRIPTION

Surface Roughness, Texture, 2D & 3D measurement & imaging

FEATURES

2D & 3D surface measurement & imaging (200mm x 150mm X-Y axis continuous scan with speed up to 40 mm/s)

APPLICATIONS

- **Roughness & Finish with imaging**
- **Texture**
- **Flatness & Warpage**
- **Volume & Area**
- **Geometry & Shape**
- **Step height & Thickness**

SCAN TO KNOW MORE

6. Laser Flash Analyzer

DESCRIPTION

Thermal diffusivity & Conductivity

FEATURES

- **Temperature performance from RT to 1600˚C**
- **Real-time pulse mapping for unmatched accuracy of thermal diffusivity for accurate testing of thin and highly conductive materials**

APPLICATIONS

The fundamental measurement of the Flash Method is Thermal Diffusivity, the thermophysical property that defines the speed of heat propagation by conduction.

SCAN TO KNOW MORE

7. BET Surface Area Analyzer with Physisorption

DESCRIPTION

Measurement of Pore volume, pore size of powder materials, surface area

FEATURES

Specific surface area: Minimum surface area of 0.01 m2/g and above

APPLICATIONS

- **Single point and multipoint specific BET surface area determinations**
- **Surface area characterization of microporous, nonporous or macroporous materials**
- **BJH adsorption and desorption average pore diameter (4V/A) determinations**

SCAN TO KNOW MORE

8. Particle Size and Zeta Potential Analyzer

DESCRIPTION

Particle size distribution & Electrostatic forces

FEATURES

- **The instrument chooses the ideal measurement angle for sample to ensure the highest data quality**
- **Particle characterization from the nano- to the micrometer range**
- **Particle size measurements via dynamic light scattering at three different measurement angles**
- **Molecular mass and refractive index measurements**

APPLICATIONS

Particle Size & Zeta Potential Measurement

SCAN TO KNOW MORE

9. Ion Chromatography

DESCRIPTION

Measures concentrations of ionic species

FEATURES

- **Ion Chromatography System [Non-metallic PEEK based] compatible for 0-14 pH & 100% RP organic solvents with built-in low/ high pressure dual pump Quaternary Gradient Pump for simultaneous analysis of anions & cations**
- **Provide multiple flexibility of detection of complex sample matrix by gradient and Isocratic mode to analyse various Anions like Cl-, F-, Br, PO4-3, SO4-3, PO4, Nitrate, Nitraite, Oxalate, Glycolate, Benzoate, Molybdate, Organic acids, etc., Cations like Na+, K, Li+, NH4+, Ca+ , Mg, Amines like propylamine and cyclohexylamine etc detection by conductivity**

APPLICATIONS

Environmental Engineering, Material Sciences, Chemical Engineering, Biotechnology, Chemistry, Ocean Science, Geo-environmental, Water Resources

SCAN TO KNOW MORE

10. Chemisorption Analyzer with Integrated Mass Spectrometers

DESCRIPTION

Specific surface area/pore size distribution, vapor adsorption and chemisorption

FEATURES

- **Optimized gas flow path**
- **High resolution TCD detector**
- **Triple sample tube**
- **Unique gas flow design and standardized gas mixing function**

APPLICATIONS

- **Metal Dispersion Measurement**
- **Pulse Injection Measurement**
- **Temperature Programmed Desorption Measurement**
- **Temperature Programmed Reaction**
- **Calibration pulse injection measurement**

SCAN TO KNOW MORE

11. Cell Imaging Multimode Reader

DESCRIPTION

Fluorescence and High Contrast Brightfield Imaging

FEATURES

Detection modes: UV-Vis absorbance, Fluorescence Luminescence, Time-resolved fluorescence

APPLICATIONS

- **Absorbance, fluorescence and luminescence-based endpoint and kinetic assays**
- **Cell imaging: 6 to 1536 well plates**
- **Determination of cell count**
- **Cytoplasm, intracellular, subpopulation analysis**
- **Signal translocation**
- **Cell migration and invasion**
- **Immunofluorescence**
- **Phenotypic assays**
- **Histology**

SCAN TO KNOW MORE

12. Pressure Plate Membrane Apparatus

DESCRIPTION

Moisture retention capacity for soil

FEATURES

Determination of soil water retention/release curve Pressure: 0.1 to 15 bar

APPLICATIONS

- **Environmental and Geological samples**
- **Geotechnical Aspects**
- **Irrigation and Drainage**
- **Agricultural Engineering**

SCAN TO KNOW MORE

13. Automatic Gas Sensing System

DESCRIPTION

Conductivity/Resitivity in Non-Ambient atmosphere

FEATURES

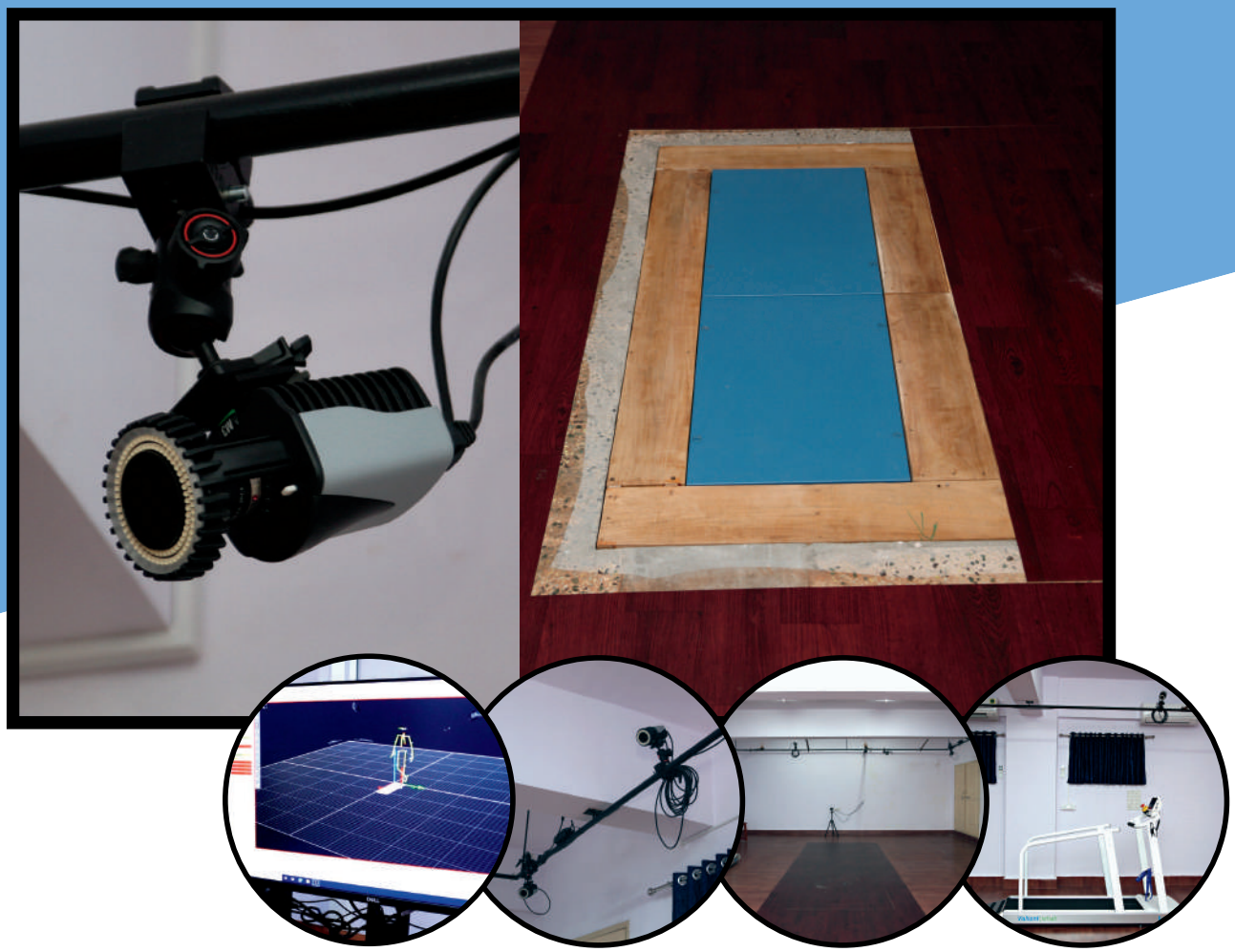
Conductive and semiconductive material can be used to sense gases such as CO and CH4. It can measure the sensitivity of the material with faster response and recovery speed. The good sensitive material is used for the application of detection of series of a corrosive and non-corrosive gases.

APPLICATIONS

- **Development of sensors for gas identification**
- **Study of material electrical property in the vicinity of gases.**

SCAN TO KNOW MORE

14. Gait Analysis Equipment



DESCRIPTION

Movement analysis and functional assessment

FEATURES

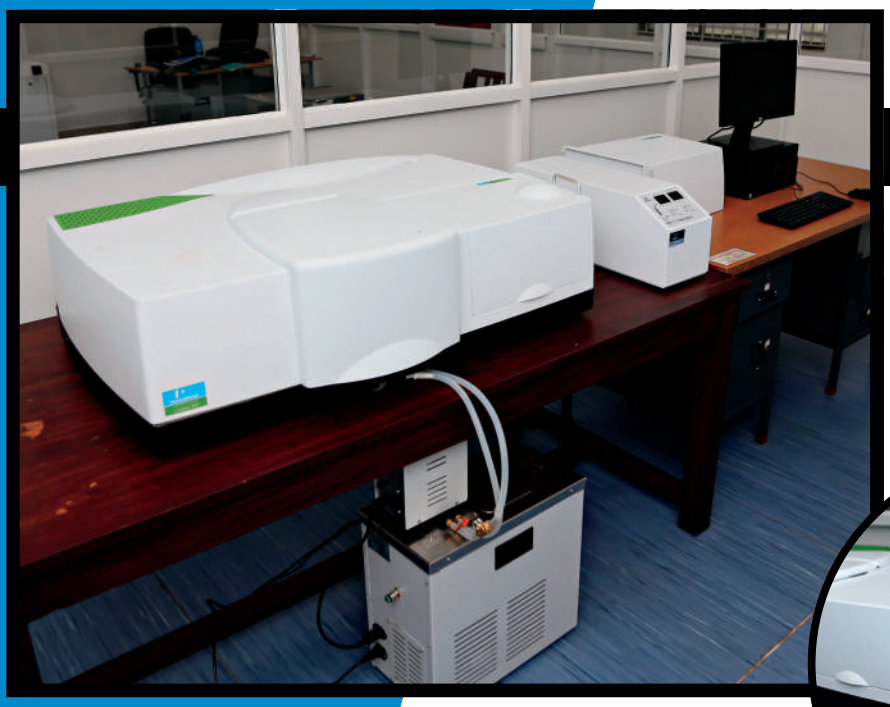
- **12 Motion Capture Cameras**
- **2 Video Camera, Treadmill**
- **2 Force Plates**

APPLICATIONS

- **Body Mechanics (upper limb and lower limb)**
- **Sports biomechanics**
- **Rehabilitation of patients with gait disabilities**

SCAN TO KNOW MORE

SPECTROSCOPIC CHARACTERIZATION



15. UV-Vis-NIR Spectrometer

DESCRIPTION

Characterizing the optical and electronic properties

FEATURES

2D detector, 150 mm Integrating sphere, 175 to 3300 nm wavelength range

APPLICATIONS

- **Glancing reflectance of glass and other optical components**
- **Quantification of colored materials**
- **Identification of material concentration using the Beer-Lambert law**
- **Find the time-of-reaction for certain chemical changes**
- **Determine the band-gap of certain semiconductors**

SCAN TO KNOW MORE

16. Thermal Gravimetric Analysis with FTIR

DESCRIPTION

Organic and inorganic compounds, polymer, coatings, semiconductors with thermal analysis

FEATURES

- **High performance balance and furnace for accuracy and precision**
- **Top loading balance for easy sample load and unload**
- **Fast cooling for reduced cycle times and improving productivity**
- **Integrated mass flow controller extends applications flexibility**

APPLICATIONS

- **Industrial – QA (quality assurance)/QC (quality control), Thermal Stability, Bio-polymers gases degradation**
- **Food – adulteration • Pharmaceutical – residual solvent**
- **Unknown identification**
- **Decomposition studies**
- **Polymer QA/QC**
- **Environment – contaminated soil**

SCAN TO KNOW MORE

17. Confocal Raman Spectrometer

DESCRIPTION

Spectral chemical profiling

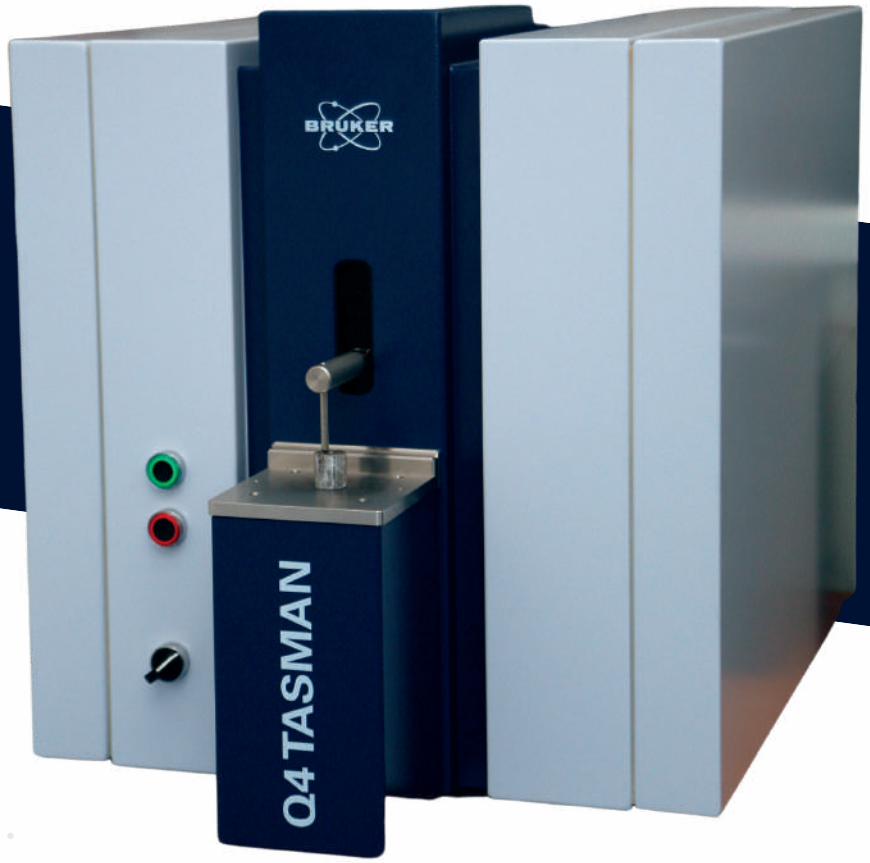
FEATURES

Raman spectral analysis using visible excitation at 532 nm and 785 nm.

APPLICATIONS

- **Raman and photoluminescence measurements**
- **Raman chemical imaging in 3D and analyze both the chemistry and the topography**

SCAN TO KNOW MORE



18. Spark - Optical Emission Spectrometer

DESCRIPTION

Composition analysis of metallic samples and metal identification

FEATURES

Fe, Cu, Al, Mg, Ti, Zn, Pb, Sn, Ni, Co bases Upto 36 elements including C, O etc.

APPLICATIONS

- **Lead, zinc, tin, cobalt, nickel and magnesium composition as alloying elements**
- **Titanium purity for its application in aviation & space, defence, chemical, biomedical**
- **Phosphorus and alkali content in aluminum**
- **Identification of Oxygen & Nitrogen at trace level during Iron/Steel production.**

SCAN TO KNOW MORE

19. Glow Discharge - Optical Emission Spectrometer

DESCRIPTION

Quantitative elemental depth profiling

FEATURES

- **Quantitative elemental depth profile analysis from the first nanometer down to more than 150 microns**
- **Simultaneous optic provides full spectral coverage from 110 to 800 nm, including deep UV access to analyze H, O, C, N and Cl**

APPLICATIONS

- **Li batteries – positive and negative electrodes**
- **Nitriding – in-depth N and C measurements**
- **LED – depth resolution, process control**
- **Structured materials**
- **Hard disks – Uniformity check and repeatability**
- **Cationic exchange in glass**
- **Coatings on steel**
- **Polymer**
- **Hydrogen – H and D can be measured simultaneously**

SCAN TO KNOW MORE

20. High Resolution Liquid Chromatography Mass Spectrometer

DESCRIPTION

Separation, identification, and quantification

FEATURES

Equipped with high resolution, high stability quadrupole analyzer

APPLICATIONS

- **Metabolic phenotyping of cells/tissues**
- **Identification and quantification of organic & chiral chemicals**
- **Detection of API in liquid/solid samples**
- **Micro pollutants detection**
- **Detection of cancer markers**
- **Extractable and leachable screening in e-cigarettes, food, cosmetics, and pharmaceutical packaging**
- **Proteomics and protein sequence identification and analysis**
- **Detection of chemical contaminants**
- **Detection of Pesticides in Drinking Water**
- **Detection of alkaloids in plant extracts**

SCAN TO KNOW MORE

21. Inductively Coupled Plasma Mass Spectrometry

DESCRIPTION

Trace elements analysis

FEATURES

ICP-MS-metal, Single cell and Single particle analysis, Microwave digestion system

APPLICATIONS

Environmental, Biological, Pharmaceutical, Petroleum, Food and Material testing samples

SCAN TO KNOW MORE

22. Fourier Transform NMR Spectrometer

DESCRIPTION

Sample analysis for structure elucidation & quality control

FEATURES

Multinuclear; 1D, 2D and 3D NMR

APPLICATIONS

Structural elucidation of variety of chemical compounds; organic molecules, inorganic complexes, drug molecules, dyes, biomolecules etc.

SCAN TO KNOW MORE

23. GCxGC TOFMS

DESCRIPTION

Mass screening & enhanced compound identification

FEATURES

Split injection mode and agitator for the better analysis of complicated samples. It includes a NIST library for comparing the mass spectra of unknown samples.

APPLICATIONS

- **Pharmaceutical drug analysis**
- **Biofuel analysis**
- **Aromatic analysis**
- **Natural products analysis**
- **Polymer analysis**
- **Analysis of esters, fatty acids, alcohols, aldehydes, terpenes etc.**

SCAN TO KNOW MORE

24. Proton Transfer Reaction Time of Flight Mass Spectrometer

DESCRIPTION

It is a versatile tool for fast and sensitive measurements of trace Volatile Organic Compounds (VOCs) at a high time resolution.

FEATURES

- **Real time quantitative analysis of the entire mass range of Volatile organic compounds (VOCs)**
- **Detection of all compounds with higher proton affinity than water using H_3O^+, as Primary ion. Hence N_2, O_2 , Ar, CO_2 etc in air are not detected.**
- **Option to use Kr^+, which has higher Ionization potential than H_3O^+, as Primary ion**
- **Detection and quantification of substances (including inorganic) such as NO_2, SO_2, CO_2, CO are also possible using Kr^+ as Primary ion.**

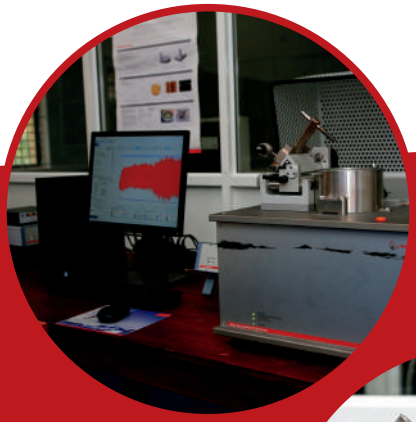
APPLICATIONS

Real time analysis of gases in situations such as ambient air monitoring, food flavour and fragrances, breath analysis, geological analysis, forensic investigation, waste incineration etc.

SCAN TO KNOW MORE

MECHANICAL CHARACTERIZATION

25. Tribotester



DESCRIPTION

Wear and Friction monitoring

FEATURES

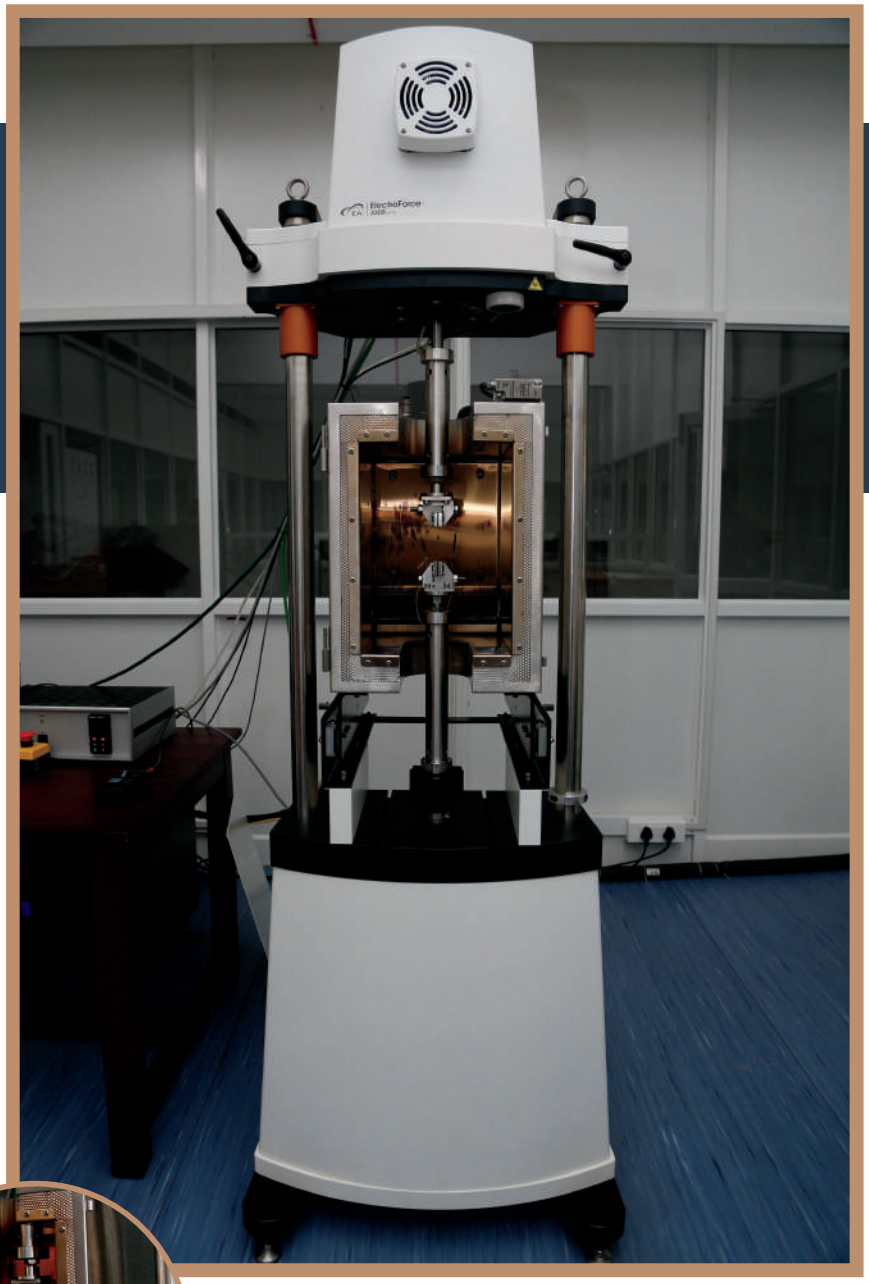
High temperature, Pin on disk (upto 1000˚C), Reciprocatory and fretting (upto 800˚C), humidity chamber, inert atmosphere, dry or lubricated testing, profilometer attached.

APPLICATIONS

- **Contribution of nanoindentation and tribology to investigation of welds**
- **Friction and thickness of hard coatings on cutting tools**
- **Tribology study for the characterization of friction and wear of polymers**
- **Tribological testing of implants-bone pair and coefficient of friction of coated knee implants**

SCAN TO KNOW MORE

26. Low Force Fatigue Testing Machine

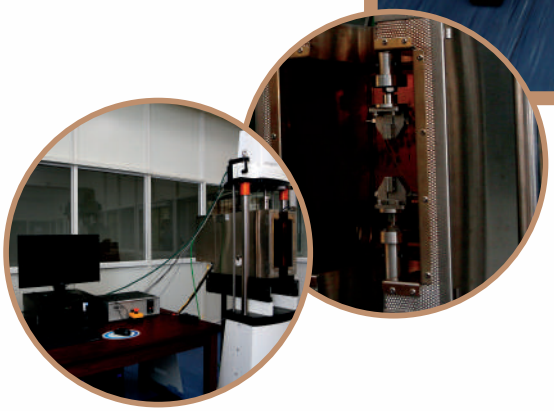


DESCRIPTION

Tension-Compression load testing

FEATURES

- **Dynamic Mechanical Analyzer Tensile, Compression, Three-point bending tests can be performed at room temperature (RT), low temperature range (upto -150˚C), high temperature range (upto 350˚C)**
- **Fatigue and creep tests at fixed temperatures.**



APPLICATIONS

- **Load Controlled Constant Amplitude Fatigue Tests of Metals**
- **Compressive Shear Test Equipment for Polymer Matrix Composites**
- **Fatigue Dental Implants Test Equipment**

SCAN TO KNOW MORE

27. 250kN Servo- Hydraulic Fatigue Testing Unit

APPLICATIONS

- High & Low cycle fatigue
- Fatigue crack growth
- Fracture toughness
- Crack propagation
- Component strength and durability
- Environmental testing
- Tension, Compression, Bending
- Stress relaxation

SCAN TO KNOW MORE

28. Advanced Modular Rheometer

DESCRIPTION

Measures the way a fluid responds to applied shear/ stress, potentially providing data on material structure and elasticity

FEATURES

Rheology, Magnetorheology

APPLICATIONS

- **Rheological characterization of Fluid**
- **Magnetorheological Fluid Characterization and Devices such as MR Clutches, Magnetorheological Brakes, Magnetorheological Valves, Seismic damper**
- **Biomedical Applications**

SCAN TO KNOW MORE

29. Impedance Analyzer

DESCRIPTION

Measurement of Electrical properties

FEATURES

- **Measurement parameters: |Z|, |Y|, θ, R, X, G, B, L, C, D, Q, Complex Z, Complex Y, Vac, Iac, Vdc, Idc**
- **25 mΩ to 40 MΩ wide impedance measurement range (10% measurement accuracy range)**
- **4-channel and 4-trace on 10.4-inch color LCD with touch screen**
- **Built-in DC bias range: 0 V to ±40 V, 0 A to ±100 mA**

APPLICATIONS

- **Measures the dielectric constant of a material**
- **Characterization of many electrochemical devices such as photovoltaic cells, fuel cells and batteries**

SCAN TO KNOW MORE

30. Instrumented Impact Tester

DESCRIPTION

Instrumented impact test is a versatile tool to study the energy related to fracture phenomena in engineering materials.

FEATURES

- **Charpy impact test, Sample size 56x10 mm with standard V notch (type A) or U notch.**
- **ASTM 23 and ISO 14556 standards.**
- **Temperature range -50^{0}C to + 200^{0}C.**

APPLICATIONS

- **Impact bending tests on metals (Charpy, Izod–conventional and instrumented)**
- **Impact tensile tests on metals**
- **Brugger tests to verify the wear-behavior of transmission gears**
- **Wedge impact test to determine the strength properties of structural adhesives**

SCAN TO KNOW MORE

31. Multi-purpose Impact testing Machine with SHPB

DESCRIPTION

Dynamic stress-strain measurement

FEATURES

Drop Weight Testing System, Split hopkinson pressure bar system, Bullet Impact System, Bird Strike System.

APPLICATIONS

- **Mechanical Testing at High Strain Rates**
- **Rock fracture toughness**
- **Dynamic mechanical behavior of high arch dam concrete**
- **Study on the distortional law of materials**
- **Mechanical properties of fibre reinforced SCC**

SCAN TO KNOW MORE

32. MultiRole Mechanical Test System

DESCRIPTION

Indentation and tensile testing

FEATURES

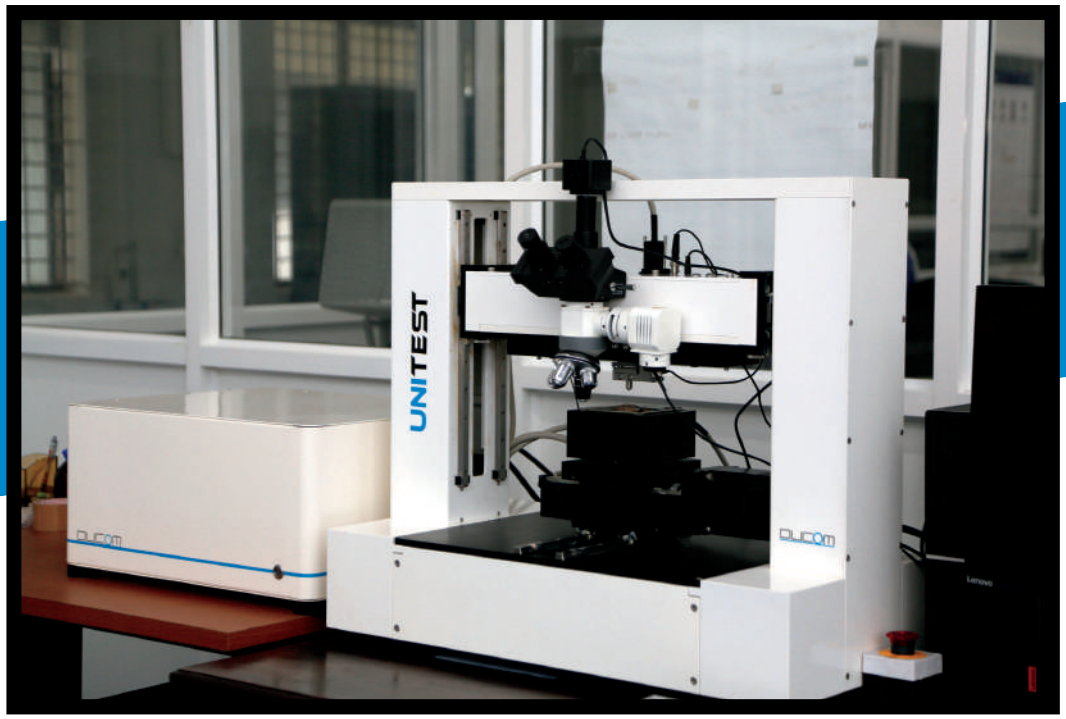
- **Independent force and depth sensors, high frame stiffness, calibrated indenter tips, direct measurement of hardness and elastic modulus**
- **Loading condition: 0.1 N to 20 N**
- **Temperature analysis: Maximum upto 400˚C**

APPLICATIONS

- **Nano Indentation**
- **Scratch Testing**

SCAN TO KNOW MORE

33. Friction and Wear Monitor



DESCRIPTION

Scratch Testing

FEATURES

- **Automated load control (continuous, fixed and ramp)**
- **Automated scratch test profile: Software controlled movement of test specimen along X and Y axis for unidirectional scratch, bidirectional scratches and scratches at different locations on the specimen**
- **Acoustic emission sensor to detect early damage of the coating**
- **Environment chamber: Lubricant corrosion cup with temperature control for testing biomaterials at physiological conditions**

APPLICATIONS

- **Critical load of hard and brittle coatings like titanium nitride, ceramics**
- **Determination of working load limit of soft coatings like PTFE and other polymers**
- **Identification of process parameters of heat treatment for best scratch resistance**
- **Estimation of bond strength at substrate - coating interface**
- **Product development and quality control of surface engineered products**

SCAN TO KNOW MORE

34. Slow strain Rate Test (SSRT) System

DESCRIPTION

It involves a slow (compared to conventional tensile tests) dynamic strain applied at a constant extension rate in the environment of interest

FEATURES

- **Slow strain rate stress corrosion test machine ensures test accuracy of slow strain velocity and flexibility effect**
- **Load speed range is in between 1 x 10-1 to 5 x 10-9 mm/s, with maximum load capacity up to 50kN.**

APPLICATIONS

- **Time to specimen failure (e.g., breakage, or from other "failure" criteria)**
- **Ductility (by elongation to fracture or the reduction of the area)**
- **Ultimate tensile strength (from the maximum load)**
- **Area under the elongation - load curve (which represents the fracture energy)**
- **Percent of ductile/brittle fracture on the fracture surface**
- **Threshold stress for cracking**

SCAN TO KNOW MORE

MANUFACTURING FACILITY

35. Hybrid Micro EDM Unit

DESCRIPTION

Machining of high precision upto micron scale

FEATURES

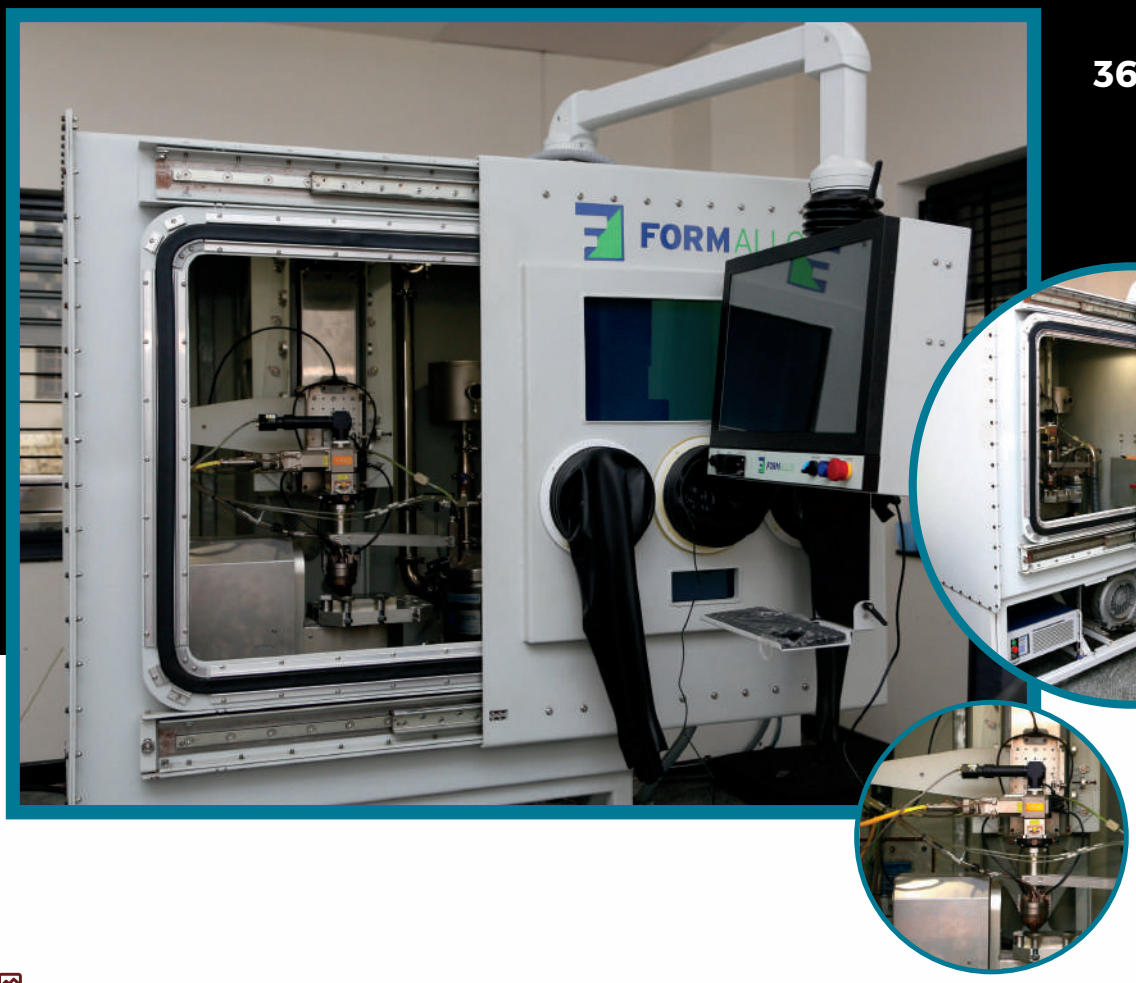
Low speed spindle (3000 rpm), High speed spindle (10000 rpm), Micro EDM

APPLICATIONS

- **Removal of material in the order of microns**
- **Machining of high precision parts like biomedical implants/stents**
- **Micro EDM facility for drilling holes or slots with minimum dimension of 250 µm**
- **High degree of Surface roughness**
- **Micro Geometry & Shape**

SCAN TO KNOW MORE

36. Metal 3D Printer



DESCRIPTION

Laser Metal Deposition, Cladding, Surface Melting

FEATURES

Laser power: 1kW, Spot size: 0.6 mm, 2 Powder feeders, 5-axis motion

APPLICATIONS

- **Repair of components**
- **Deposition of Metallic components**
- **Fabrication of Functionally Graded Materials (FGM's)**
- **Processing of Metal-Matrix Composites**
- **Laser Surface Melting, Laser Cladding**

SCAN TO KNOW MORE

37. 5-Axis CNC

DESCRIPTION

High precision 5-axis machining

FEATURES

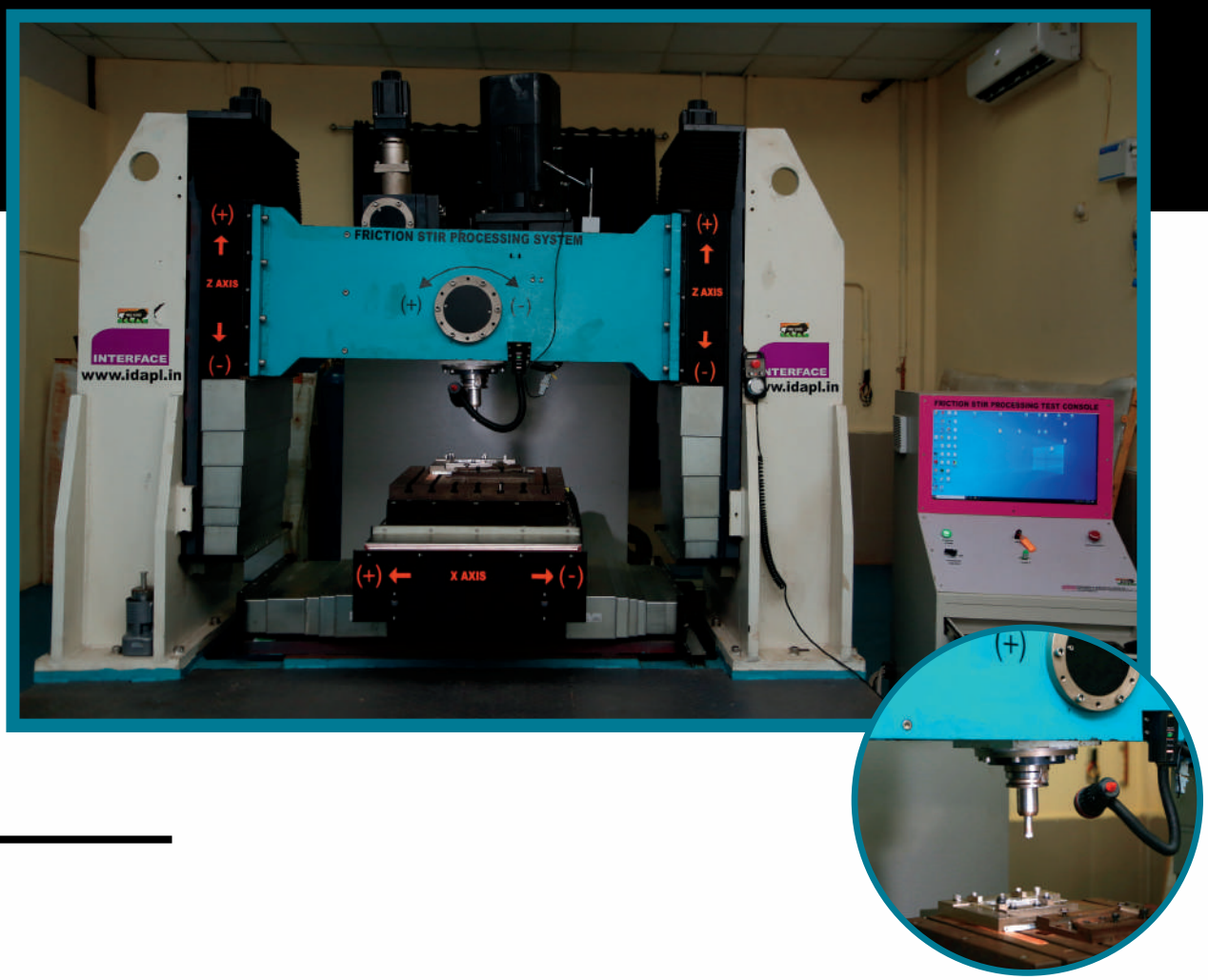
Movement accuracy: 0.01 mm, Precision/Repeatability: +/- 0.03 mm, Controlled tool speed: 1 rpm, Position feedback system.

APPLICATIONS

- **High resolution surface finish, High dimensional accuracy**
- **Machining of aerospace components**
- **Machining of Automotive components**
- **Machining Bio medical implants**
- **Machining Marine structures**
- **Machining of metallic civil structures**

SCAN TO KNOW MORE

38. Friction Stir Welding



DESCRIPTION

Welding of sample through interfacial friction heat

FEATURES

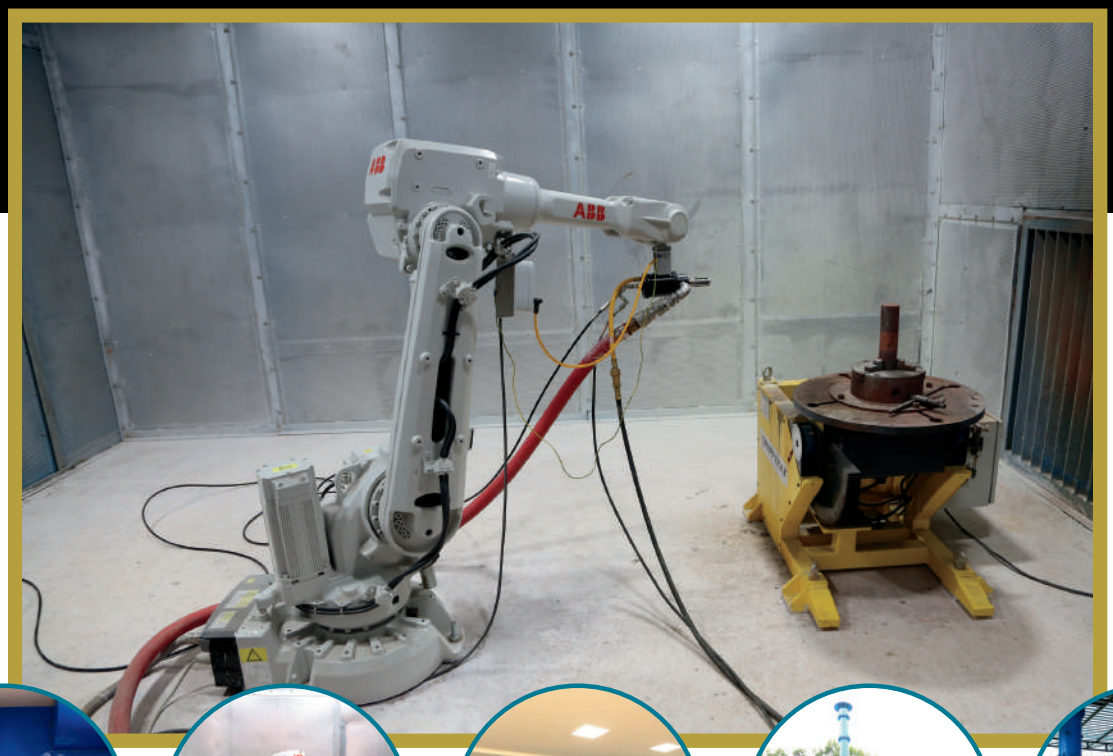
Friction Stir Processing, Friction Stir Welding

APPLICATIONS

- **Surface modification**
- **Aerospace applications**
- **Automotive applications**
- **Bio-medical applications**
- **Marine structures applications**

SCAN TO KNOW MORE

39. High Velocity Oxyfuel / Airfuel Thermal Spray Coating Facility



DESCRIPTION

Thermal spraying by mixing fluid fuel and oxygen

FEATURES

- **System is capable of working under HVAF or HVOF mode to spray particles of size range -53/+5 (5 to 60 µm) microns at high supersonic velocities upto 1000 m/s while heating the particles up to 1800 - 2000˚C.**
- **An auxiliary supersonic HVAF (80 kW or above) torch is capable of spraying low melting point metals and alloys such as Copper, Aluminium alloys etc.**
- **The deposited coatings exhibit lowest porosity (less than 0.5%) and high hardness for typical cermet coatings.**

APPLICATIONS

- **Heavy abrasion and erosion resistance of pump impellers, piping etc.**
- **Sliding wear resistance of shafts, hydraulic rods, centrifugal screens etc.**
- **Cavitation resistance of impellers and hydro turbine blades and vanes.**

SCAN TO KNOW MORE

40. Hollow Fiber Membrane Spinning System

DESCRIPTION

Wet spinning, in which a polymer is dissolved and extruded directly into a coagulant

FEATURES

- **Temperature-controlled Coagulation Bath Capacity up to 120-150 L equipped with idle rollers for fiber guiding**
- **Draw Roller Unit for Initial draw**

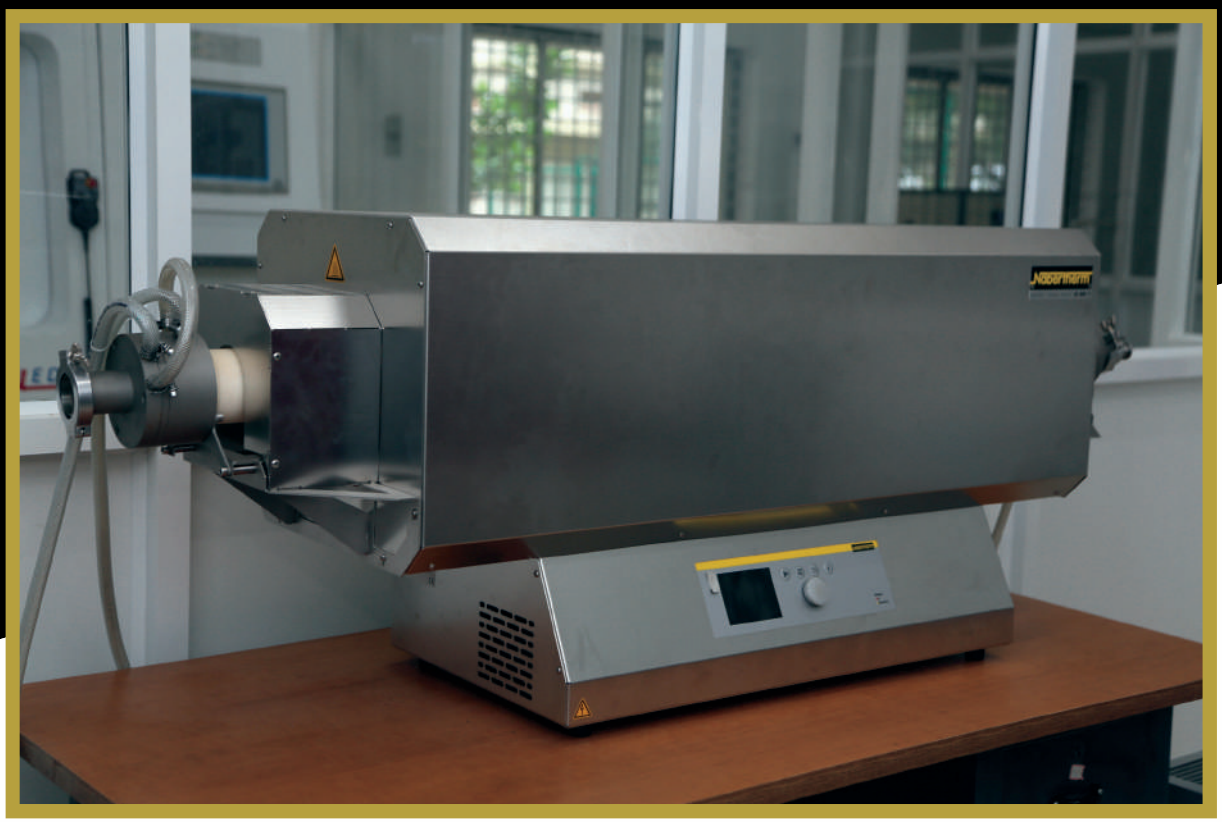
APPLICATIONS

Industrial separations, Filtration of drinking water

SCAN TO KNOW MORE

MATERIAL PROCESSING

41. Vacuum Assisted High Temperature Furnace



DESCRIPTION

Programmable furnace with non-ambient conditions

FEATURES

- **Vacuum operations range upto 10-5 mbar**
- **Gaseous atmosphere: Ar, He, N2, O2, CO2, N2+H2, Ar+H2**
- **Constant temperature zone: 200 mm in center of the tube**
- **Temperature Range: 500 to 1450˚C**

APPLICATIONS

- **Hardening and tempering of steels**
- **Annealing**
- **Ashing Coal And Coke Testing**
- **Additive Manufacturing**
- **Asphalt Binder Analysis**
- **Smelting, Sintering**

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42. Multi-Specimen Grinding and Polishing Machine

DESCRIPTION

Lapping & Polishing

FEATURES

- **Automatic grinder/polisher improves the productivity, quality of preparation with much lesser operator dependence**
- **Offering completely scratchless specimen**
- **Six specimens can be polished simultaneously**

APPLICATIONS

- **Microscopy Study**
- **SEM/EBSD sample preparation**
- **XRD Texture/Stress sample preparation**

SCAN TO KNOW MORE

43. Ball Milling Units

DESCRIPTION

Mixing and size reduction of powders to Nano size

FEATURES

Size reduction principle: Combination of impact, friction and revolution

APPLICATIONS

Mechanical alloying, homogenization, size reduction, colloidal grinding. These application are the domain of chemistry, civil engineering, recycling of wastes, metallurgy, mining, chemicals, ceramics, and oxides etc.

SCAN TO KNOW MORE

44. Ultra-Centrifuge

DESCRIPTION

Mass Fractionation of Particles

FEATURES

Efficient separations from samples as small as 175 µL up to 32.4 ml and at speeds of up to 150,000 RPM with more than 1,00,000 G's

APPLICATIONS

Useful for applications such as Fractionation, affinity purification, separation of components

SCAN TO KNOW MORE

45. UV Ozone Cleaning System

DESCRIPTION

Ultra Clean Contamination free surface

FEATURES

185 nm and 254 nm ultraviolet light with surface heating

APPLICATIONS

- **Atomically cleaning Semiconductor Silicon Wafers using UV Ozone**
- **Make Hydrophobic surfaces more Hydrophilic**
- **Fast & Simple method to clean AFM, SEM and TEM samples, surfaces and probes**
- **UV Ozone Atomically clean glass slides and coverslips**
- **Cell culture and cell adhesion surface preparation**

SCAN TO KNOW MORE

46. Electrohydraulic Specimen Mounting Press

DESCRIPTION

Sample Preparation

SCAN TO KNOW MORE

47. Liquid Nitrogen Plant

FEATURES

120 litre per day (99% purity)

APPLICATIONS

Material Characterisation (SEM, TEM, NMR, etc.), Cryo-Surgery, Space Simulation, Infrared Sensors, Dry Freezing, Cryopreservation of biological samples, Cryomachining, Shielding material from oxygen atmosphere

SCAN TO KNOW MORE

48. Abrasive Cut off Machines

DESCRIPTION

Metallographic specimen cutting machine can be used to cut various metal and nonmetal materials so as to get specimen and observe the metallographic or lithofacies structure. It has cooling system so as to clear up the heat produced during cutting and avoid to burn the metallographic or lithofacies structure of specimen because of heat.

FEATURES

- **Cutting Capacity: 100mm**
- **Cut-Off Wheel Size: 12” (300mm)**

APPLICATIONS

Sample preparation for metallographic studies.

SCAN TO KNOW MORE

49. Probe Sonicator

DESCRIPTION

Cell disruption method which utilizes sound energy or high-frequency sound waves to break cells

FEATURES

Particles Emulsification and Deagglomeration

APPLICATIONS

- **Nanotechnology (producing nanoparticle materials and graphene dispersions)**
- **Cell lysing**
- **Sample preparation**
- **Homogenization**
- **ChIP Assay**
- **Emulsification**
- **Disaggregation and Deagglomeration**
- **Uses in the field of sonochemical processing**

SCAN TO KNOW MORE

50. Type I & II Water Purification System

DESCRIPTION

Ultra Pure Water for Laboratories

FEATURES

Deliver RNase, DNase and DNA-free water

APPLICATIONS

- **Feed for laboratory ultrapure water systems**
- **Laboratory washing machines including final rinse**
- **Feed for autoclaves and environmental chambers**
- **Buffer preparation**
- **Photometry, spectrophotometry, general chemical analysis, media preparation**
- **Protein electrophoresis, microbiological media preparation, cytology and histology work.**

SCAN TO KNOW MORE

51. Glove Box

DESCRIPTION

Work Station for Contamination/ Moisture sensitive materials

FEATURES

Consists of a large and small antechambers of Cylindrical type with 400 mm Ø 600 mm Length and 154 mm Ø 410 mm Length respectively

APPLICATIONS

A confined or controlled atmosphere - an essential condition for developing processes, experimenting with, or handling sensitive or dangerous materials.

SCAN TO KNOW MORE

52. Automatic Electrolytic Polishing Machine

DESCRIPTION

Electrochemical process that removes material from a metallic part. The part is immersed in a temperature controlled bath of electrolyte .

FEATURES

Electropolishing and Etching for material

APPLICATIONS

- **Medical device stent polishing and deburring of stainless steel and cobalt chrome**
- **Reducing friction, boosting performance and extending life on automotive and racing industry parts**
- **Industrial stainless steel 300 series polishing to reduce surface roughness and burr removal**

SCAN TO KNOW MORE

COMPUTATIONAL FACILITY

53. ANSYS Multiphysics simulation package

DESCRIPTION

Engineering Simulation Software
For Computational Software
Optical and Electrical modelling of semiconductor devices

SCAN TO KNOW MORE

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Brochure Designed by CSD, NITK, Surathkal