Department of Mechanical Engineering, NIT Calicut

MULTI-POINT BET SURFACE AREA ANALYSER

Photo of Instrument:

Instrument Name	Multi-point BET Surface area analyser
Instrument Model & Serial No.	Smart SORB-93
Instrument Make	Smart Instruments
Category of Instrument	Characterization and Testing
Description of Instrument	BET surface area analyzer is one of the most used methods to measure and analyze the surface area of porous materials and nanoparticles. This physical characterization technique provides quantitative data on the specific surface area and pore volume of the solid materials. The method is suitable for a wide range of solid matrices, from catalyst powders to monolithic materials.
Instrument Technical Description and Major Specifications (This Specifications Limited to Major 5)	Smart Sorb 93, Surface Area Analyser is based on the dynamic BET principle. Nitrogen gas is used for adsorption. The dynamic flow method uses a highly sensitive thermal conductivity detector to measure the change in the concentration of an adsorbate/carrier gas mixture during the adsorption or desorption process. It determines the surface area at a single point and it can be enhanced for measuring multi-point surface area and total pore volume analysis with different gas mixture percentages. • Surface Area range - 0.1 m^2/gm to 1500 m^2/gm - Normal. Extendable up to 2500 m^2/gm. • Accuracy - Typically better than ± 5% • Reproducibility - Typically better than ± 3%

	• Regeneration System Temperature Range: Ambient to 300°C • Sample holder capacity - 7 ml
Application of Instrument (Limited to Major 4 or 5)	For inspecting the surface area and pore volume of • Catalysts for automotive, fertilizers and petrochemical industries • Carbon powder for rubber, adsorbents (gas separation and water purification), gas masks, inks, laser printers etc • Minerals such as alumina, clays, pigments, phosphates, silica, zirconia etc • abrasives, adsorbents, biomaterials, ceramics, cement, etc
Type of Sample Required for Analysis / Testing (Quantity, Pre-Preparation, State etc.) **Guidelines for Sample Submission – User Instructions**	• **Type of Sample:** Powders of particle size less than 2 mm • **Instruction to the users:** Before doing the analysis, users may share the information about the expected range of surface area for their samples with the instrument operator.
Types of Analysis / Testing	1. BET surface area analysis • Determination of surface area by using single carrier gas mixture 2. BET Multi-point surface area analysis • Determination of surface area by a minimum of three carrier gas mixtures • Requires a minimum of three experimental runs 3. Pore volume analysis • Determination of pore volume and average pore diameter (values only)
Faculty In-Charge Name / Email / Contact	Dr. Mohammed Rashad K, rashad@nitc.ac.in, 9744899126 Dr. Jinu Paul, jinupaul@nitc.ac.in, 9002279620
Technical Staff Name / Email / Contact	Mr. Sanal P R, sanal@nitc.ac.in, 9497186559

Department of Mechanical Engineering, NIT Calicut

Location of Instrument	Ceramics and Composites Lab, Production Engineering Block
Other Details	User charges vary depending on the type of analysis/testing

User Charges:

S.NO.	Type of Analysis / Testing	Internal - within the Department of NITC	Internal - Other Departments NITC	External Academic Educational Institutes	National R&D Labs	Industry
1	BET Surface area analysis	Rs. 100/sample	Rs. 200/sample	Rs. 500/sample	Rs. 500/sample	Rs. 1000/sample
2	BET Multi-point surface area analysis	Rs. 200/sample	Rs. 400/sample	Rs. 1000/sample	Rs. 1000/sample	Rs. 2000/sample
3	Pore volume analysis	Rs. 100/sample	Rs. 200/sample	Rs. 500/sample	Rs. 500/sample	Rs. 1000/sample

Slot Booking and Payment Work Flow: