micromeritics

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TriStar II *PLUS*

TriStar II Plus Surface Area and Porosity Analyzer

Advanced Hardware and Software Features

- The unique stainless steel analysis manifold is corrosive resistant and designed for highly-accurate gas management

- Improved dewar design provides more than 40 hours of continuous temperature control

- Available in a krypton capable model for the analysis of very low surface area materials

- Intuitive MicroActive software gives the user the ability to interactively evaluate isotherm data and reduces the time required to obtain surface area and porosity results

- User-defined reporting options allow direct modeling

- Powerful Python scripting language allows users to develop extensions to the standard report library available within the TriStar II Plus software application

- An innovative dashboard monitors and provides convenient access to real-time instrument performance indicators and maintenance scheduling information

- Capable of utilizing two isotherms (CO_2 and N_2) for calculating pore size diameter via NLDFT for micropore analyses of carbons

Data Reduction Benefits

- Interaction with adsorption data is direct. By simply moving the calculation bars, the user is immediately updated with new textual properties. One-click access to important parameters allows the user to focus on the result rather than the parameters

- Interactive data manipulation minimizes the use of dialog boxes and tunneling of dialogs to specify calculation parameters. This allows the user to accurately and efficiently determine surface area and porosity of their materials

- Improved ability to overlay files (up to 25) including mercury intrusion data with a file add and subtract feature

- User selectable data ranges through the graphic interface allows direct modeling for BET, t-Plot, Langmuir, DFT interpretation, and much more

- Report Options editor allows the user to define up to five reports with on-screen previews. Each report has the ability to possess multiple summary, tabular, and graphical information panes

Enhanced Software Capabilities, Data Reduction Features, and Instrument Monitoring

MicroActive for TriStar II Plus Software

The intuitive MicroActive for TriStar II Plus software gives the user the ability to interactively evaluate isotherm data and reduce the time required to obtain surface area and porosity results. It is not necessary to generate reports to view results. Calculations, such as the BET surface area transform plot, can be easily generated and adjusted. The selection bars allow for a range of data points to be quickly and easily selected. As a result, the summary of values derived from the calculations is instantly updated. Within the calculation window(s), the range of data used can be further refined.
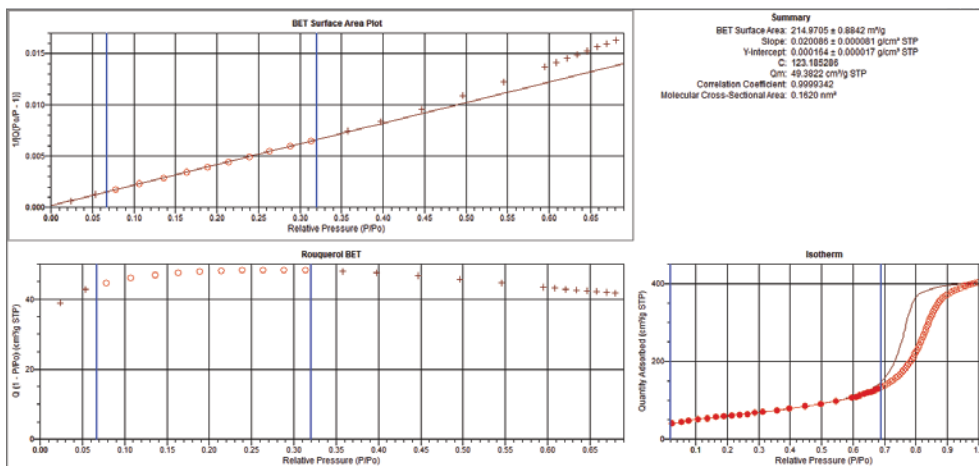
Interactive selection of the BET surface area calculation range

## Gas Adsorption and Mercury Intrusion Overlay Capability

MicroActive for the TriStar II Plus software also includes a powerful utility that allows the user to overlay a mercury porosimetry pore size distribution with a pore size distribution calculated from gas adsorption isotherms. This new import function allows users to rapidly view micropore, mesopore, and macropore distributions in one easy-to-use application.
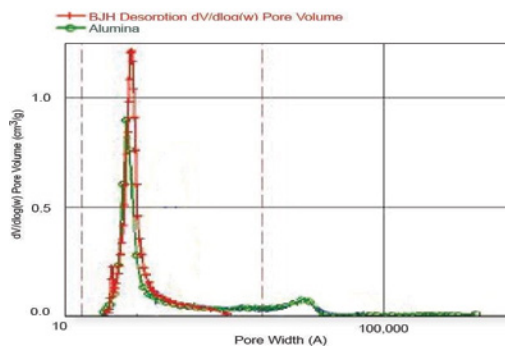
Overlay of BJH desorption and mercury intrusion log differential pore size distributions for alumina pellets

Python Programming Language Included

The Python programming language has been incorporated into the TriStar II Plus software. This powerful scripting language allows users to develop extensions to the standard report library available within the TriStar II Plus application.
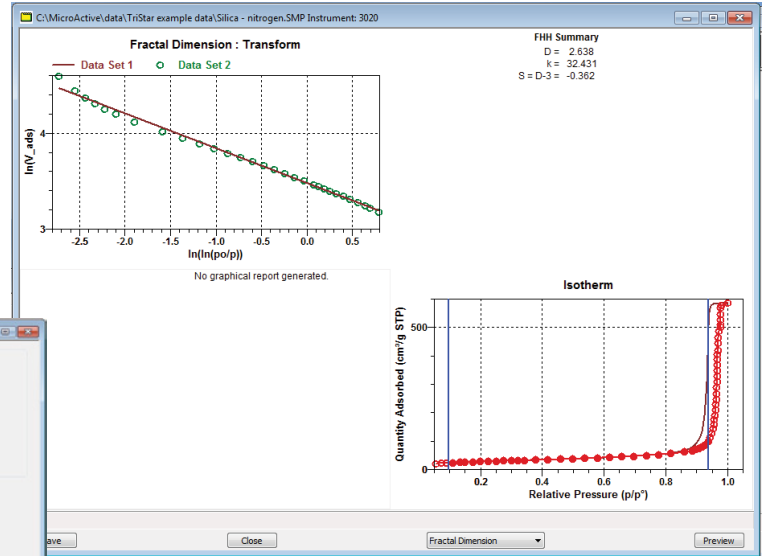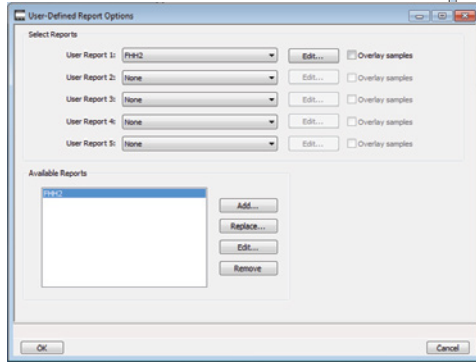

New isotherm models or calculations are easily added to the report system. The Python interface to MicroActive allows users to customize their reports and extend the utility of MicroActive.

Dual DFT

The Dual DFT NLDFT model allows the user to combine the informa- tion gathered from nitrogen and carbon dioxide isotherms to deliver a full pore size distribution on materials (such as carbon slit pores) where pores of molecular sizes are present. The range of pore size analysis in this method is extended to smaller pore sizes compared to the standard nitrogen analysis. This is due to the fact that CO_2 can access some very small micropores that are not accessible to N2 at cryogenic temperatures due to size restrictions, connectivity problems, or extremely slow diffusion.
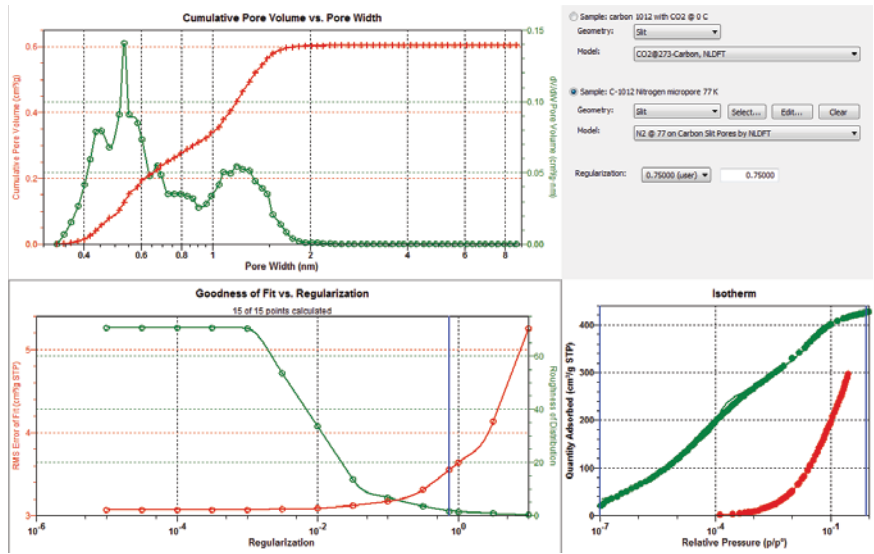
This advanced NLDFT method allows users to determine the pore size distribution of their sample using two isotherms. In this example CO2 adsorption (red) at 273 K and nitrogen adsorption (green) at 77 K are used to calculate a single pore size distribution. Users do not have to cut and paste distributions from CO2 and nitrogen - a single distribution is determined using both isotherms.
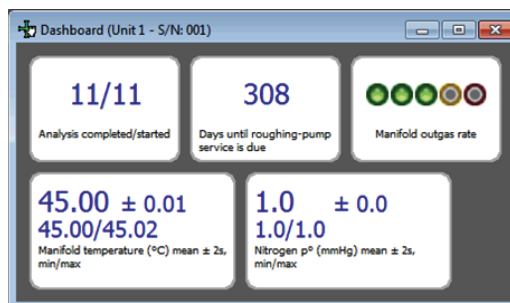
With a single click the TriStar II Plus provides a powerful suite of information that allows the user to maintain the instrument in peak operating condition with real-time analysis views.

External Sample Preparation Devices

Micromeritics' sample preparation devices prepare batches of samples for surface area and pore volume analysis. They combine flowing gas and/or vacuum with heat to remove atmospheric contaminants, such as water vapor and adsorbed gas, from the surface and pores of the sample.

The quality of the data produced by surface area and pore volume analyses depends greatly on the cleanliness of the sample surface. All Micromeritics' sample preparation devices accept helium, nitrogen, argon, and other non-corrosive gases.

The FlowPrep™ 060 applies both heat and a stream of inert gas to the sample for removal of adsorbed contaminants from the surface and pores. With six degassing stations, this sample preparation unit lets you choose the temperature, gas, and flow rate best suited for your sample material and application. Needle valves allow the user to introduce the flowing gas slowly to prevent fluidization of samples.

The VacPrep™ 061 offers two methods for removing adsorbed contaminants. In addition to flowing gas, this sample preparation unit provides vacuum to prepare samples by heating and evacuation. The VacPrep offers the user a choice of vacuum or gas flow on each of the six degassing stations. Needle valves allow the user to introduce the flowing gas or vacuum slowly to prevent fluidization of samples.

The SmartPrep™ 065 applies a stream of flowing gas over the sample at elevated temperatures to remove adsorbed contaminants. Temperature, ramp rates, and soak times of each sample are individually controlled on the six degassing stations by a computer. This sample preparation unit contains two serial ports, one for connecting to the computer and the other for connection to an additional SmartPrep. Up to five ramps and soaks are allowed. All degas information is integrated into the sample data file for future reference.

SmartPrep 065

VacPrep 061
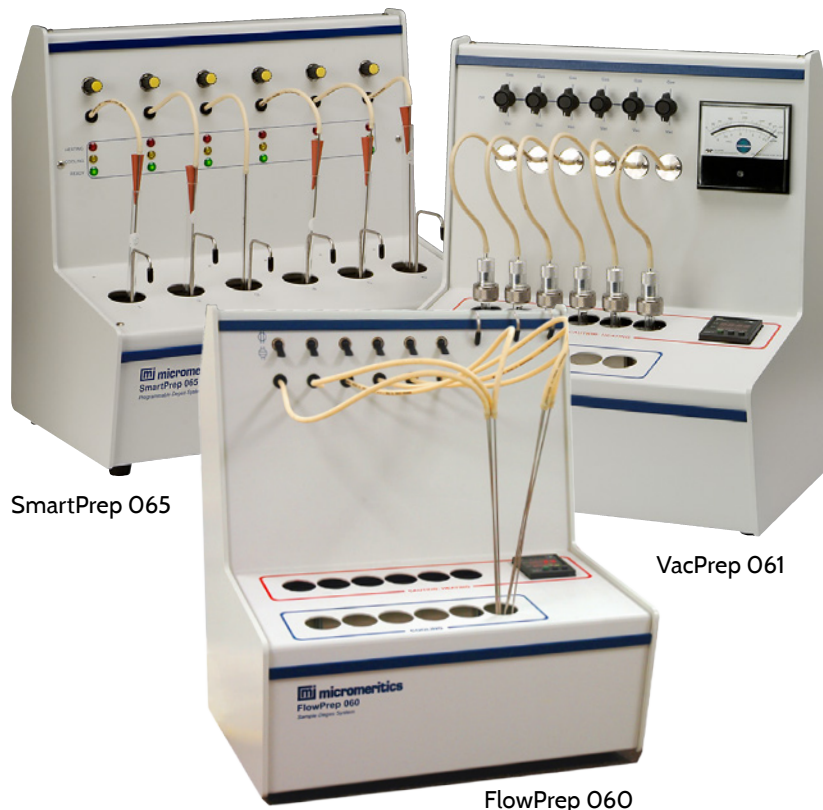
FlowPrep 060

Specifications

Pressure Measurement

Absolute	Range: 0 to 950 mmHg • Resolution: Within 0.05 mmHg Accuracy: Within 0.1% of full scale • Linearity: < ± 0.1% of span
Relative	P/P_O range: 0 to 1.0 P/P_O • Resolution: < 10-4

Analysis

Specific Surface Area	From 0.01 m²/g, nitrogen unit • From 0.001 m²/g, krypton unit
Total Surface Area	From 0.1 m², nitrogen unit • From 0.01 m², krypton unit
Pore Volume	From 4 × 10-6 cm³/g
Dewar Duration	Up to 40 hours

Adsorptive Gases

Nitrogen Unit	Nitrogen; argon, carbon dioxide, or other non-corrosive gases; butane, methane, or other light hydrocarbon vapors; Oxygen can also be used only with an appropriate vacuum pump.
Krypton Unit	Same as Nitrogen unit, plus the capability to perform krypton surface area analyses at lower pressures

Environment

Temperature	10 and 35 °C (50 to 95 °F), operating • 0 to 50 °C (0 to 122 °F), non-operating
Humidity	20 to 80% relative, non-condensing

Physical

Height	74 cm (29 in.)
Width	40 cm (16 in.)
Depth	51 cm (20 in.)
Weight	37 kg (82 lbs)

Electrical

Voltage	100/120, 220/240 VAC
Power	150 VA, maximum
Frequency	50 to 60 Hz

Due to continuous improvements, specifications are subject to change without notice.

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