micromeritics®

The Science and Technology of Small Particles™

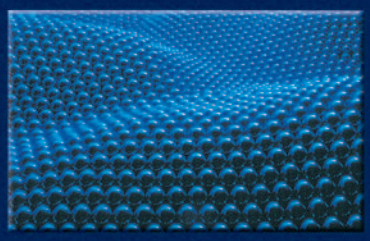
PARTICLE SIZE

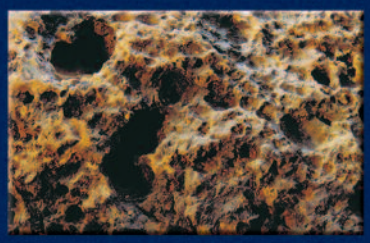
SURFACE AREA

POROSIMETRY

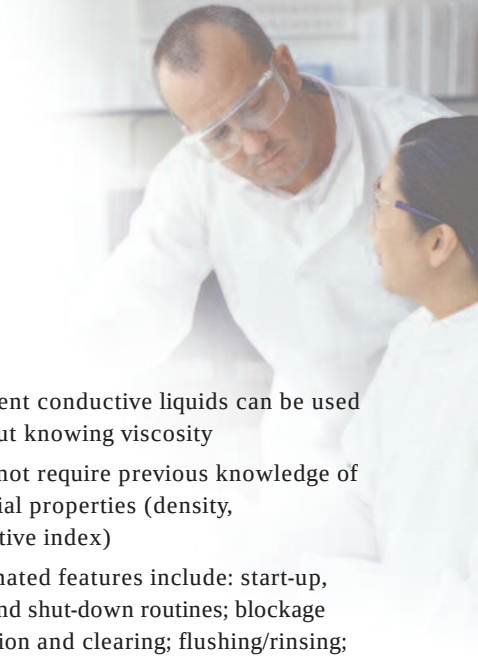
DENSITY

CHEMISORPTION





Products



The Elzone™ II 5390

Unlike other measurement techniques, the electrical sensing zone method can size samples that have assorted optical properties, densities, colors, and shapes. The new Elzone II 5390 utilizes this powerful particle characterization technique to determine the size, number, concentration, and mass of inumerable organic and inorganic materials. The instrument determines particle size in a range suitable for a wide variety of industrial, biological, and geological specimens down to 0.4 µm. A high level of accuracy and resolution, speed, ease of use, and its compact size make the Elzone II equally suitable for industry, quality control, and research and development laboratories.

- Sizes and counts both organic and inorganic materials
- Different conductive liquids can be used without knowing viscosity
- Does not require previous knowledge of material properties (density, refractive index)
- Automated features include: start-up, run, and shut-down routines; blockage detection and clearing; flushing/rinsing; and calibration
- Optional **Confirm** 21 CFR Part 11 software assists with compliance to FDA regulations. IQ and OQ services help assure that the system is validated for accuracy, reliability, and consistent performance. These services also provide safeguards to protect the integrity of analysis records

PHYSISORPTION

Surface area and porosity are two important physical properties that determine the quality and utility of many materials, which often must be carefully engineered to perform specific functions. Differences in the surface area and porosity of particles within the material, which otherwise may have the same physical dimensions, can greatly influence its performance characteristics. With a large selection of gas sorption analyzers, Micromeritics offers a product to fulfill almost any need for surface area and porosity determination.

The ASAP™ 2020 Accelerated Surface Area and Porosimetry System

The ASAP 2020 uses the volumetric gas sorption technique to obtain high-quality data for research and quality control applications. Designed to provide surface area, porosity, and chemisorption data to materials analysis laboratories with ever-expanding needs, the standard model can be upgraded to perform a full range of surface characterization analyses. All options can be integrated into the ASAP 2020 cabinet and require no additional space.

- Measures surface areas ranging from less than 0.001 to more than 3000 m^2/g
- Optional micropore system delivers porosity data on pores as small as 0.35 nm with a comprehensive selection of reports

- A HighVac option provides the low-pressure capability and pressure measurement resolution required for low surface area analyses
- Enhanced Chemical Resistance and Water Vapor Adsorption options are also available
- Optional **Confirm** 21 CFR Part 11 software assists with compliance to FDA regulations. IQ and OQ services help assure that the system is validated for accuracy, reliability, and consistent performance. These services also provide safeguards to protect the integrity of analysis records

The TriStar™ II 3020

The TriStar II is an automated, three-station, surface area and porosity analyzer capable of increasing the speed and efficiency of quality control analyses with the accuracy, resolution, and data reduction to meet most research requirements.

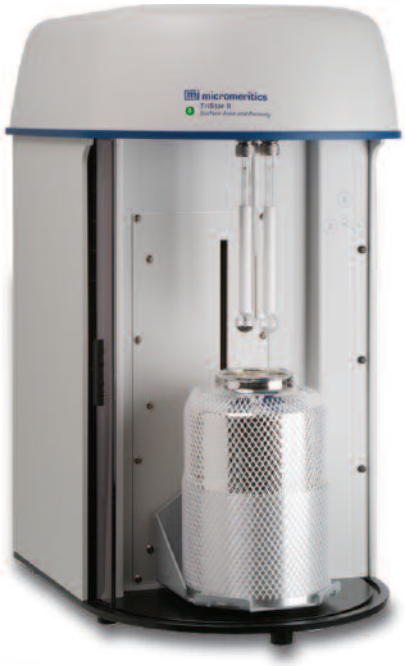
• Simultaneous and independent analysis of up to three samples – three BET surface area measurements can be performed in less than 20 minutes

• Measures surface areas as low as 0.01 m^2/g using the standard nitrogen system. A Krypton Option can extend surface area measurements to as low as 0.001 m^2/g

• A dedicated saturation pressure port, 2.75-liter Dewar, and extended length sample tubes are standard

• Free space can be measured, calculated, or manually entered

• Optional **Confirm** 21 CFR Part 11 software assists with compliance to FDA regulations. IQ and OQ services help assure that the system is validated for accuracy, reliability, and consistent performance. These services also provide safeguards to protect the integrity of analysis records



The Gemini™ VII 2390 Series

The Gemini VII 2390 Series surface area analyzers utilize a patented twin-tube design to produce accurate and repeatable surface area and porosity results. Their low cost, small footprint, speed, accuracy, simplicity of use, reliability, and ruggedness make the Gemini Series an ideal tool for teaching, research, and quality control environments. The Gemini VII Series permits low to high surface area measurements without requiring exotic gases such as argon or krypton. All model options can be operated stand alone or connected to a computer running Micromeritics' Gemini VII Windows® software, greatly expanding data reduction and reporting capabilities.

Three Model Options:

Gemini VII 2390*a*
Ideal for rapid and accurate surface area determinations by single-point and multi-point BET and Langmuir methods. In addition, it provides standard methods for total pore volume, micropore analysis by the t-method, and much more. Included is the capability to determine statistical thickness surface area (STSA) of carbon blacks. (Refer to ASTM D 6556, ASTM D 3765, ISO/DIS 18852.2, or ISO/CD 4652-2/3)

Gemini VII 2390*p*
All the capability of the 2390*a* with the addition of a saturation pressure (P_0) tube that allows the system to monitor the saturation pressure of the adsorptive on a continuous basis during the analysis. This design feature permits a rapid measurement of the adsorption isotherm to near saturation, allowing pore size distribution also to be determined

Gemini VII 2390*t*
All the capability of the 2390*p*, including a P_0 tube, with the addition of a larger Dewar and longer sample tubes for extended analyses. This provides the additional capability to measure the total adsorption-desorption process. With this data set, one can perform a BJH or Dollimore-Heal pore size distribution using up to 1000 points

• Optional **Confirm** 21 CFR Part 11 software assists with compliance to FDA regulations. IQ and OQ services help assure that the system is validated for accuracy, reliability, and consistent performance. These services also provide safeguards to protect the integrity of analysis records

The ASAP™ 2420 Accelerated Surface Area and Porosimetry System

The new ASAP 2420 System is designed for high-performance/high sample throughput. With six independently operated analysis ports, a new analysis can begin as soon as another is finished. This provides an important advantage over many multiport instruments that require all samples to be prepared or analyzed at the same time. A standard feature of the ASAP 2420 is a programmable and fully automated sample preparation module with twelve independently operated ports.

- BET surface area analyses utilizing six parallel runs can be achieved in as little as 30 minutes
- Analysis time can be extended with a long-duration Dewar, a necessity for obtaining high-resolution adsorption/desorption isotherms that take a long time to complete
- A low surface area option uses krypton as an adsorptive to measure total surface areas of 5 m^2 or less
- With low-pressure dosing and equilibration modes, a micropore option allows micropore analyses to be performed concurrently on all six independently operated analysis ports
- Optional **Confirm** 21 CFR Part 11 software assists with compliance to FDA regulations. IQ and OQ services help assure that the system is validated for accuracy, reliability, and consistent performance. These services also provide safeguards to protect the integrity of analysis records

MERCURY INTRUSION POROSIMETRY

The AutoPore IV Series mercury porosimeters are used in the analysis of powders and solids for the determination of important physical characteristics such as pore size distributions, total pore volume, total pore surface area, median pore diameter, sample densities (bulk and skeletal), fluid conductivity, and mechanical properties.

AutoPore™ IV Series Mercury Porosimeters

The AutoPore IV series uses mercury intrusion to determine total pore volume, pore size distribution, percent porosity, density, and transport properties. Included are powerful data reduction and reporting packages, fast pressure ramp rates, a flexible and controllable vacuum system, and high-performance low- and high-pressure generation systems.

- Measures pore diameters from 0.003 to 360 µm
- Available with 2 low-pressure ports and 1 high-pressure port or 4 low-pressure ports and 2 high-pressure ports for increased sample throughput
- Available in 33,000 psia or 60,000 psia models
- Quiet, high-pressure generating system
- Enhanced data reduction package includes tortuosity, permeability, compressibility, pore-throat ratio, fractal dimension, Mayer-Stowe particle size distribution, and more
- Operates in either scanning mode or rate-of-intrusion equilibration mode
- Collects extremely high-resolution data; better than 0.1 µL for mercury intrusion and extrusion volumes
- Enclosed mercury system — low-volume mercury usage

DENSITY

Density measurements guide the formulation process and influence the overall quality of many of today's manufactured products. Measuring the volume of a displaced medium (i.e. gas, liquid, or powder) provides the basic technique of pycnometry. Micromeritics pycnometers are used worldwide to obtain material density measurements.

The AccuPyc™ 1340 Gas Displacement Pycnometry System

The AccuPyc II 1340 Series are fully automatic pycnometers that provide high-speed, high-precision volume measurements and density calculations on various powders, solids, and slurries having volumes from 0.01 to 350 cm^3. The instrument completes most sample analyses in less than three minutes with excellent accuracy.

- Integrated control and analysis module can control up to five additional external analysis modules
- Four standard sample chamber sizes are available — 1 cm^3, 10 cm^3, 100 cm^3, and 350 cm^3
- MultiVolume Option Kits allow analyses of a variety of sample sizes in one analyis module
- Capable of measuring open- and closed-cell foam materials in accordance with ASTM method D 6226
- Temperature-control version allows analysis at user-selectable temperatures
- Glove box model separates the control and analysis modules, allowing analysis in controlled environments
- Optional Windows® interface provides exceptional reporting and archiving capability

CHEMISORPTION

Chemical adsorption (chemisorption) analysis techniques provide much of the information necessary (such as percent metal dispersion, active metal surface area, size of active particles, and surface activity of catalytic materials) to evaluate today's catalytic materials in the development and production phases, as well as after-use evaluation. Micromeritics instruments are specifically designed for the highly aggressive environment present during chemisorption analysis.

The AutoChem™ II 2920 Automated Catalyst Characterization System

The AutoChem performs a full array of highly precise, temperature-programmed chemisorption studies. It uses dynamic techniques to automatically perform pulse chemisorption and temperature-programmed methods — reduction (TPR), desorption (TPD), oxidation (TPO), and reactions (TPRx) — as well as BET surface area evaluation.

- CryoCooler II option allows analysis temperatures from -100 to 1100 ºC
- Optional Vapor Generator allows analysis using vaporized liquids in an inert carrier stream
- Includes a mass spectrometer port
- Optional mass spectrometer available
- Integrated peak editing and data reduction software

Chemisorption Option for the ASAP™ 2020 Accelerated Surface Area and Porosimetry System

A chemisorption upgrade added to a HighVac or Micropore ASAP 2020 system provides surface characterization analysis of catalytic materials using the volumetric gas sorption technique. This option is designed to be integrated into the standard ASAP 2020 cabinet and requires no additional space.

- Two independent vacuum systems allow preparation and analysis to proceed concurrently
- Permits determination of low-pressure chemisorption uptake
- Two-station intelligent degas system option provides fully automated degassing with controlled heating time profiles
- Chemisorption configuration includes twelve gas inlets that are automatically selectable to allow for automation of pretreatment, backfill, and analysis, and an integrated connection for a mass spectrometer
- Optional oil-free “dry” degas vacuum system is available for systems that use a mass spectrometer or have stringent requirements for cleanliness

The ChemiSorb™ Series Chemisorption Analyzers

The ChemiSorb 2720 and 2750 both utilize the dynamic (flowing gas) technique of analysis to study physical or chemical adsorption. The basic ChemiSorb 2720 makes chemisorption (percent dispersion, active metal area, crystallite size, and surface acidity) and physisorption (single-point BET surface area, Langmuir surface area, and total pore volume) affordable for even the most modestly funded laboratories. The ChemiSorb 2750 allows the same analyses as the ChemiSorb 2720 with the added advantages of higher precision, faster throughput, and more convenience in accommodating a variety of experiments.

- ChemiSorb 2720 – Dual ports, one for analysis and one for sample preparation
- ChemiSorb 2750 – Dual-function sample ports can be used as either a sample port or degas port. Three built-in preparation gas inlets and four carrier gas inlets allow for a variety of experiments without having to disconnect, reconnect, and purge gas lines
- Optional access fitting allows the ChemiSorb to utilize a mass spectrometer or other external detector
- The optional ChemiSoft™ TPx System (temperature-programmed controller and software) expands the capability of the ChemiSorb 2720 or 2750 to include: multipoint BET surface area, temperature-programmed reactions, data archiving, and advanced data reduction and reporting options

micromeritics®

The Science and Technology of Small Particles™

Micromeritics Instrument Corporation
4356 Communications Drive
Norcross, GA 30093
USA
Telephones:
U.S. Sales (770) 662-3633
International Sales (770) 662-3660
Fax (770) 662-3696

Micromeritics China
Apt. 5H, No. 1 Building
Hua-Ao (Epoch) Center
No. 31 Zi Zhu Yuan Road
Hai Dian District
Beijing 100089
P.R. CHINA
Telephone (+86) (0)10-6848-9371
Fax (+86) (0)10-6848-9371

Micromeritics France S.A.
Parc Alata
Rue Antoine Laurent Lavoisier
F-60550 Verneuil en Halatte
FRANCE
Telephone (+33) (0)3 44 64 60 80
Fax (+33) (0)3 44 64 60 89

Micromeritics GmbH
Erftstrasse 54
D-41238 Mönchengladbach
GERMANY
Telephone (+49) (0)2166-98708-0
Fax (+49) (0)2166-98708-88

Micromeritics Ltd.
Unit 2, Chestnut House
178-182 High Street North
Dunstable, Bedfordshire LU6 1AT
ENGLAND
Telephone (+44) (0)1582-475248
Fax (+44) (0)1582-475252

Micromeritics N.V./S.A.
Eugene Plaskylaan 140B
1030 Brussels
BELGIUM
Telephone (+32) (0)2-743-39-74
Fax (+32) (0)2-743-39-79

Micromeritics SRL
Via W. Tobagi n. 26/7
20068 Peschiera Borromeo
Milano
ITALY
Telephone (+39) (0)2 553 02833
Fax (+39) (0)2 553 02843

For additional product and materials analysis service details visit:

www.micromeritics.com

0309-SFC