THE microReport

micromeritics®
The Science and Technology of Small Particles™

MICROMERITICS INSTRUMENT CORPORATION

VOLUME 22 NO. 1

50 YEARS

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Micromeritics to Showcase its Extensive Line of Materials Characterization Instruments at Pittcon 2012

Pittcon, a premier annual conference devoted to laboratory science and instrumentation, takes place from **March 11 through March 15, 2012, at the Orange County Convention Center in Orlando, FL.** Micromeritics, celebrating its 50th anniversary, is located in Booth 3419. With Micromeritics Analytical Services, Micromeritics Pharmaceutical Services, and its Particulate Systems products, Micromeritics currently offers one of the broadest ranges of physical characterization instruments and services on the market.

At Pittcon 2012, Micromeritics is introducing its new innovative **MicroActive™ Data Analysis Software** that allows users to interactively evaluate isotherm data from Micromeritics' ASAP®, TriStar®, and Gemini® gas adsorption instruments. Users can easily include or exclude data, fitting the desired range of experimentally acquired data points. Interactive data manipulation minimizes the use of dialog boxes to specify calculation parameters allowing accurate and efficient determination of surface area and porosity. It is not necessary to generate reports to view results – now see it graphically and interactively on the screen.

Micromeritics is also highlighting the Saturn DigiSizer® II High-Definition Digital Particle Size Analyzer, a highly advanced tool for those faced with challenging particle size distributions. If process viability is affecting the desired yield, performance, or quality of your product, take control of your process with the Saturn DigiSizer. Superior resolution allows the user to characterize outlier particles not visible to other particle sizing systems. With unique design and data reduction features, this instrument measures particle size in a range of 40 nanometers to 2.5 millimeters with an extremely high level of resolution, repeatability, and sensitivity from unit to unit and site to site.

Surface area and porosity are important physical properties that influence the quality and utility of many materials and products. Micromeritics gas adsorption instruments are ideal for measuring these properties on a wide variety of materials that include high-tech ceram-

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ics, catalysts, fuel cells, carbons, pharmaceuticals, cosmetics, paint and coatings, super-capacitor components, propellants, geological materials, aerospace materials, and much more. From increasing the speed and efficiency of a routine quality control analysis to providing the accuracy, resolution, and data reduction for exacting research requirements, Micromeritics offers an instrument to fit the application.

Micromeritics **ASAP 2020 HD Accelerated Surface Area and Porosimetry System** includes many features that offer improved isotherm resolution and accuracy. The instrument is designed to provide surface area, porosity, and surface activity (chemisorption) information to materials analysis laboratories with ever-expanding needs. Adsorption and desorption analyses using a wide variety of adsorptives are permitted. The ASAP 2020 HD can also be used to determine the microporosity and evaluate the hydrogen, methane, or CO_2 storage capacity of materials. Micropore size and volume can easily be obtained on MOFs, zeolites, activated carbons, and various nanomaterials. The ASAP 2020 HD is also available with an optional upgrade to allow the use of hydrocarbon or water vapors for sorption studies.

The **TriStar II 3020 Surface Area and Porosity System** is a fully automated, three-station instrument capable of increasing the speed and efficiency of quality control analyses, with the accuracy, resolution, and data reduction to meet most research requirements. The instrument includes a dedicated saturation pressure port and three analysis ports that operate simultaneously and independently of one another. A krypton option allows measurements in the very low surface area range.

The low-cost **Gemini VII Series Surface Area Analyzers** utilize a patented twin-tube design to produce fast, accurate, and repeatable surface area and porosity results. Reliable and simple to use with a small footprint, the Gemini VII is an ideal tool for teaching, research, and quality control environments. It permits low-to-high surface area measurements without requiring exotic gases such as argon or krypton. Three model options are available.

Particulate Systems High-Pressure Volumetric Analyzer (HPVA) is designed to measure high-pressure adsorption isotherms with hydrogen, methane, carbon dioxide, and other gases using the static volumetric method. Typical applications for this instrument include catalysts, zeolites, activated carbons, carbon nanotubes, and hydrides. Understanding the adsorption characteristics of materials is critical in the research and advancement of hydrogen storage, fuel cells and batteries, stack gas scrubbers, and hydrocarbon traps.

Micromeritics and Particulate Systems offer six instruments that use a different method of determining particle size distribution of powdered material, including one for characterizing particle shape. Methods include X-ray Monitored Gravity Sedimentation, Static Laser Light Scattering, Dynamic Laser Light Scattering, Electrical Sensing Zone, Air Permeability, and Dynamic Image Analysis. In addition to the Saturn DigiSizer, particle size instruments displayed at Pittcon 2012 include four additional models suitable for a variety of applications.

The **Elzone® II 5390 Particle Size Analyzer** determines the size, number, concentration, and mass of a wide variety of organic and inorganic materials. Unlike other measurement techniques, the electrical sensing zone method (Coulter Principle) is capable of accurately sizing samples of varying optical properties, densities, colors, and shapes. The Elzone determines particle size in a range suitable for a wide variety of industrial, biological, and geological specimens down to 0.4 micrometer. **The SediGraph® III 5120 Particle Size Analyzer** measures mass by X-ray absorption and particle size by sedimentation in the range of 300 micrometers

to 0.1 micrometer. Particulate Systems' Particle Insight Dynamic Image Analyzer is ideal for applications where the shape, not just the diameter, of raw materials is critical to the performance of the final product.

The **Particle Insight** offers up to 28 different shape parameters analyzed in real-time in either aqueous or organic solvent suspensions. The system measures particles in a range from 3 µm up to 300 µm in its standard configuration.

With its temperature stabilization feature, the **Cordouan VASCO DLS** Particle Size Analyzers are unique dynamic light scattering (DLS) nanosizing instruments capable of measuring particle size in a range from 6 micrometers to 1 nanometer. The optical configuration design provides superior detection efficiency for opaque sample, decreases the instrument sensitivity to 'multiple scattering artifact', and strongly reduces the laser thermal effect allowing very accurate measurements even in concentrated and dark dispersions.

Dynamic vapor sorption, commonly known as DVS, is based on the gravimetric determination of the quantity of vapor adsorbed or desorbed from the sample material. By varying the vapor concentration surrounding a sample and measuring the change in mass it produces, the rate and quantity of solvent adsorbed by a sample can be measured. Surface Measurement Systems, represented by Particulate Systems, offers a wide range of Dynamic Vapor Sorption instruments that utilize dynamic gas flow and the gravimetric technique to produce high-resolution adsorption and desorption isotherms of water and organic vapors on solid materials.

Humidity can adversely affect a range of materials to include food, pharmaceuticals, fuel cells, packaging, high-energy materials, polymers, building materials, filtration materials, and personal care products. Knowing how water vapor interacts with these materials can yield vital information for the proper formulation, processing, and storage of these materials.

The **DVS-Intrinsic** is an entry level, water vapor only instrument. With a small footprint, it operates in the 20 to 40 °C temperature range.

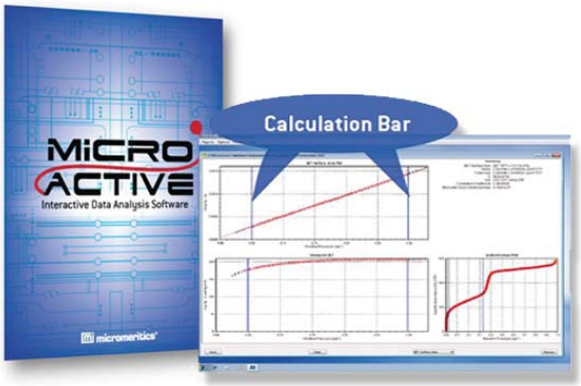
Gas pycnometry is a common analytical technique that uses a gas displacement method to measure volume accurately. These volume measurements can be used to calculate absolute density which is an important physical characteristic to many applications such as pharmaceuticals, coatings, crystal structures of carbons and ceramics, powdered metals, rigid plastic foam, plastic film, organic chemicals and polymers, slurries, material blends, and much more.

Micromeritics' **AccuPyc® II 1340 Gas Displacement Pycnometry System** is a fast, fully automatic analysis system that provides high-speed, high-precision volume measurements and density calculations. The AccuPyc determines absolute density of powders, solids, and slurries having volumes from 0.01 to 350 cm^3 with superior accuracy. For those who require high throughput, an integrated control and analysis module can run up to five additional external analysis modules. Each module can have a different size sample chamber (1 cm^3, 10 cm^3, 100 cm^3, 350 cm^3) providing even more versatility. In addition, obtaining skeletal volume measurements using the AccuPyc combined with envelope volume from Micromeritics' **GeoPyc® 1360** allows the user an alternative low-cost method to quickly determine total pore volume and percent porosity in a dry environment.

New Products

MicroActive

New Innovative Interactive Data Analysis Software



Micromeritics' new innovative MicroActive data analysis software allows users to interactively evaluate isotherm data from Micromeritics' ASAP, TriStar, and Gemini gas adsorption instruments. Interaction with adsorption data is direct. Users can easily include or exclude data, fitting the desired range of experimentally acquired data points. Interactive data manipulation minimizes the use of dialog boxes to specify calculation parameters allowing accurate and efficient determination of surface area and porosity of their materials. By simply moving calculation bars with the cursor, the user is immediately updated with the new textural properties. One-click access to important parameters allows the user to focus on the result rather than the parameters. It is not necessary to generate reports to view results - now see it graphically and interactively on the screen.

Screen layout has been designed to provide a user-friendly interface. Rapidly switch between a user-selectable experimental data view and traditional advanced or basic views. Isotherms can be viewed on either a linear or logarithmic scale, available to the user under each calculation model. Many gas adsorption models are included - all using the isotherm data. Reports include Isotherm, BET surface area, Langmuir surface area, t-plot, BJH adsorption and desorption, Horvath-Kawazoe, DFT pore size, and Dubinin.

http://www.micromeritics.com/Product-Showcase/MicroActive-Interactive-Data-Analysis-Software.aspx

ChemiSorb HTP

High-Throughput, High-Resolution Chemisorption Analyses

Chemical adsorption analyses can provide much of the information needed to evaluate catalyst materials in the design and production phases, as well as after a period of use. A fully automated, six-analysis station adsorption instrument, the Micromeritics ChemiSorb HTP is a superior analytical tool optimized for the measurement of chemical adsorption isotherms and the subsequent reduction of the adsorption data to familiar chemisorption parameters. For those with high-throughput needs, such as large catalyst manufacturers and researchers involved in new catalyst development, the ChemiSorb HTP offers significant advantages over other chemisorption alternatives.

With its six independently operated analysis stations, multiple analyses can be run simultaneously on one ChemiSorb HTP, saving valuable time and lab space. The instrument is capable of lengthy, unattended analyses and includes a high-throughput mode that allows the user to start multiple parallel analyses. Degas/sample preparation is done in situ prior to analysis. Because each analysis station can operate concurrently and independently of one another, samples may be added or removed from degas/analysis stations without disturbing the treatment of other samples undergoing preparation or analysis. The easy-to-use analysis program operates in a Windows environment with the ability to run other applications while an automatic operation is in progress. Reports can be manipulated and customized in a variety of ways.

The instrument includes a vacuum system and manifold with constantly monitored pressure transducers on each of its analysis stations. Each station is also equipped with a furnace enabling independent control of sample temperature and ramping from 10 °C above ambient to 700 °C. The temperature is recorded with each equilibrium pressure to provide the highest quality isotherms possible. An equilibration option allows the user to specify different equilibration times. A mass flow controller is installed in each analysis station to ensure accurate and reproducible flow through the sample, allowing either powders or shaped catalysts to be prepared. Up to twelve different gases can be attached to the ChemiSorb HTP simultaneously.

http://www.micromeritics.com/Product-Showcase/Chemisorb-HTP-High-Throughput-Chemisorption-Analyzer.aspx

MKS Cirrus 2 Mass Spectrometers

Add Versatility to Micromeritics AutoChem Catalyst Characterization Systems

Quadrupole mass spectrometers offer fast, on-line atmospheric pressure gas analysis with the ability to monitor a large number of different gases and gas mixtures with a single analyzer. The MKS Cirrus 2 Atmospheric Pressure Gas Monitoring System offers the versatility of Microvision 2 quadrupole mass spectrometry in a convenient bench-top configuration. It is ideal for on-line monitoring and analysis of gases and gas mixtures including trace contaminants in process gases, solvent vapors, hydrocarbons, atmospheric and inorganic gas species (including corrosives), freons, and noble gases. Gas compositions can be tracked over a wide dynamic range (ppb to percentage levels) with a speed of up to 250 data points per second. The heated silica capillary inlet ensures a rapid response to changes in gas composition.

Micromeritics' AutoChem II 2920 Chemisorption Analyzer is a fully automated instrument capable of conducting a comprehensive array of highly precise chemical adsorption and temperature-programmed reaction studies. The instrument gives the researcher the ability to obtain valuable information about the physical properties of catalysts, catalyst support, and a variety of other materials. Micromeritics' AutoChem 2950 HP Chemisorption Analyzer is an automated high-pressure catalyst characterization system that is capable of preparing and analyzing samples at elevated pressures up to 1000 psia and at temperatures from –100 to 1100 °C.

The Cirrus 2 system enables the AutoChem II and AutoChem 2950 HP to function as multi-component microreactors. Cirrus 2 software includes Process Eye™ Professional which controls analyzer data collection and monitors real-time data and analyzer status. A Recipe wizard helps create and configure analysis conditions. The Micromeritics/Cirrus interface software runs inside Process Eye Professional and is accessed via its own menu. This interface enables the user to control the analyzer via recipes which can also be saved for future use. Micromeritics has included preset parameters in the software, enabling you to create Peak Jump recipes with just a few keystrokes. The interface allows the user to collect data automatically from the AutoChem, customize Peak Jump recipes, access standard operations, calibrate detectors, and scale the AutoChem sample thermocouple signal.

http://www.micromeritics.com/Product-Showcase/AutoChem-II-2920.aspx

Useful Guide for Purchasing an Analytical Laboratory Instrument

Prior to purchasing an analytical laboratory instrument, a number of criteria should be considered by the individual or group responsible for the purchase.

While the initial price is a factor, it is not wise to base a buying decision solely on this or any one criterion. Operating costs, instrument specifications and performance, manufacturer reliability, and many additional factors should all be researched and considered.

http://www.micromeritics.com/Pressroom/Press-Release-List/Useful-Guide-for-Purchasing-an-Analytical-Laboratory-Instrument.aspx

Microchannel Reactor for Fischer-Tropsch Synthesis: Adaptation of a Commercial Unit (PID-Micromeritics Microactivity Reference)

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3. Micromeritics Instruments Corporation, 4356 Communications Drive, Norcross, GA 30093, USA

Fischer-Tropsch Synthesis (FTS) is a well-known reaction that is gaining renewed attention due to growing interest in the micro-GTL process. Associated gases in offshore platforms and isolated onshore gas fields (stranded gas) require compact units able to transform gas into liquid fuel on a much smaller scale than is possible in conventional GTL plants. Consequently several papers, books, and patents have been published during the past decade from both industry and academia concerning the field of microchannel reactors including the GTL process and in particular FTS.

Microchannel technology offers new possibilities for FTS allowing highly compact units (process intensification), intrinsically safe functioning and excellent temperature control with substantial significance in control selectivity for liquid fuels (C5+ selectivity).

Figure 1. Microchannel block

The objective of this communication is to present developments in adapting a catalytic test unit **(PID-Micromeritics Microactivity Reference)** for testing microchannel cross-flow blocks during FTS. The development permits the same unit to be used for testing powder catalysts, structured catalysts (monoliths), and microchannel blocks.

PID-Micromeritics Microactivity Reference

The microchannel blocks (Figure 1) present 100 microchannels (0.7 x 0.7 x 20 mm) coated with FT catalyst (20%Co-0.5%Re/Al_2O_3) perpendicularly interspersed with 100 similar microchannels for cooling [1].

The original unit allowed control of reactor temperature as well as pressure and flow of the different gas reactants. A second fluid line was developed to cool the exothermic FTS using pressurized water. This line includes a high-pressure pump, heater and thermocouple to control water temperature, a heat exchanger permitting a water-cooling loop, pressure transducers, and a motorized needle valve to control water pressure.

The low compressibility of liquid water rendered initial attempts to control pressure impossible. Overcoming this problem required the addition of a container partially filled with air in order to cushion the very large pressure changes associated with the temperature fluctuations. The final strategy was to adjust the pressure set point of the cooling water to a pressure corresponding to at least 20 bar higher than water vapor pressure at the FTS temperature. Under these conditions, the cooling stream is highly stable.

Additional modifications were also necessary in the control software to include new control loops for the cooling stream (temperature and pressure) and monitoring of the high-pressure pump.

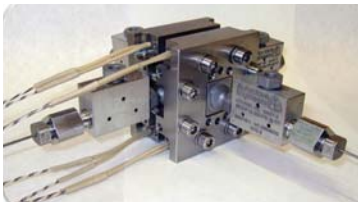


Figure 2. Microchannel reactor

The microchannel block was fitted with CFD-designed headers assuring homogeneous gas velocity at the entry of all microchannels and graphite gaskets guaranteeing excellent sealing (<L0.01). A double housing ensures strength to the compression and deformation of the graphite gaskets and includes heating cartridges for the reduction pretreatment (Figure 2). A tee junction at each gas inlet and outlet allows thermocouples to be arranged in contact with each block face. In combination with thermocouples on the upper and lower surfaces of the block, this enables complete monitoring of the microchannel unit through-

out the data logging facility of the control software.

Several reactions were carried out with microchannel blocks having different catalyst loads. The system proved highly stable. Standard tests were carried out over several weeks allowing for changes in flow, pressure and temperature. Figure 3 shows CO conversion and methane selectivity under different conditions in a typical experiment.

References:
1. L. C. Almeida, F. J. Ehcave, O. Sanz, M. A. Centeno, G. Arzamendi, L. M. Gandia, E. F. Sousa-Aguiar, J. A. Odeiozola, M. Montes, , "Fischer-Tropsch Synthesis in Microchannels", Chemical Engineering Journal 167 (2011) 536–544.

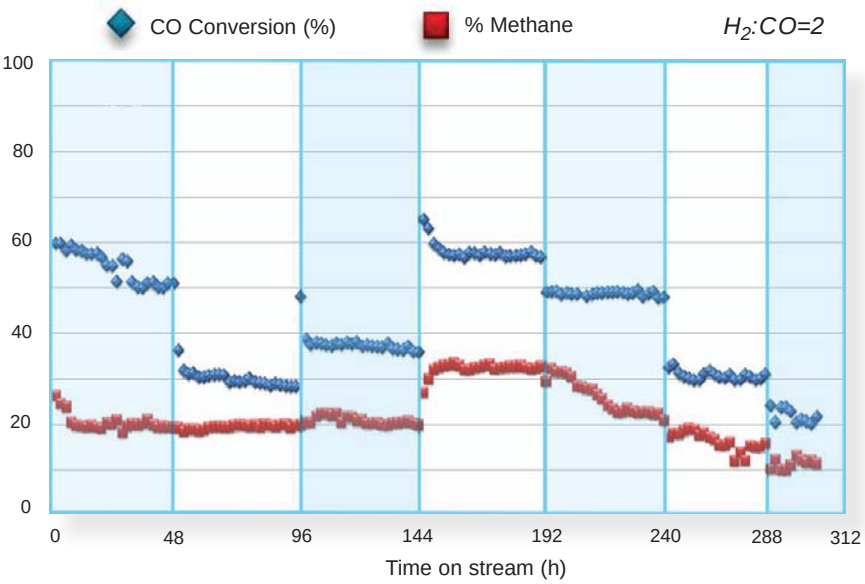


Figure 3: CO conversion and methane selectivity in microchannel test

Professor Angiolina Comotti

Micromeritics Announces Instrument Grant to the University of Milano Bicocca

Micromeritics' Grant Selection Committee has selected the recipient of its grant award for the fourth quarter of 2011. An **ASAP 2020 HD** Micropore High Definition Accelerated Surface Area and Porosimetry Analyzer has been awarded to the University of Milano Bicocca, Milano, Italy.

According to Professor Angiolina Comotti, Principal Investigator, "New molecular van der Waals crystals containing permanent microporosity were discovered and their porosity was investigated. We are pursuing this research theme with new molecular porous crystals and polymeric materials exploring different weak and covalent interactions for the fabrication of the microporous frameworks. The ASAP 2020 HD will provide the low-pressure capability and pressure measurement resolution for sub-microporous materials. Our research activity includes the study of advanced micro- and sub micro-porous materials endowed with specific-site properties that will be explored also by solid state and hyperpolarized 129Xe NMR." Professor Comotti gained the title of Associate Professor in 2010. She has published 80 papers in a wide variety of peer-reviewed journals with over 1300 citations and participated in numerous invited lectures.

According to Preston Hendrix, Micromeritics' president, "This program is designed to promote and advance the acquisition and use of particle characterization instrumentation in non-profit universities and institutions where other means of funding are not generally available. We are very proud and excited to present this award in an ongoing grant program to support important research." Mr. Hendrix has appointed a special Grant Selection Committee to ensure the success and effectiveness of this program.

Micromeritics' Instrument Grant Program is intended to provide particle characterization instruments to non-profit universities and research organizations for the purpose of fostering and supporting meritorious research projects. A maximum of one instrument/integrated system will be awarded per calendar quarter. The next grant decision will be made prior to 03/31/12. The next application deadline is also 03/31/12 for a 06/30/12 grant decision.

Applications may be submitted at any time in accordance with the application instructions and will remain active for a period of one year from the date of submission.

MICROMERITICS ANALYTICAL SERVICES The Particle Testing Authority

The mission of Micromeritics Analytical Services (MAS) is to provide all our customers with the best in contract analytical services. We will continually strive to improve and expand the services provided to meet our customers' needs.

See MAS at the Upcoming U.S. Biochar Conference

MAS will be participating and presenting a paper at the upcoming **U.S. Biochar Conference** hosted by the Sonoma Biochar Initiative to be held July 29-Aug 1 in Rohnert Park, CA. Our paper is a joint publication with other Biochar researchers looking for a good method for characterizing biochar material. For more information on this conference visit http://www.biochar-us.org/conferences%20.html.

What is Biochar?

Biochar is a fine-grained charcoal made by pyrolysis of biomass material such as wood, crop residue, and solid waste. Biochar has many agricultural benefits. Spread into the top layer of the soil, biochar enhances plant growth with its ability to retain moisture and replenish the soil's organic carbon, fostering the growth of microbes that are essential for nutrient absorption.

Biochars permit the use of less fertilizer decreasing agricultural pollution through runoff and leeching. Biochar is also desirable because it generates clean energy through the pyrolysis process and reduces CO_2 from the atmosphere.

New Resources and Capability

– MAS Expands Staff of Laboratory Analysts

Nhut Tran, originally from Vietnam, is a graduate of Georgia State University with a BS in Biological Science and a minor in Chemistry. He specializes in all particle sizing techniques with additional experience in vapor adsorption.

Aurora Gostilean is a graduate of the University of Babes-Bolyai in Romania with a BS in Chemistry. Before joining Micromeritics, she worked in Romania for Terapia Pharmaceuticals. She specializes in analyzing samples using both gas adsorption and mercury porosimetry techniques.

Amanda (Mandy) Scott is a graduate of Georgia Gwinnett College with a BS in General Biology. She is fully trained on Micromeritics' entire line of gas adsorption instruments.

MAS Events:

Pittcon
March 11 - 15
Orlando, FL

Biochar Conference
July 29 - August 1
Rohnert Park, CA

For more information visit www.particletesting.com or contact Greg Thiele at greg.thiele@micromeritics.com or (770) 662-3611.

Particle Characterization Services Include:

- Particle Size Distribution
- Particulate Count
- Nanoparticle Size
- B.E.T. Surface Area
- Pore Size Distribution
- Pore Volume Distribution
- Total Pore Volume
- Density
- Active Surface Area
- Crystallite Size
- High-Pressure Adsorption
- Magnetic Content
- Percent Metal Dispersion of a Catalyst
- Surface Energy
- Dynamic Water Vapor Sorption
- TGA
- DSC
- Zeta Potential
- Isosteric Heat of Desorption
- Microscopy
- Method Development
- Method Validation
- Consulting Services

MICROMERITICS PHARMACEUTICAL SERVICES

Characterizing Lyophilized Pharmaceutical Products

There is an expanding emphasis on the area of lyophilized products in the pharmaceutical and biotechnology industries. These companies are increasingly using lyophilization technologies and production processes to produce a final dosage form that has a longer shelf life, enhanced stability, and fewer restrictions on transportation and storage.

Typically, a lyophilized cake is the result of a freeze-drying process. The structure of the cake, including its density, total pore volume, pore size, and surface area, is tightly controlled by production. Any variability in the production process, such as the primary drying temperature, secondary drying temperature, and moisture content can impact the physical and chemical properties of the lyophilized cake.

Micromeritics Pharmaceutical Services offers a variety of analytical services to characterize lyophilized products. Mercury intrusion porosimetry can provide important information on the internal cake structure assisting in process development, batch variability, and integrity of the cake. Total pore volume and pore size distribution are directly related to the integrity of the cake and reconstitution properties. BET surface area data provide insights into the morphology of the solid phase of the cake providing additional information on structure and reconstitution.

Selecting the optimal drying temperature for multi-component systems that may include water, buffers, fillers, and the active pharmaceutical ingredient is critical due to the fact that physical properties of these materials can change significantly with slight changes in temperature. Our analytical services for Modulated Differential Scanning Calorimetry (mDSC) identify the temperatures where these changes take place providing researchers with information that is critical in the determination of optimal drying temperatures. Unlike traditional Differential Scanning Calorimetry (DSC), mDSC provides the ability to accurately analyze complex transitions in frozen materials.

The amount of residual moisture in lyophilized products can impact long-term stability and shelf life. The type of water in the lyophilized product varies from physically bound, adsorbed, or chemically bound water. Water adsorption and desorption kinetics of lyophilized materials provide data that is useful in the determination of drying conditions, product stability, and environmental considerations for storage and transportation. Thermo gravimetric analysis (TGA) and Karl Fischer titration can typically account for all water present in the cake. Dynamic Vapor Sorption (DVS) analysis can provide useful information on the behavior of the cake when exposed to varying levels of humidity.

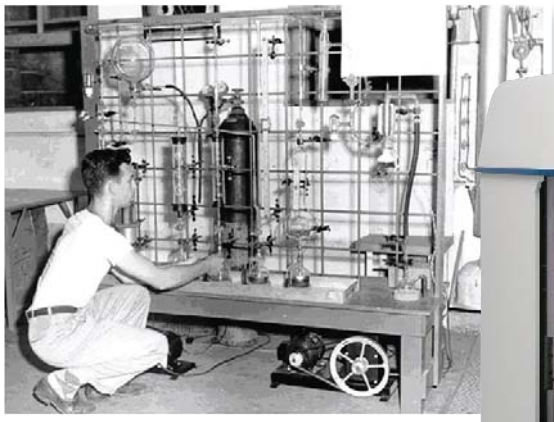
To learn more about our analytical services for characterizing your lyophilized materials please visit our web site at www.micRx.com or call us at 770-624-3393.

Defining Material Characterization Worldwide for 50 Years

In an age where science and technology have changed the world, material characterization is viewed as integral to the development and improvement of many of today's products. Fundamental research, process control, production, and quality assurance/control in a broad cross-section of industries require physical characterization of raw material to ensure the quality and performance of the end product.

Co-founders Dr. Clyde Orr and Warren Hendrix

Founded in 1962 and celebrating its 50th anniversary, Micromeritics is often credited with having fostered the growth of material characterization on an international basis. Before Micromeritics co-founders, Dr. Clyde Orr and Warren Hendrix, established the company, physical chemists were forced to build their own apparatus out of glass tubing in order to make surface area measurements of particles. The analyses were very time-consuming and results were inconsistent from one hand-built device to the next. The company began with the introduction of the first commercial physical adsorption instrument, the Orr Analyzer. In a single metal cabinet design built to exacting specifications, this revolutionary instrument used modern pressure gauges and produced data that were both repeatable and reproducible.



Since that time, the company has become recognized as the world's foremost manufacturer of automated analytical laboratory instruments used exclusively for the physical characterization of powders and solids. Micromeritics has installed over 20,000 instruments with approximately half of these still active in the field. Throughout the world, on a daily basis at any given time, thousands of samples are being analyzed on our instruments. Micromeritics instruments have been cited in thousands of peer-reviewed technical papers, attesting to the reliability of our measurements in performing fundamental research.

For five decades, Micromeritics has provided materials characterization instruments and applications

Orr Analyzer circa 1962

support to most of the world's top industrial companies and academic institutions whose applications include: pharmaceuticals, catalysts and catalyst support systems, ceramics, clays, pigments, plastics, paper coatings, geological materials, and metal powders, to name a few. Our innovative products help our customers increase efficiency, generate revenue, develop new products, manage production, assure quality, and quantify natural phenomena.

Our mission statement remains, "The driving force of our company is to develop and support high-quality, high-performance instrumentation of unmatched accuracy and utility, never losing sight of the primary importance of satisfying the needs of our customers." Micromeritics is dedicated to continuing this process of developing state-of-the-art instruments and services, providing superior customer support far into the future."

Instrument Training

Micromeritics provides basic start-up training for most instruments during installation. However, when operators wish to maximize their proficiency and broaden their capability with their Micromeritics instrument, more advanced training is needed. To achieve this goal, Micromeritics offers for most instruments targeted classes in which customers may expand their ability and improve their understanding by learning from the experts who designed their instruments. These classes, periodically held at Micromeritics' headquarters in suburban Atlanta, Georgia, include:

Theory Overview
Learn about the science upon which each instrument is based and how this science applies to successful sample preparation, analysis, and results interpretation.

Detailed Operations
Effective sample file creation, use of analysis parameters, and manual sample entry are all covered. Increase efficiency and learn to use the full power and flexibility of the operating software.

Automatic Analyses
Develop correct analysis procedures to optimize collection of accurate, reproducible data. Much class time is spent performing hands-on analyses in a controlled, tutorial environment.

System Utilities
Learn instrument software utilities which help manage sample files and directories, protect data, and select system options.

Report Optimization
Learn to configure reports and obtain the most useful information, as well as improve report comprehension.

Troubleshooting
Learn techniques to quickly locate and resolve instrument and software problems.

User Maintenance
Under the guidance of a Micromeritics Maintenance Specialist, practice routine maintenance procedures which improve operation, reduce downtime, and increase data accuracy.

Course Enrollment
Training courses last from two to four days and are designed to provide hands-on, performance-based instrument skills and knowledge. Small classes allow individual instruction and peer interaction. Course materials include a Study Guide, a complimentary copy of *Analytical Methods in Fine Particle Technology*, and a wealth of other educational material. A Certificate of Completion is awarded to each trainee.

Advanced Training
Micromeritics University is excited to add a new series of Advanced Training Courses to its standard training program. Offered as one-to-two day sessions that can be taken as a stand-alone course or in conjunction with a relevant instrument training course, these courses are excellent options for those looking to achieve a greater depth of understanding in the analytical capability of their Micromeritics instrument. Advanced courses will be conducted by a member of Micromeritics Scientific Services staff and contain a thorough examination of each topic in a classroom environment. While there are no prerequisites, attendees should either have a basic understanding of their instrument and its daily operation, or take the standard instrument training course prior to the advanced course.

Contact us at http://www.micromeritics.com/Service-Center/Training-Class-List.aspx to register and for detailed course descriptions.

Students attending a recent Autopore course

Visit our website for the complete 2012 course schedule and registration.

2012 Training March - June

ASAP 2020 Physisorption
March 19 - 21

ASAP 2020 Physi/Chemi
March 19 - 22

Textural Characterization of Porous Materials Using DFT/NLDFT
March 23

AutoPore IV
April 17 - 19

Characterization of Materials Using Mercury Intrusion Porosimetry
April 20

ASAP 2420
June 26 - 28

Saturn DigiSizer II
June 12 - 14

Using Shape and Size to Characterizer Particle Morphology
June 15

For additional information or to register for the class of your choice, visit www.micromeritics.com/Service-Center/Training-Class-List.aspx or phone 770.662.3607. Early registration is recommended since class space is limited.

Events

Pittcon 2012
March 11 - March 15, 2012
Orange County Convention Center
Orlando, FL
Booth #3419

ACS Spring 2012
March 25 - 29, 2012
San Diego Convention Center
San Diego, CA

Nano Israel 2012
March 26 - 27, 2012
Intercontinental Hotel
Tel Aviv, Israel

Sorption Seminar
April 24 - 25, 2012
Institute of Chemical Process Engineering (CVT)
of Karlsruhe Institute of Technology (KIT)
Isruhe, Baden-Württemberg, Germany

ArabLab 2012
March 26 - 29, 2012
Dubai Convention Center (DICEC)
Dubai, UAE

Interphex 2012
May 1 - 3, 2012
Jacob Javits Convention Center
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Attention Authors

We welcome articles and information concerning particle technology applications performed with Micromeritics instrumentation. Everything from a single plot with operating conditions to an in-depth article on physisorption, chemisorption, etc. with supporting graphs will be considered. If your material is published in The microReport, you will receive a copy of Analytical Methods in Fine Particle Technology by Paul A. Webb and Clyde Orr.

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