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Micromeritics Proudly Announces Its Second Instrumentation Grant Award Winner

Micromeritics recently launched an Instrument Grant Program that is intended to provide particle characterization instruments to non-profit universities and research organizations for the purpose of fostering and supporting meritorious research projects.

The initial grant was awarded to the Berkeley Catalysis Center at the University of California-Berkeley. Dr. Alan Katz, the principle investigator intends to use the instrument (an AutoChem 2920) to determine the concentration and acid/base characteristics of catalytic active sites on solids in a fashion that cannot be accomplished by other techniques. In particular, this will be used to investigate the chemisorption of H₂, CO, CO₂, and N₂O, as well as reactive chemisorption using hydrogen and alkanes as reductants.

After careful consideration of many deserving applications, the special Grant Selection Committee has selected the second grant award winner. An AutoChem II 2920 Catalyst Characterization System has been awarded to the Department of Chemical Engineering at the University of South Carolina.

Dr. John Monnier, Research Professor and Principal Investigator states, "One of the primary emphasis areas of the University is nanotechnology, and the



**AutoChem II 2920
Chemisorption Analyzer**



Dr. John Monnier

continued on page 2

Grant Award continued

efforts are being led by the USC Nanocenter. Nanoscale catalysis is a focal point, or thrust area, of the Nanocenter which includes not only the traditional areas of catalyst synthesis and evaluation for environmental and chemical processes, but also the Future Fuels™ initiative at USC which is heavily focused on fuel cells and alternative energy sources, of which catalysts and electrocatalysts are key components. Selective chemisorption is the single most important analytical tool used for the study and application of materials employed in these catalytic processes, and is the only technique that directly measures the concentration of active surface sites

responsible for catalytic transformations. All other analytical tools measure only physical and/or chemical correlations related to concentrations of active sites.”

According to Preston Hendrix, Micromeritics' President, “This program is designed to promote and advance the acquisition and use of particle characterization instrumentation not generally available through other means to non-profit universities and institutions. We are very proud and excited to present this award in an ongoing grant program to support important research.”

A maximum of one instrument/integrated system will be awarded per cal-

endar quarter. Remaining grant deadline dates for 2007 are:

**Application deadline
6/30/07;**

Grant decision prior to 9/30/07

**Application deadline
9/30/07;**

Grant decision prior to 12/31/07

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. For more information, go to www.micromeritics.com and click on **Grant Program** for a detailed grant description, application requirements, and application.

Micromeritics Appoints New Manager of Market Development



Mr. Peter Bouza

Peter Bouza has been named Manager of Market Development for Micromeritics Particle Size, Count, and Shape Business.

In his new role, Mr. Bouza will be responsible for expanding the Particle Size, Count, and Shape business of Micromeritics.

Peter joins Micromeritics from Beckman-Coulter where he worked in varying roles for over 15 years in their Particle Characterization Division. For the past seven years he has held the position of General Manager for Global Operations. He has a Bachelor

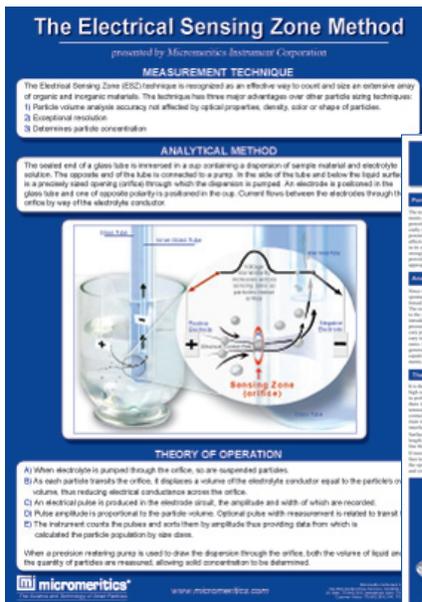
of Science in Electrical Engineering and is finalizing a Master of Science in Industrial Engineering from Florida International University in Miami, Florida.

Mr. Bouza's comprehensive expertise in the area of particle analysis is especially relevant with Micromeritics' Saturn DigiSizer High Resolution Laser Particle Size analyzer and recent introduction of the Elzone II Particle Size analyzer. His knowledge and experience will be instrumental in helping Micromeritics to build stronger relationships with the biotechnology and pharmaceutical industries.

Scientific Theory Posters are Now Available.

Micromeritics Instrument Corporation is releasing a series of posters illustrating the theories behind the technologies of our broad line of automated particle characterization analytical laboratory instruments.

In this series of posters, the various theories used to determine particle characteristics such as surface area, particle size, pore volume, pore size, absolute density, envelope density, bulk density, catalytic activity, and active surface area will be presented. These posters are now available through our on-line catalog or by calling customer support or your sales representative.



The Electrical Sensing Zone Theory and the Mercury Porosimetry Theory posters are currently available.

Micromeritics Extensive Bibliography Referencing More Than 6,000 Scientific Papers Surpasses 25,000 Downloads

This bibliography has been updated to include approximately 600 papers referencing Micromeritics instruments published since January.

For those interested in the physical characteristics of powders and solids for fundamental research, product development, quality assurance and control, production, or process control applications, this bibliography is an indispensable tool.

In this series of peer-reviewed papers, various particle characteristics such as surface area, particle size, pore volume, pore size, absolute density, envelope density, bulk density, catalytic activity, and active surface area are determined for a wide variety of materials. Each of these technical papers references one or more Micromeritics products. The list by no means represents a complete and exhaustive search of the literature, but includes

those papers that are available from various sources on the Internet.

We have often been asked for references to papers in which a scientist uses a Micromeritics instrument to study the same or similar materials as the new user intends to study. This document will satisfy that need. It also serves as a powerful reference resource for those engaged in particle characterization.

Pulse Chemisorption with AutoChem II 2920: Isopropylamine on Zeolites

Andrew D'Amico

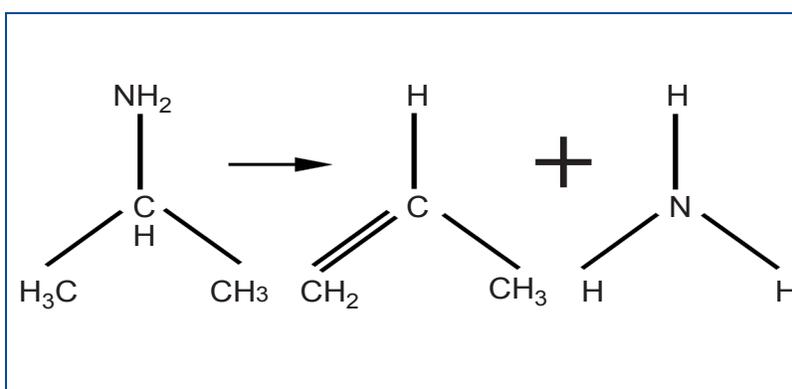
Introduction

Several ZSM-5 zeolite samples were analyzed using the AutoChem II 2920. By pulsing isopropyl amine onto the zeolites, the concentration of acid sites can be determined for a particular zeolite. This is very important for catalytic reactions. For example, the reaction that occurred during these analyses proceeded through an intermediate due to an acid-base reaction between the amine and the zeolite, followed by a specific type of E2 elimination, known as the Hoffman elimination. Due to the second order kinetics involved in this reaction, a high concentration of acid sites would allow the reaction to proceed much more quickly.

Preparation

While there was no preparation of the sample as far as degassing is concerned, it could be said that the sample was 'prepared' by heating. The ZSM-5 samples contained various cations, including ammonium (NH_4^+). These cations were not as desirable for the analysis as the hydrogen cation (H^+). Since samples containing the hydrogen cation are more expensive, the sample can be converted to the hydrogen cation

The Hoffman elimination reaction:



Materials:

The samples used are listed below.

Zeolite Type	$\text{SiO}_2 / \text{Al}_2\text{O}_3$
ZSM-5-30	30
ZSM-5-55	50
ZSM-5-80	80

by heating the sample to high temperature. These samples were 'prepared' by first being heated to $500\text{ }^\circ\text{C}$ and then cooling back to $200\text{ }^\circ\text{C}$.

Analysis

The preparation part of the analysis was followed by the pulse chemisorption step of the analysis. During this step, there

were twenty loop injections of isopropylamine occurring at four-minute intervals. The last part of the analysis involved a temperature-programmed desorption (TPD). At this step in the analysis, the mass spectrometer began scanning for propylene, the product of interest. Data were collected during a temperature ramp to $500\text{ }^\circ\text{C}$.

Data

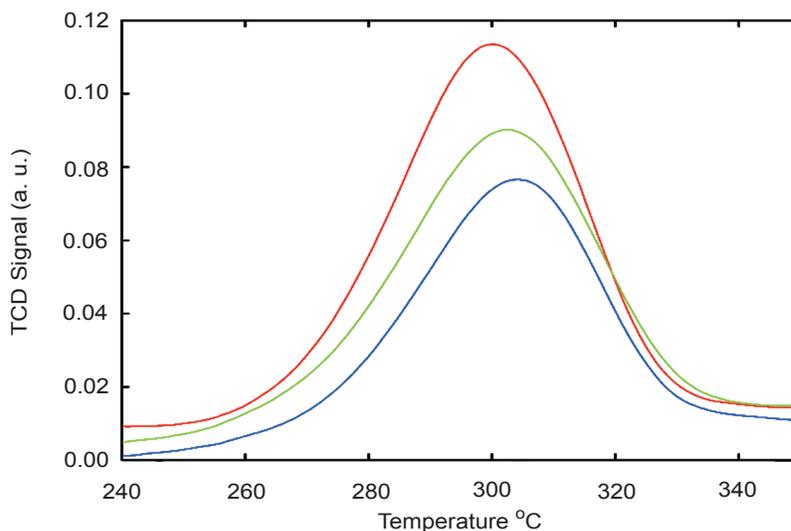
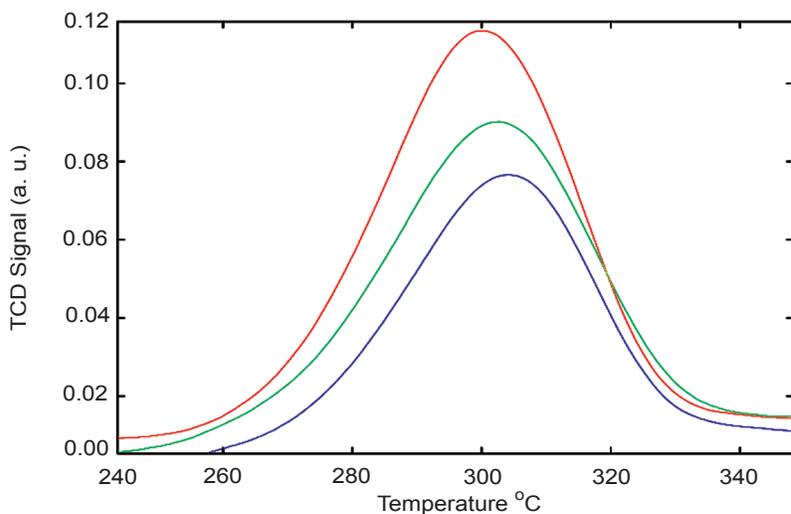
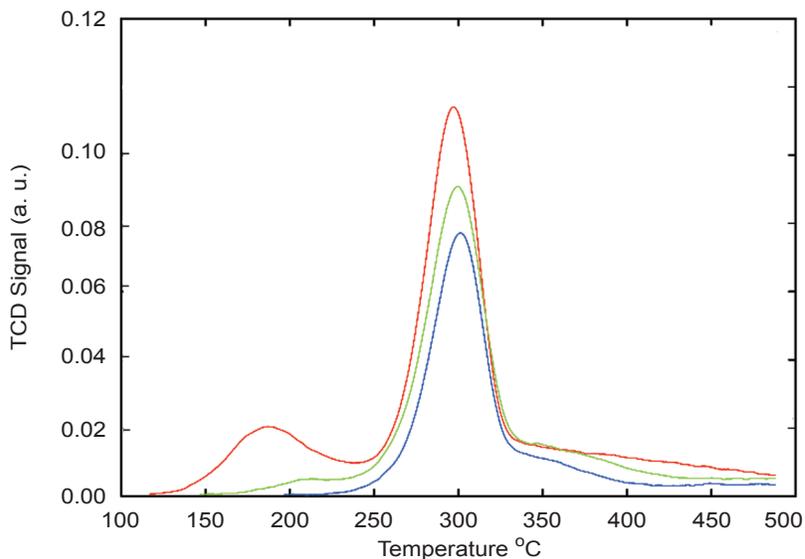
These graphs show how the intensity of the TCD signal changes for various zeolite samples. Notice that a direct proportionality exists between the peak intensities and the concentration of aluminum oxide (Al_2O_3), and an inverse proportionality exists between the peak intensity and the silica-to-aluminum oxide ratio ($\text{SiO}_2/\text{Al}_2\text{O}_3$).

Legend:

ZSM-5-30	
ZSM-5-55	
ZSM-5-80	

Attention Authors

We welcome articles and information concerning particle technology applications performed with Micromeritics instrumentation. See the back page for further information.



What's New at MAS

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.

In keeping with our mission statement, MAS has a new shipping address (One Micromeritics Dr., Suite 200, Norcross, GA 30093) that will allow us to quickly and efficiently receive your important samples. Samples are now received at our front door by our lab coordinator, who is ultimately responsible for booking the samples into the LIMS and starting them on their journey through the lab. The time savings for your samples could be as much as one entire day.

MAS is pleased to offer average primary particle size analyses for those working with dried or aggregated nanoparticles. The analysis method is based on knowledge of the particle shape and measurement of the surface area, density, and mass of the sample. The part number for this new testing service is 005 – 70 and the cost is \$235 per sample. Reports will include the measured BET surface area, true density of the material, and the calculated average particle diameter. For more information, download the nanoparticle size poster at www.particle-testing.com/downloads.

In the coming months, MAS plans to offer particle shape analysis and nanoparticle size by dynamic light scattering. Look for information on the web site, www.particle-testing.com.



Look for Micromeritics Analytical Services at these upcoming events and meetings:

American Chemical Society - Fall 2007
August 19 - 23
Booth 1007
Boston Convention Center
Boston, MA

American Council of Independent Labs
October 13 - 16
Annual Meeting
Intercontinental Hotel
Atlanta, GA

ALMA 28th Annual Conference
November 7 - 9
Wyndom St. Anthony Hotel
San Antonio, TX

Micromeritics Analytical Services is pleased to introduce three new employees.



L to R

Yanette Cunningham, B.S. Chemical Engineering, is responsible for chemical adsorption analysis which includes the AutoChem 2920 and ASAP 2020 Chemisorption instruments.

Shanita Jones, B.S. Chemistry, is our new lab coordinator who is responsible for receiving, invoicing, and storage of samples and analysis results.

Luminita Dudu, B.S. Chemistry, is responsible for measuring gas adsorption isotherms and BET surface area analyses.

Micromeritics Instrument Training Courses

Training is provided for most Micromeritics instrumentation at the time of installation. This training presents all the information required for a new operator to quickly become proficient operating the instrument. In cases where personnel changes occur or more advanced training is required, Micromeritics conducts a variety of classes for many of our instruments. These courses are held at our headquarters in suburban Atlanta, Georgia. The courses include:

Detailed Operational Procedures

Items covered are effective sample file creation, use of analysis parameters, and manual sample entry. You'll learn how to utilize the full power and flexibility of the operating software.

Automatic Analysis

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

Systems Utilities

Discover all of the instrument software utilities which help you manage sample information files and directories, protect data, and select system options.

Troubleshooting

Learn techniques that enable you to locate and quickly resolve instrument problems.

Report Generation and Comprehension

Learn to configure reports and obtain more useful information, as well as improve comprehension of the reports produced.

User Maintenance

Practice routine maintenance procedures which improve operation, reduce downtime, and increase data accuracy.

Theory Overview

Learn about the scientific theory upon which each instrument is based and how it applies to the critical factors relevant to successful sample preparation and analysis performance.

Enrollment

Training courses last from 2 to 4 days and are designed to provide hands-on, performance-based instrument knowledge. Small classes guarantee close individual attention. Included in the course materials are a Study Guide, an instrument Operator's Manual, and other handout materials. Certificates of Completion are also awarded to all trainees.



Students attending a recent training course: (L to R)

Trainer Mack Spivey
John Fomica
Leonel Sierra
Devon Preston
S.C.V. Moorthy

Training 2007

AutoChem 2920
August 7 - 9

Saturn DigiSizer 5200
August 21 - 23

ASAP 2420
August 28 - 30

AutoPore IV 9500 Series
September 11 - 13

TriStar
September 18 - 20

ASAP Physisorption and Chemisorption
October 16 - 19

ASAP 2020 Physisorption
October 16 - 18

For additional information or to register for the class of your choice, contact the Micromeritics Training Department at 770.662.3607. Early registration is recommended since class space is limited.

See our website for a complete course schedule.

www.micromeritics.com

Events

20th Interphex - Japan

June 20 - 22, 2007
Tokyo Big Site
Tokyo, Japan

Ninth International Workshop on Physical Characterization of Pharmaceutical Solids

June 24 - 30, 2007
Crown Plaza
Boston, MA

International Carbon Conference

July 15 - 20, 2007
Sheraton Hotel and Towers
Seattle, WA

American Chemical Society

August 19 - 23, 2007
Boston Convention Center
Booth 1007
Boston, MA

Pacific Coast Catalysis Society

September 8, 2007
University of Washington
Seattle, WA

M. S. & T. 2007

September 16 - 20, 2007
Cobo Center
Detroit, MI

See our website for a complete Event schedule www.micromeritics.com

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.

Send your article to:
James Kerce, Editor
The microReport
MICROMERITICS
One Micromeritics Drive
Norcross, GA 30093-1877
james.kerce@micromeritics.com

Include your title, return address and phone number. Contributions cannot be returned, but each will be acknowledged.

How To Reach Us

Micromeritics offers over 50 sales, service, and distribution offices throughout the world. For additional information, a free product demonstration, or the location of the office nearest you, call or write:

HEADQUARTERS:

Micromeritics Instrument Corporation
One Micromeritics Drive
Norcross, GA 30093-1877
USA
Telephone:
U.S. Sales (770) 662-3633
International Sales (770) 662-3660
Fax: (770) 662-3696
WEB: www.micromeritics.com

SUBSIDIARIES:

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
Tel: (+86) (0)10-6848-9371
Fax: (+86) (0)10-6848-9371

Micromeritics Shanghai China
Room 15M, J Building, Ladoll International
No. 831 XinZha Road, JingAn District,
Shanghai 200041, CHINA

Micromeritics France S.A.
Parc Alata
Rue Antoine Laurent Lavoisier
60550 - Verneuil en Halatte, FRANCE
Tel: (+33) (0)33-3-44-64-6080
Fax: (+33) (0)33-3-44-64-6089

Micromeritics GmbH
Erftstrasse 54
D-41238 Mönchengladbach, GERMANY
Tel: (+49) (0)2166-98708-00
Fax: (+49) (0)2166-98708-88

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

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

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

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Micromeritics
One Micromeritics Drive
Norcross, GA 30093-1877, U.S.A.

