CHEMISORB AUTO

Essential chemisorption, ultimate value

micromeritics.com/products/chemisorb-auto

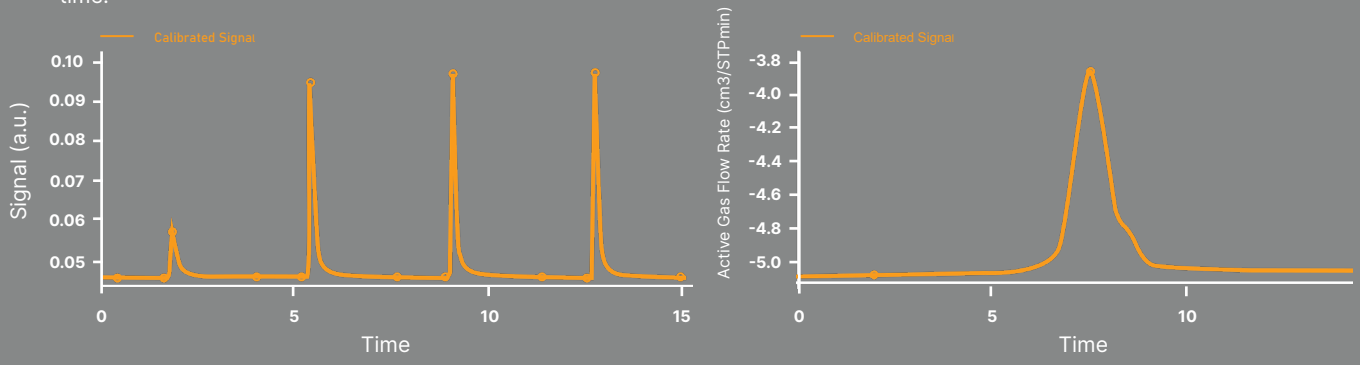
micromeritics®

ChemiSorb Auto
Results no rival can match

ChemiSorb Auto is redefining routine chemisorption analysis with a compact, automated benchtop solution that delivers high-performance results—without the complexity or cost of traditional systems. Designed for labs that demand reliability and efficiency, ChemiSorb Auto empowers researchers in both academic and industrial settings to qualify catalysts and conduct TPx experiments with confidence.

Reliable Results You Can Trust

Engineered for consistent, high-precision performance, ChemiSorb Auto ensures repeatability within ±1% and delivers near-instantaneous detector response thanks to its minimal void volume. Whether you're performing routine analyses or advancing heterogeneous catalysis research, you can count on accurate temperature profiles and dependable data every time.



Effortless Operation

From setup to results, ChemiSorb Auto is built for simplicity. Load your sample, initiate the test, and walk away in under five minutes. Its intuitive MicroActive software streamlines workflows for users of all experience levels, eliminating operator error and freeing up valuable lab time.

Chemisorption Catalyst Characterization

Chemisorption is a surface-specific process where adsorbate molecules undergo chemical reactions with solid surfaces, forming strong, often irreversible bonds through electron sharing. This high-energy interaction is essential for catalyst characterization, offering insights into activation temperatures, available surface metal, site strength, and performance across redox cycles. Available tests:

01

Temperature Programmed Reduction (TPR)

- Catalyst activation behavior
- Max reduction rate
- Quantitative hydrogen consumption

02

Temperature Programmed Oxidation (TPO)

- Evaluate catalyst regeneration
- Characterize carbon deposits
- Study redox properties

03

Temperature Programmed Desorption (TPD)

- Characterize acid and base sites
- Isosteric heat of adsorption
- Evaluate binding affinity

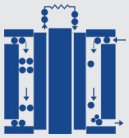
04

Pulse Chemisorption

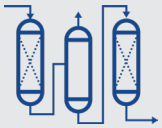
- Number of active sites
- Metal dispersion
- Active metallic surface area
- Crystallite size

Relevant Applications

CATALYSTS FOR:



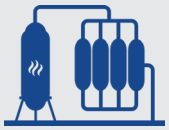
FUEL CELLS



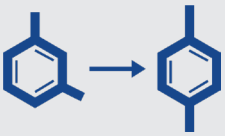
HYDROCRACKING

WATER-GAS SHIFT

FISCHER TROPSCH



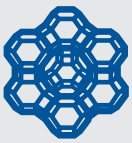
REFORMING



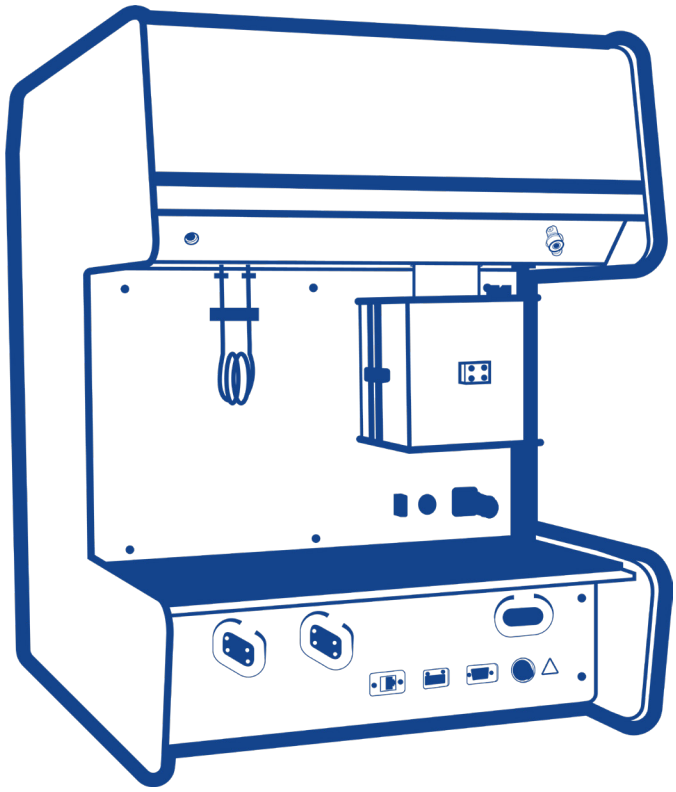
ISOMERIZATION

PARTIAL OXIDATION

HYDROGENATION



CATALYTIC CRACKING



CHEMISORB AUTO
FEATURES

LEARN MORE →

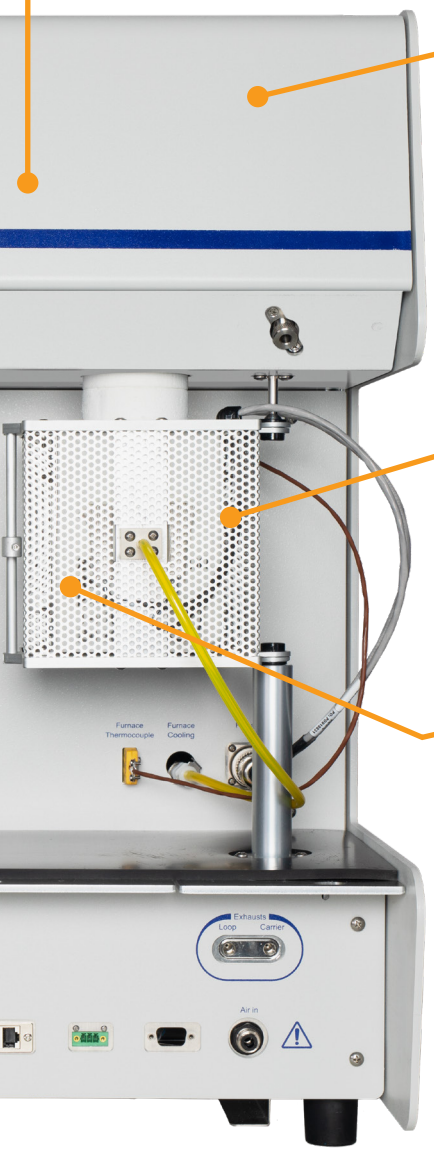
Loop Pressure Measurement
Exact quantities of gas dosed to the sample are known, ensuring repeatability within +/-1%.

Patented Blending Valve
Allows precise gas blending and multi-point automatic gas calibrations.

8 Total Gas Inlets
Four each for carrier and loop gases fed to the system with two high-precision mass flow controllers.

3rd Party Safety Tested and Approved
CE Certified with NRTL marking and CB scheme validation, ensuring high quality and operator safety.

Minimal Internal Gas Volume
Assures high resolution, fast detector response, and reduces error when calculating gas volumes.



Highly Sensitive Linear Thermal Conductivity Detector (TCD)
Assures the calibration volume remains constant over the full range of peak amplitudes so the area under the peak is directly proportional to the volume of gas reacted.

Forced Air Cooling
Cools the furnace temperature rapidly down to near ambient (500°C to 50°C in 30 minutes), reducing analysis time and increasing throughput.

Dynamic Clamshell Furnace
Provides temperature control up to 1000°C and controlled heating from 1 to 100°C at a linear rate with minimal temperature overshoot.

OPTIONAL ACCESSORIES

Mass Spectrometer

Provides a direct probe for the identity and quantity of specific reation products. Includes heated transfer line, trigger cable for remote data acquisition, and data recording / integration with MicroActive software.

Zeolite Trap

Replaces the cold trap, avoiding the need to create slush baths. Hydrophillic zeolite in a U-tube is placed in-line between the sample and the TCD, adsorbing all water vapor produced during catalyst reduction.

Cryocooler

Enables the start of an analysis at sub-ambient temperature, dow to -100ºC

MicroPrep

Used to outgas the zeolite trap in-situ, fully regenerating it after saturation from sample prep and TPR experiments.

BET Option

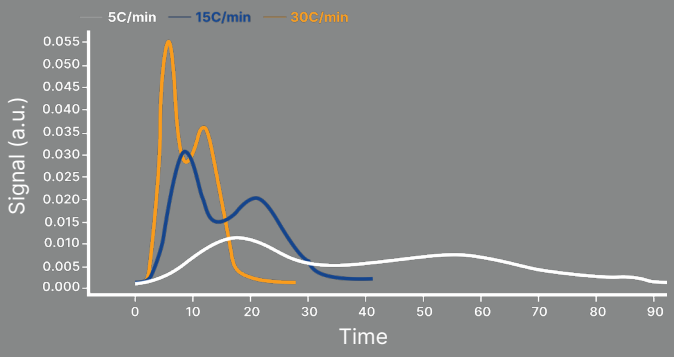
Allows for in-situ BET surface area measurements.

Software / Intuitive MicroActive

Move quickly from data to decision

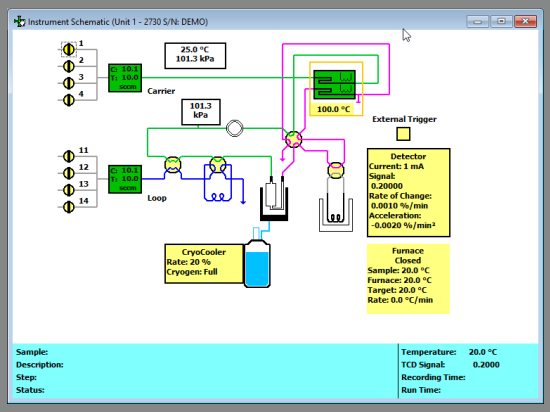
Rapidly transition from experimental data to material characteristics with Micromeritics' own MicroActive data analysis software. Get all the answers you need with:

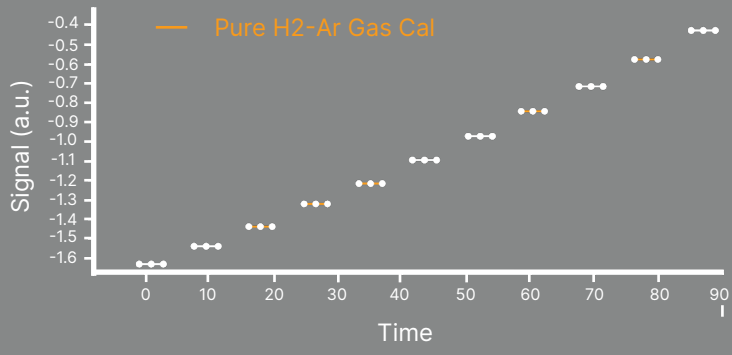
- Interactive peak analysis including: limit selection, baseline definition, integration, and deconvolution
- Built-in analysis models for pulse chemisorption, % dispersion, metal surface area, crystallite size, first order kinetics, heat of desorption, activation energy, BET surface area, and more
- Seamless integration of mass spec data
- Detailed, configurable graphical reports
- Automatic file exporting for data management



Program what you envision, visualize what you have programmed

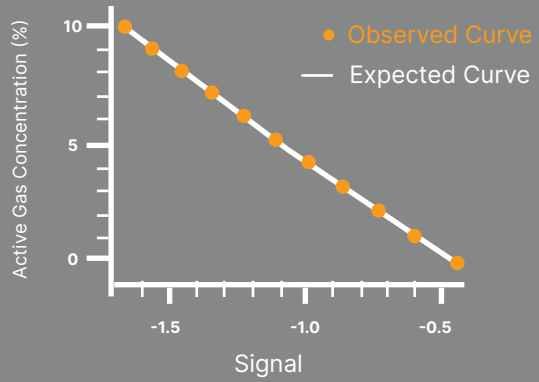
The new MicroActive method editor features an intuitive process illustration that shows the programmed state of the instrument at every step of the method so you can see that your method matches your vision.





Automatic Gas Calibration

Determining the active gas concentration in the mixture with an automatic calibration procedure is a breeze. ChemiSorb Auto will automatically mix the inert gas feed from the carrier MFC with the active gas feed from the loop MFC via the patented blend valve. This is done in a stepwise function across a range of concentrations, allowing the user to apply the saved calibration to a variety of sample data sets. Linear and polynomial fits are applied to the curve with correlation coefficients >0.995.



Specifications

ChemiSorb Auto	
Temperature	Ambient to 1000°C
	-100°C to 1000°C with CryoCooler
Temperature Ramp Rates	-100°C to 400°C: up to 100°C/min
	400°C to 600°C: up to 50°C/min
	600°C to 800°C: up to 25°C/min
	800°C to 900°C: up to 10°C/min
	900°C to 1000°C: up to 5°C/min
Carrier Gases	4 inlets: H_2, O_2, He, Ar, H_2/Ar, and more
Analysis (loop) Gases	4 inlets: He, H_2, CO, O_2, N_2O, NH_3/He, and more
Analysis Types	Pulse Chemisorption
	Temperature-programmed reactions: TPR, TPO, TPD, TPSR
	Strong Chemisorption: Reactive metal area, dispersion, crystallite size
	Active site surface concentration
	Reduction, Oxidation Temperatures
	Acid site strength distribution: Lewis/Brønsted acid site distribution
	Breakthrough Curve Measurement
	Activation Energy
Optional Capabilities	Detection by Mass Spec
	B.E.T. Surface Area

Patented Blend Valve: Pat No. 10,487,954

Service / Support

Comprehensive Service & Support

With over 10,000 installations worldwide and 60+ years of experience, Micromeritics delivers trusted, ISO-9001 certified service solutions to maximize instrument uptime and performance.

- **1-Year Parts & Labor Warranty**
- **Preventive Maintenance & Repairs**
- **Global Network of Certified Engineers**
- **Reduced Cost of Ownership**
- **User Training for Optimal Operation:**

We support your instruments throughout their full life cycle—on-site or at our factory—ensuring reliable performance and peace of mind.

Expert Application Support
Our team of scientists and engineers provides world-class application support and training to help you get the most accurate, insightful data from your instruments—every step of the way.

Particle Testing Authority (PTA)
Need advanced material characterization? Our ISO 17025-accredited, FDA-registered PTA lab offers:

- **25+ Analytical Techniques**
- **7-Day Typical Turnaround**
- **Globally Recognized Experts:**

Access cutting-edge instruments and expert guidance to supplement your lab or develop new methods.

SCAN QR CODE FOR
MORE INFORMATION

Micromeritics products are 3rd party tested to conform to the highest level of compliance and safety.

Malvern Panalytical
a spectris company

micromeritics®
a Malvern Panalytical company

SciAps
a Malvern Panalytical company

a powerful combination