ALTAMIRA INSTRUMENTS

AMI PHYSISORPTION SERIES

PRODUCT

Altamira Instruments

Introduction

Altamira Instruments (AMI) was founded in Pittsburgh, Pennsylvania, in 1984 and was founded by three professors in catalysis at the University of Pittsburgh.

Since its inception, AMI has been committed to providing high-quality characterization equipment in the field of catalysts and powder science and technology.

In 1985, AMI developed the world's first fully automatic temperature programmed chemisorption analyzer AMI-1. After several generations of iterated product updates over the past 40 years, a variety of technical modules have been developed. On the basis of the chemisorbent analyzer, different modules, such as Fourier in situ infrared, SSITKA, high pressure analysis, programmed temperature vulcanization, can be freely selected to form solutions for different application scenarios.

The AMI-300 series of fully automatic programmed chemisorption analyzer, BenchCAT micro-reactor system and high-throughput catalyst screening system can be customized according to user requirements. Customized products are suitable for a wider range of analysis and research. From the pressure range of the analysis station to the number of analysis stations to the special functions of the instrument control software, AMIs can meet the more stringent requirements of users in the use of the instrument.

In 2018, AMI advances into physical adsorption instruments market and introduced a high-precision physical adsorption instruments that can accurately measure the micropore size distribution of samples. Subsequently, a physical adsorption instruments for rapid detection was introduced, and the specific surface area of four samples could be detected in up to 40 minutes. The AMI physical adsorption instruments has a very high testing speed, and the error of sample data reproducibility has reached an advanced level of less than or equal to 1%.

As a result, AMI has become a leading professional manufacturer in the field of adsorption characterization of solid materials and catalysts.

Typical customers of AMI services are Stanford University, Carnegie Mellon University, University of Michigan, National Res Energy Lab (NREL), Oakridge Nat Labs and other top global universities, as well as international industry giants such as GE, HP, Dow Chemistry, British Petroleum, Exxon Mobil. It covers many different fields such as energy and chemical industry, environmental protection, batteries, catalysts, medicine, advanced materials and so on.

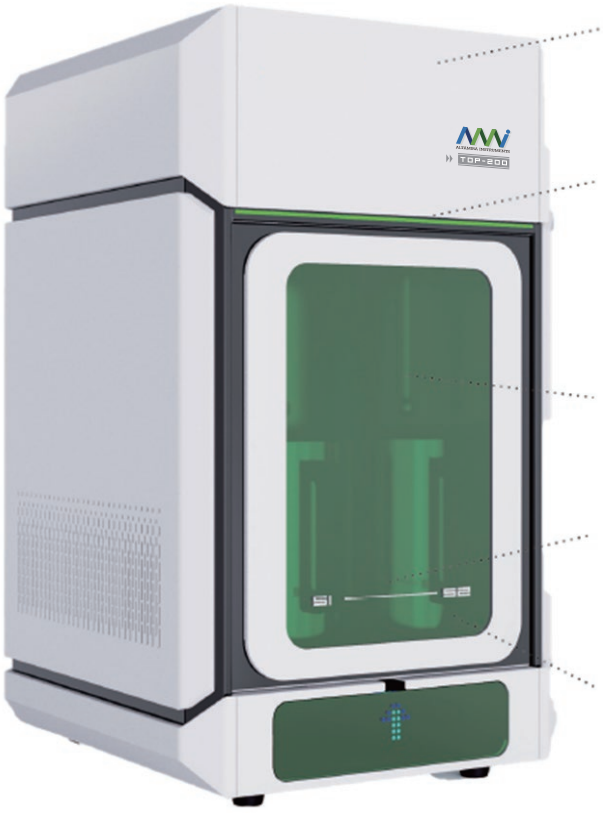
For the global market, AMI works closely with professional adsorption characterization industry distributors in various countries to provide them with perfect service and after-sales support capabilities through professional training. AMIs currently have service centers in these countries: Germany, Canada, the United Kingdom, Italy, China, Mexico, Brazil, India, Thailand, South Korea, Singapore, and so on.
AMI will customize these instruments to meet your exact research needs today.

AMI will customize these instruments in the future to meet your changing research needs.

TOP 200 Extensible multi-stations gas adsorption analyzer

AMI has re-incorporated many of the technical advantages of the adsorption field and launch the TOP 200 Extensible multi-stations gas adsorption analyzer. TOP 200 gas adsorption analyzer is compact and powerful, and can accurately test micropores, mesopores and surface area to study the adsorption behavior of different adsorbates at different temperatures.

TOP series of instruments have a completely new internal structure, enabling the full independence of different analysis stations. At the same time, four analysis stations can complete four different gas adsorption experiments. The four stations can start the experiment separately and complete the experiment independently without waiting for each other.



Multi-optimized manifold provides optimal dead volume and stable vacuum performance, and helps obtain the most reliable analytical results.

Each analysis station is equipped with a separate three-stage sensor to ensure the smallest system dead volume during balancing, improving the stability and balancing speed of test results.

Sample tube and P0 tube are equipped with isothermal jacket, liquid nitrogen surface control accuracy is better than 0.1mm.

Multiple analysis stations, which can be independently controlled.

Large-capacity high-vacuum Dewar flask with a thermal insulation time of more than 70 hours ensure the need for ultra-long analysis of micropo-rous samples

TOP 200 Extensible multi-stations gas adsorption analyzer

Basic performance parameters

Specific surface area:
>0.0001m^2/g

Pore size:
0.35nm - 500nm

Power:
110~220V, 50/60Hz

Pressure Sensors

Pressure resolution: 10^{-8} torr
Pressure sensor: 1000torr 10torr 1torr/0.1 torr
Number of pressure sensor: Each analysis station has a separate three-stage pressure sensor

Vacuum System

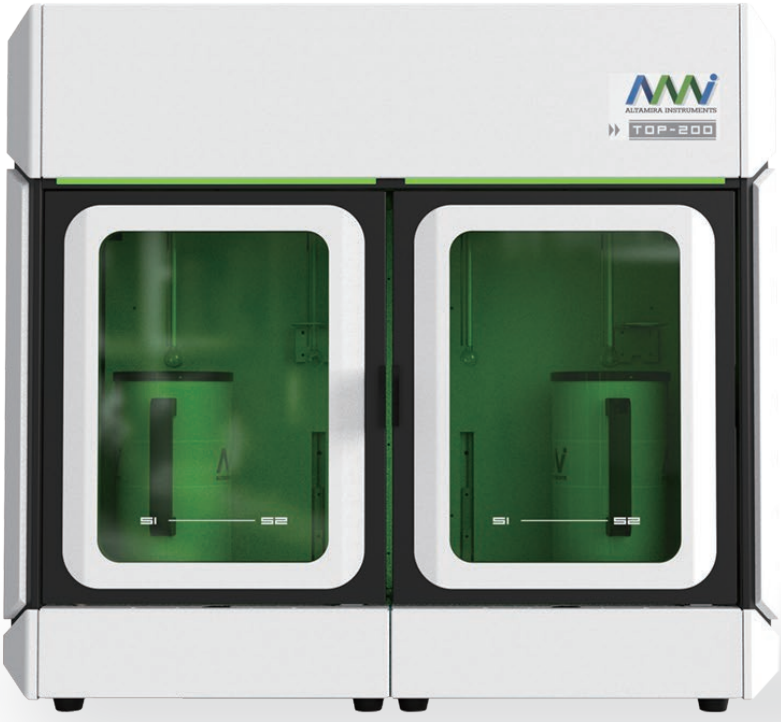
Minimum relative pressure: 10^{-8}, some samples are reached 10^{-9}.
Manifold: Multi-optimized design to provide the most suitable dead volume
Flexible vacuum configuration:
Mechanical oil pump is standard. It can be upgraded to an independent turbomolecular pump for each analysis ports.

Number of Analysis ports

Optional configuration: Two or four Analysis ports
Elevator: Each analysis station is equipped with a separate elevator

Design of P_0 tube:

Material: stainless steel
Independent P_0 for each analysis ports



Independent analysis testing

True independent analysis for each station.
Simultaneous determination of gas adsorption capacity at different analysis stations

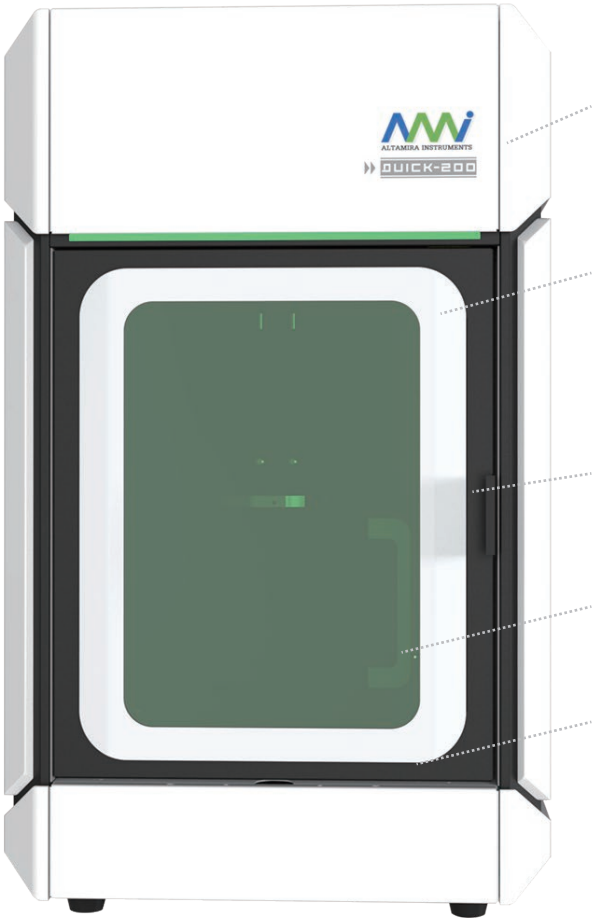
Optional steam absorption parts

Steam sorption components can be selected to complete the steam sorption test

Quick 200 multi-stations surface area analyzer

Quick series gas adsorption analyzer continues the many advantages of TOP, compact body, very small dead volume, stable vacuum, excellent cold bath liquid surface constant technology, is the best choice for research and development, quality control.

QUICK series instruments perform better in the scene of rapid detection of large quantities of samples. The instrument mainly detects the specific surface area of the sample and the pore size distribution over 2 nm. It can also detect the adsorption capacity of the sample to specific gases. The instrument is designed with a four-station common Dewar bottle to ensure no error in parallel tests and more stable test results



Multi-optimized manifold provides optimal dead volume and stable vacuum performance, and helps obtain the most reliable analytical results.

Each analysis station is equipped with a separate three-stage sensor to ensure the smallest system dead volume during balancing, improving the stability and balancing speed of test results.

Sample tube and P0 tube are equipped with isothermal jacket, liquid nitrogen surface control accuracy is better than 0.1mm.

4 or 8 Analysis ports to choose

Large-capacity high-vacuum Dewar flask with a thermal insulation time of more than 70 hours ensure the need for ultra-long analysis of micropo-rous samples

Quick 200 multi-stations surface area analyzer

Basic performance parameters

Specific surface area:
$>0.0001 m^2/g$

Pore size:
2nm - 500nm

Power:
110~220V, 50/60Hz

Pressure Sensors

Both the main road and the branch are equipped with 1000torr sensors.

The number of sensors:

Four stations are equipped with 6 1000torr and 8 stations are equipped with 12 1000torr pressure sensors.

Vacuum System

Manifold: Multi-optimized design to provide the most suitable dead volume

Vacuum configuration:

Mechanical oil pump is standard.

Number of Analysis ports

Optional configuration: 4 or 8 Analysis ports.

Elevator: Each-four analysis station is equipped with a separate elevator

Design of P0 tube:

Material: stainless steel

No. of P0 stations: 1-2

Every four analysis stations that share one Dewar bottle share the same P0 tube to improve the use efficiency of P0 tube

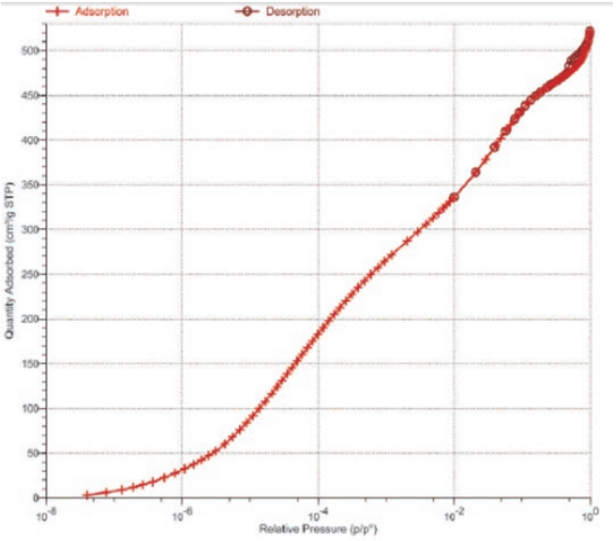
Multi-stations Filled Gas Device

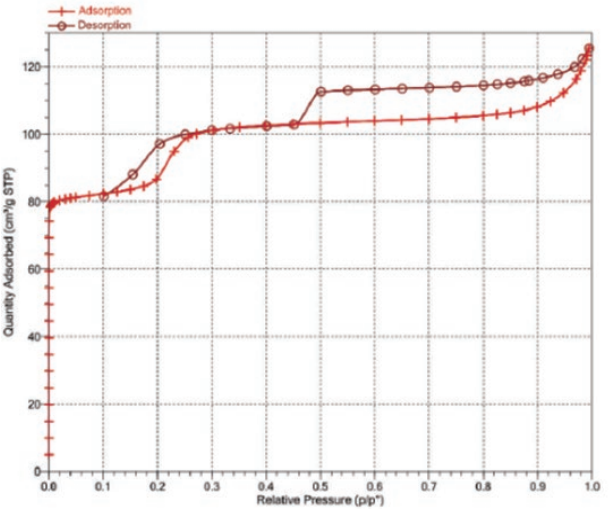
The device is optional. The air intake device can be automatically controlled by the instrumentation software to achieve the intake of many different gases. Remove the hassle of frequently switching gases

AMI Physisorption Software

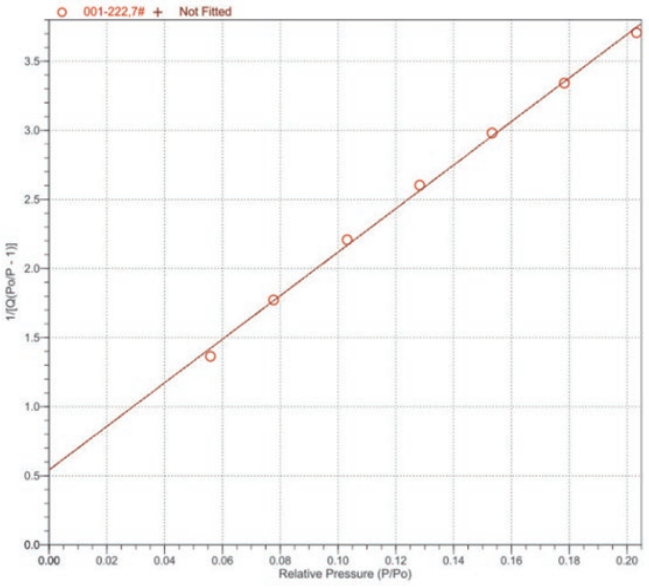
The analysis results for the top and quick series are included:

Isotherm curve
BET (Brunauer, Emmett, and Teller) surface area
Langmuir surface area
t-Plot
Alpha-s method
The BJH (Barrett, Joyner, and Halenda) method
Dollimore-heal adsorption and desorption curve
Horvath-Kawazoe (H-K)
The MP method
DFT
NLDFT
Dubinin-Astakhov (D-A)
Dubinin-Radushkevich (D-R)
Summary reports
Custom reports
Calculation model for heat of adsorption





Whether it's a complex multi-stage tunnel structure or an oversized ratio surface area, TOP and A can provide excellent responses



Lithium battery positive material than surface test report

BET surface area report
BET surface area:
0.26700±0.00053m2/g
C: 30.054609
Correlation Coefficient: 0.9989853

Specification

	TOP200		QUICK200	
Analysis port(s)	2	4	4	8
p0 Port(s)	2	4	1	2
Number of micropore analysis stations	UP TO TWO	UP TO FOUR	NONE	NONE
Adsorbates	N_2 , Ar, Kr, H_2 , O_2 , CO_2 , CO, NH_3 , CH_4 , etc.			
Surface Area Range	0.0001 m^2/g to unknown upper limit; Measurement accuracy (standard sample) ≤ ± 1.0 %			
Pore Size Range	0.35 nm – 500 nm(Options) Repeatability: ≤ 0.2 nm in mesopore range and ≤ 0.02 nm in micropore range		2nm – 500 nm(Options) Repeatability: ≤ 0.2 nm in mesopore range and ≤ 0.02 nm in micropore range	
Minimum Pore Volume	0.0001 cm^3/g			
Pressure Sensors (Individual sensor systems for each analysis port can be selected)	1000 Torr, 10 Torr(Options) and 1 Torr(Options) or 0.1 Torr (Options), one extra 1000 Torr for p0 determination		Four high precision 1000torr sensors for analysis ports. extra 1000 Torr for p0 determination	
Pressure Sensor Accuracy	± 0.15 % (Full Scale)			
Degassing Stations	2 in-situ	4 in-situ	Standard independent four-station degassing station	
Degassing Temperature	Room temperature to 400 °C (optional 500 °C), accuracy 1 °C		Room temperature to 400 °C (optional 500 °C), accuracy 1 °C	
Vacuum System	Standard mechanical oil pump (ultimate vacuum 10^{-3} Pa), optional turbo molecular pump (ultimate vacuum 10^{-8} Pa)		Standard mechanical oil pump (ultimate vacuum 10^{-3} Pa)	
Independent vacuum system for each analysis port	√ (Options)	√ (Options)	NONE	
Temperature Requirements of Environment	15 – 40 °C			
Humidity Requirements of Environment	10 % – 90 %			
Power Requirements	110-220 V , 50/60 Hz, maximum power 300 W, current 5 A			
Steam absorption	√	X	X	X
Independent Intake Gas System for Each Analysis port	√ (Options) multiple different adsorbates can be tested simultaneously		NONE	

Software features

More concise:

1. Template test, no need to set experiment condition repeatedly

2. Automatically post-test free space, reduce experiment error and increase test speed

3. Degassing stations can be controlled and safety monitoring is provided without manual duty

4. Constant pressure test, new adsorptive measurement function of finger pressure point, to get measurement result more quickly and accurately

5. Real-time monitoring of data results, checking test progress and adsorption results at any time

More secure:

1. The software can monitor the temperature of heating pack in degassing station and provide safety protection function.

2. The software can record the control flow in the process of the experiment and provide the basis for the analysis and diagnosis of abnormal data.

Modular manual control, with only one click, can complete vacuum pumping, backfill and other operations. No need to switch valve manually

More powerful:

1. Adsorption kinetics test (quantitative test): The software can automatically calculate the function of adsorption kinetics data. The adsorption kinetics of Adsorbates at a partial pressure can be calculated and the diffusion performance of adsorbates in adsorbents can be studied.

2. Calculating the isothermal adsorption heat: The software can calculate the adsorption heat. The heat generated by the adsorption process can be used to measure the strength of the adsorbent.

3.BET Rouquerol plot: Based on the filtering method proposed by Rouquerol, it helps to quickly obtain the appropriate p/p0 selection range. BET selection of microporous materials can be assisted by dragging and dropping.

4. overlay function: can achieve the comparison of multiple sets of experimental data, and export the data in the form of excel at the same time, for easy comparison, summary, processing of data.

5.NLDFT Model: Multiple NLDFT models are embedded in the software to provide more convenient and comprehensive micropore structure analysis functions

Accessory Parts:

Degasser:

Vacuum degasser: Prep J4
Degassing position: 4
Degassing temperature: room temperature ~ 400 C, control precision (+) 1 C, each degassing position can be set a different degassing temperature.
Anti-pumping: Each degassing position is equipped with a separate anti-pumping unit, which is integrated with the card head.

Multi-stations Filled Gas Device

Multistations Filled Gas Module: Multistations Filled Gas Module is an extended device that allows the instrument to selectively test in a variety of gases.
Fully automatic control: you can select the desired gas through the software;
Enhance the sealing effect: the intake module centrally connects the gas to reduce the leakage point;

Vacuum plug

The patented sealing technology used in combination with the vacuum plug and the test instrument, when transferring the sample tube, does not need to worry about the air impurities re-contaminating the sample, ensures the repeatability of the test results for many times, and improves the efficiency of the experiment. The vacuum plug is equipped with a sintering filter. When the sample is pumped, only the vacuum plug needs to be blown, eliminating a series of tedious operations such as disassembling the instrument to clean the pipeline, saving time and effort.

Isothermal jacket

The isothermal jacket fills the liquid nitrogen with a siphonic effect and wraps the sample tube. Equipped with isothermal jackets, the maximum stability of cold free space can be maintained, restoring the true test results.

Densi100 Automatic True Density Analyzer

1. Instruments name: Automatic True Density Analyzer;

2. Test function: True density, True volume, Open/Closed porosity;

3. Test accuracy: Test accuracy better than ±0.03%, Repeat accuracy is better than ±0.02%;

4. Test resolution: 0.0001g/ml;

5. Test principle: Gas expansion replacement method; positive pressure injection method;

6. Test gas: helium(or Nitrogen);

7. Test efficiency: about 3 min/one test, and the number of repeated tests can be customized;

★8. Test mode: 5 test modes are built in the software.including: Pellets, Powder, Fine Powder, Foam and Customize. (air intake volume can be customized;

★9. Test pressure: Positive pressure gas injection test, range 0-150kPa. Users can customize the maximum pressure for testing;

10. Test temperature range: Ambient temperature. Configure a temperature sensor to monitor the experimental temperature in real time, which can be viewed on the display screen and the experimental report;

11. Sample Cell: Upper Entry Sample Test Cell. Standard 100ml or 10ml sample test cell and standard calibrator. The 100 ml sample cell can be changed to 10 ml or 35 ml sample cell with accessories. The 10 ml sample cell can be changed to 1 ml or 3.5 ml sample cell with accessories

12. Sample types: various solid samples, such as powder, granule, block, foam, etc.;

13. Control and analysis system system: Adopting a modular structure movement, LCD touch screen built-in special software for operation control system and data processing. The all-in-one design does not require a computer;

★14.Data reading method: Mini printer, and digital display, and U disk

15. Specifications: length 38*width 28*height 28cm, weight about 10kg; 110-220V , 50/60HZ, maximum power 100W.

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