

# High-Throughput Surface Area and Pore Size Analyzer





# // Sync Series

## Specific Surface Area and Pore Size Analyzer



4-Station  
Version



**8** stations

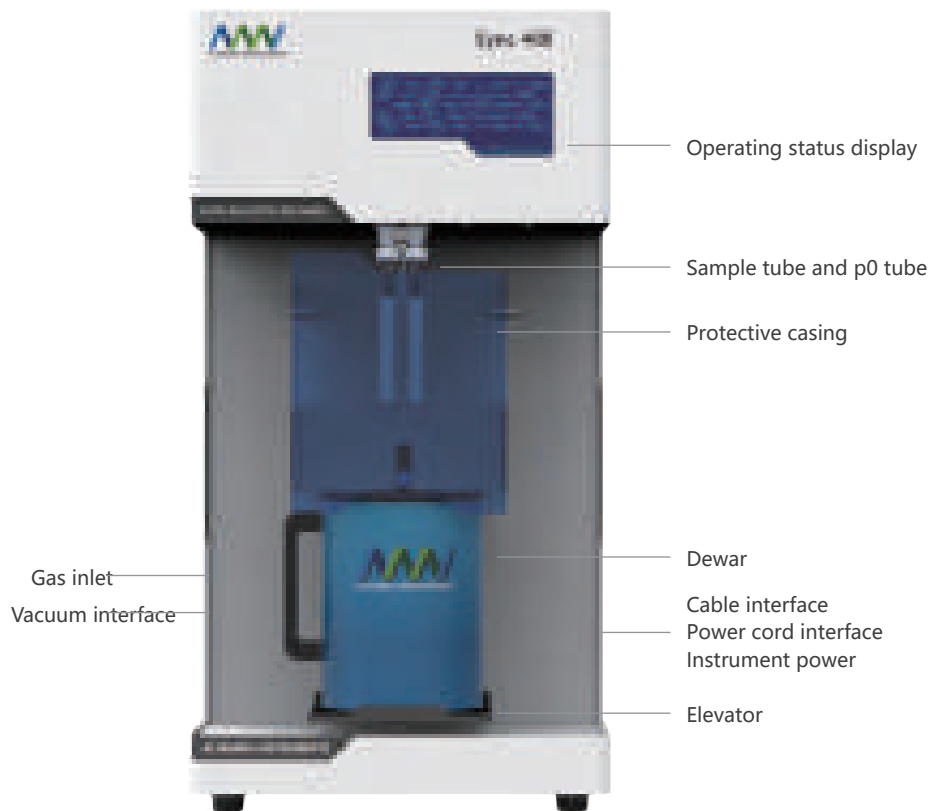


**12** stations

# Overview

The Sync Series of surface area and pore size analyzers are the latest instruments introduced by AMI for characterizing the surface properties and pore structure of meso to micro-porous materials.

The Sync Series utilizes the static-volumetric gas adsorption method to analyze the adsorption behavior of materials. During testing, all sample stations share the same Dewar and gas source, ensuring high accuracy and repeatability while eliminating differential analysis between multiple stations.



	Analysis port (4 Station version)	Pore size range	Pretreatment
Sync400	optional	0.35  500nm	independent
Sync400 - 8 stations	optional	0.35  500nm	independent
Sync400 - 12 stations	optional	0.35  500nm	independent



# Technical Superiority

The Sync Series features Vtech technology, a suite of proprietary innovations designed to enhance the accuracy, efficiency, and repeatability of gas adsorption analysis. It includes Vspace cold free space control, Vlevel liquid nitrogen level control, Vstable stability testing, and Vctrl powder elutriation control, each optimizing key aspects of the adsorption process. These technologies regulate free space volume, maintain consistent liquid nitrogen levels, minimize test fluctuations, and prevent sample loss, ensuring highly stable and reproducible results. By integrating Vtech technology, the Sync Series delivers greater efficiency and precision, making it especially effective for macroporous material characterization.

Powder elutriation control technology integrates both software and hardware to prevent sample loss from the sample cell, ensuring efficient testing. It also prevents contamination of the instrument's gas path caused by sample elutriation during testing. Additionally, this technology safeguards instrument operation, enhancing both system reliability and user safety.

Vctrl



Vspace

Cold Free Space Control Technology (Vspace) maintains a constant cold free space throughout the test, preventing fluctuations that could affect measurements. This ensures high accuracy, repeatability, and stability in analysis results, providing consistent and reliable data.



Vstable

Stability Test Technology (Vstable) enhances test accuracy and stability, ensuring high-precision analysis of macroporous materials like white carbon black and alumina. This technology improves repeatability and reliability, enabling accurate pore size analysis for materials larger than 50 nm.



Vlevel

Liquid Nitrogen Level Control Technology utilizes a self-developed, large-capacity glass Dewar, designed to overcome the inconsistencies and fragility of traditional blown glass Dewars. Manufactured using a proprietary process and special materials, it ensures uniform wall thickness, high durability, and resistance to breakage. This design maintains a high vacuum for extended periods, providing long service life, enhanced safety, and reliable thermal stability.

# Features

## High-Throughput

With the ability to analyze up to four samples simultaneously, the system achieves a BET specific surface area test time of just 20 minutes per sample. This high-throughput capability is ideal for customers with large testing demands in both industrial production and scientific research.

## Safety

To ensure the safety of users,

(1) Independently operated safety protection software remotely monitors the instrument's operating status. In the event of abnormal pressure or other hazards, it automatically intervenes to mitigate risks, ensuring the safety of both the instrument and the operator.

(2) The protective casing around the Dewar prevents low-temperature liquids, such as liquid nitrogen, from splashing during operation, enhancing operator safety.

## Real Time Monitoring of $p_0$

An independent  $P_0$  pressure sensor is configured to enable real-time monitoring during testing, ensuring accurate pressure measurements. This eliminates the impact of ambient temperature and atmospheric pressure on experimental results, enhancing data reliability.

## Inlet Gases

Users can opt for the multi-channel gas intake feature, allowing for seamless switching between different adsorption gases with ease and flexibility.

## Visual Display of Operating Status

A status display system on the instrument's front panel provides a visual representation of its operating status. Each electromagnetic valve is equipped with an LED indicator, clearly showing whether it is open or closed. This allows users to intuitively monitor the instrument's operation in real time during testing.

## Communication

The instrument features a LAN communication interface, enabling integrated control via a host computer. This allows for remote access and operation, providing seamless monitoring and control from any connected device.

## Independent Vacuum Degasser

The instrument comes standard with a fully independent vacuum degasser, capable of programmable temperature control for sample preparation. This system offers greater intelligence, flexibility, and convenience in sample pretreatment while eliminating delays caused by in-situ degassing at the analysis position, significantly enhancing testing efficiency.

# Control / Analysis Software

The newly developed Sync Control Software is an advanced intelligent platform designed for operation control, data collection, computational analysis, and report previewing on Windows. It also features unique experimental monitoring capabilities, enhancing precision and efficiency throughout the testing process.

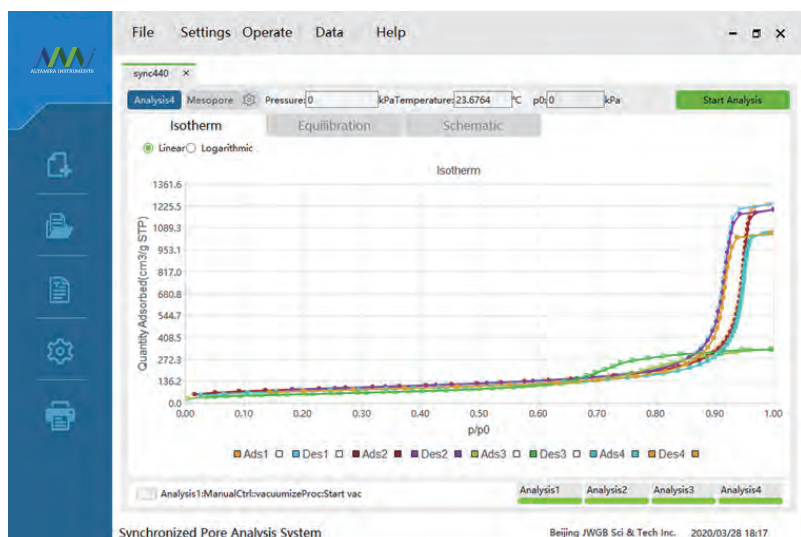
## Real-Time Monitoring Dosing

The system utilizes a unique intelligent adsorption equilibrium pressure judgment and control method, significantly enhancing test efficiency compared to the traditional fixed-point method while ensuring sufficient adsorption equilibrium.

Additionally, the software features a dedicated interface for real-time monitoring of the adsorption equilibrium process for each sample. This allows users to better understand adsorption characteristics, identify abnormalities such as gas leaks or insufficient pretreatment, and continuously monitor instrument performance throughout the experiment.

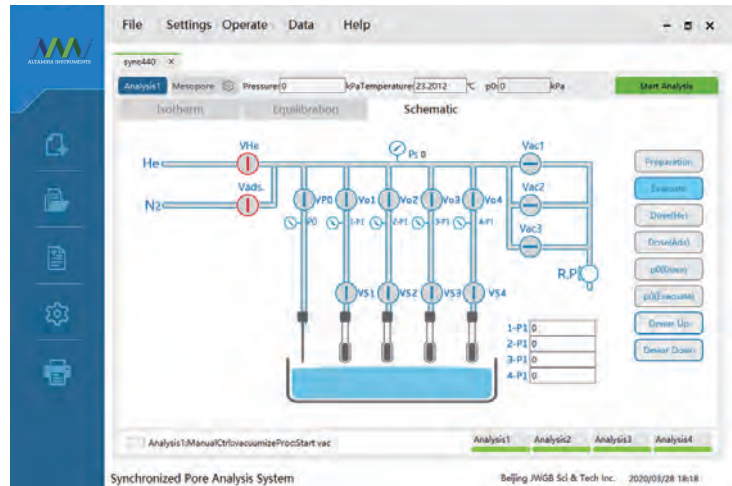
## Adsorption Isotherm

The software features a dedicated interface for real-time display of adsorption isotherms for each sample, allowing users to track experiment progress and monitor adsorption results as they occur. This enables the early detection of experimental abnormalities, such as air leaks or changes in cold free space, ensuring greater accuracy and reliability in test results.



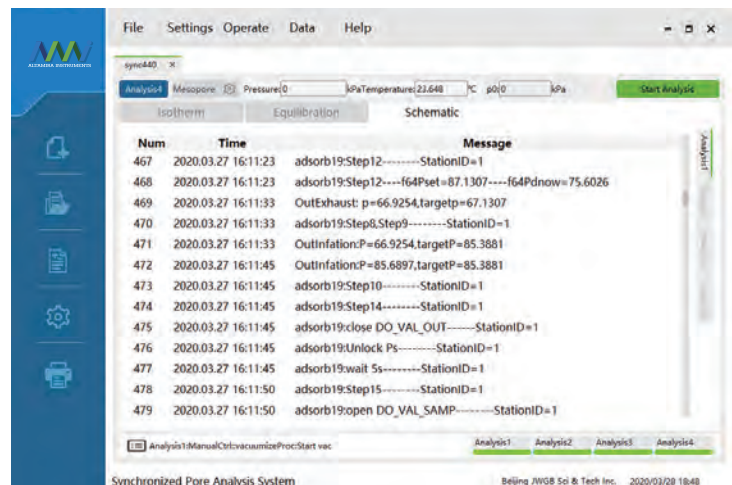
## Control

Unlike traditional manual on/off valve control, the Sync software offers a series of automated control processes, reducing the likelihood of manual operation errors while allowing users to perform multi-functional manual adjustments when needed. During testing, users can visually monitor pressure changes and valve statuses across different instrument components, enhancing process transparency. This not only helps users better understand the test process but also allows engineers to diagnose and maintain the system remotely with greater ease. Additionally, the software features a fully automated liquid nitrogen refilling process. After extended testing periods, users can safely add liquid nitrogen following the software's guided prompts. The system automatically pauses and resumes the test without requiring manual intervention, ensuring a high level of automation and uninterrupted operation..



## Real-Time Record Storage of Instrument Control Process

The message window can be toggled for display and logs the experimental control process along with manual software operations in real time. This functionality enables engineers to analyze data efficiently and remotely diagnose abnormalities.



## Data Analysis

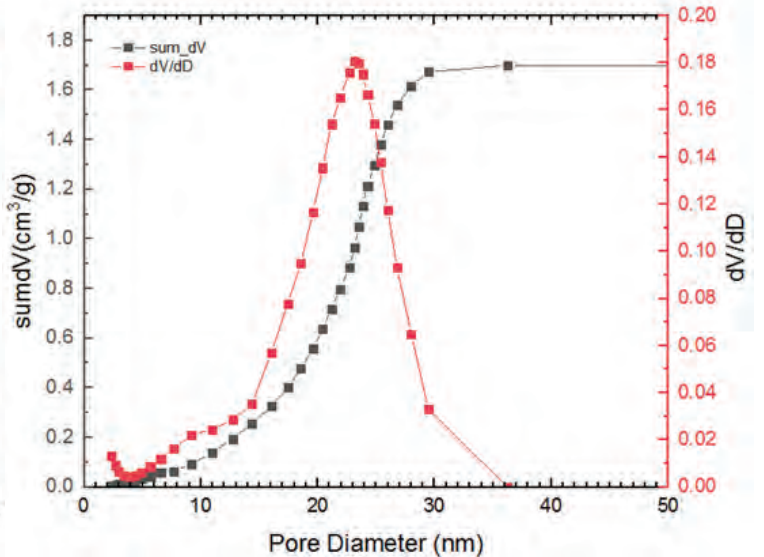
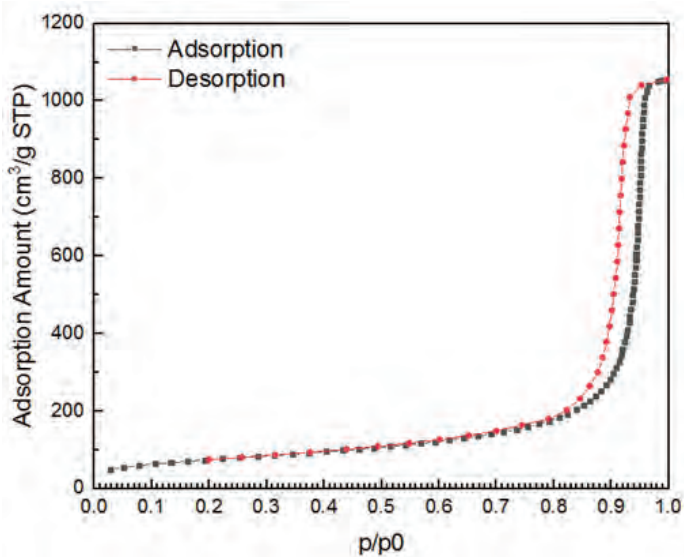
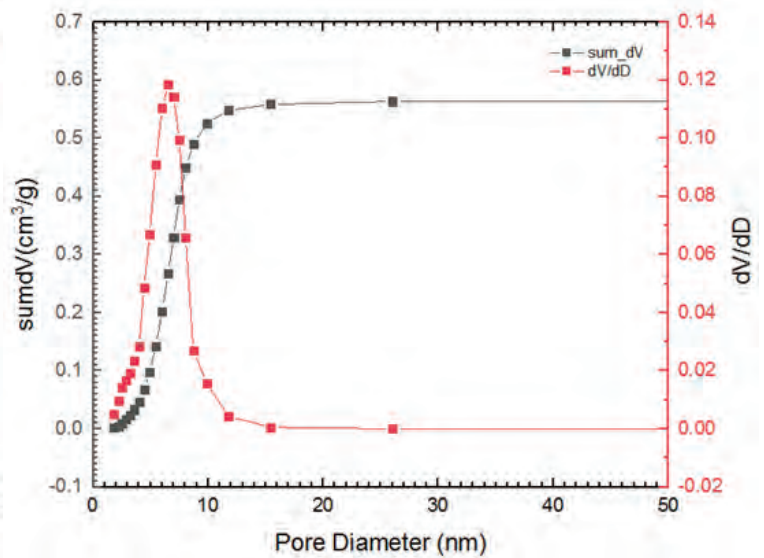
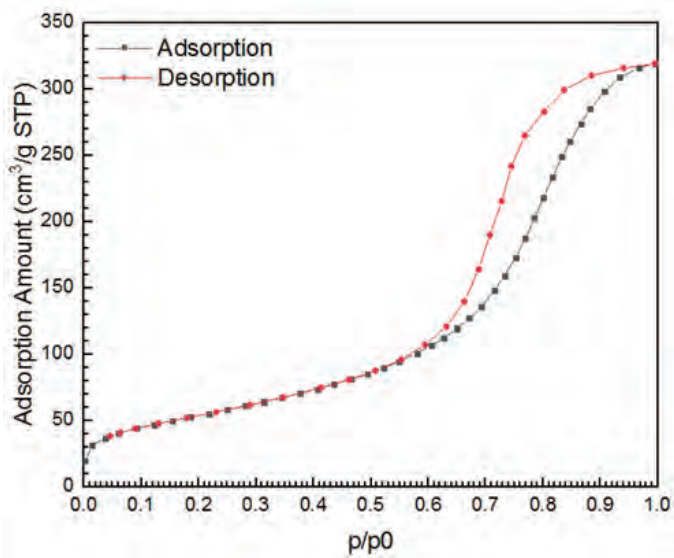
- Isothermal absorption and desorption curve;
- BET specific surface area (single point, multiple points);
- Langmuir surface area;
- Statistical thickness surface area. (STSA);
- BJH pore size analysis;
- t-plot analysis;

- HK pore size analysis;
- SF pore size analysis;
- NLDFT pore size distribution;
- Most common pore size, Average pore size, Total pore volume;
- Adsorption curve etc.;

# Analysis Example

Repeatability of specific surface area BET  
 $\leq 1\%$

Sample	Test number	measurement	Average	Repeatability
G8	1	9.094	9.17	0.66%
	2	9.222		
	3	9.243		
	4	9.098		
	5	9.162		
	6	9.228		
C8	1	127.367	126.6	0.31%
	2	126.362		
	3	126.482		
	4	126.578		
	5	126.167		
	6	126.863		



# Specifications

Model	<b>Sync series</b>
Test principle	Static volumetric-gas adsorption
Adsorbate gas	N <sub>2</sub> , Ar, Kr, H <sub>2</sub> , O <sub>2</sub> , CO <sub>2</sub> , CO, NH <sub>3</sub> , CH <sub>4</sub> and other non-corrosive gases
Analysis port	1, 2 or 4 - depending on configuration at time of order
Pressure sensor	1000torr - see table
p/p <sub>0</sub> range	10 <sup>-5</sup> -0.998
Specific surface area range	>0.0005 m <sup>2</sup> /g; Standard sample test repeatability (RSD)≤1.0%
Pore size range	0.35nm-500nm; Accurate analysis of mesopores and macropores, pore size repeatability (SD)≤0.2nm
Pore volume range	>0.0001 cm <sup>3</sup> /g
Degassing station	External for 2 or 4 station, option in-situ for 1 station Sync
Degassing temperature	ambient—400°C (external), control precision 1°C
Vacuum pump	Two-stage rotary vane mechanical vacuum pump, ultimate vacuum 6.7*10 <sup>-2</sup> Pa
Physical	L 510mm × W 530mm × H 930mm, 40 Kg
Power requirements	100-240VAC, 50/60Hz, Maximum power300W

**Table:** Overview of different models of the AMI-sync series

Model	Sync 440	Sync 420	Sync 220	Sync 210	Sync 110
Analysis ports	4	4	2	2	1
Number of pressure transducers at the stations	4	2	2	1	1
p <sub>0</sub> transducer	1	1	1	1	1
Pressure transducers at the manifold	1	1	1	1	1
Pressure transducers total	6	4	4	3	3



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