SSA-7000

Specific surface area and pore size instrument

Static gas adsorption instrument

彼奥德电子
www.bjbuilder.com

High performance
Scientific research

- Fine analysis of microporous/mesoporous/macroporous/ultra-low specific surface area
- AI intelligent degassing control, creating a "dehydration freedom" model
- Precise control of fixed point and constant pressure, further improving stability
- Multiple sample analysis modes and test templates, one click call
- A variety of adsorbent potential energy parameters meet the isothermal performance analysis

北京彼奥德电子有限公司
蒸汽吸附 高压吸附
物理吸附 真实密度

400-6698981

BUILDER

SSA-7000 Technological Advancement

The SSA- 7000 Static multi- purpose gas adsorption analyzer is an instrument with excellent testing capability and accuracy, which can accurately analyze microporous (0.35 - 2 nm) and conventional mesoporous and microporous (2 - 500 nm) samples. The performance is more outstanding for 0.35 -0.7 nm micropore testing and testing of samples with very low specific surfaces (< 1 m^2/g). With advanced technology, excellent quality and more comprehensive theoretical model, the single analysis station design makes it more able to play the advantages of stability and data reproducibility to meet the needs of scientific research and academic discussion and other applications.

Design- advantage

Fast and Efficient Use

SSA-7000 sample analysis and degassing pretreatment can be performed synchronously or asynchronously; PFC high precision pressure electronic control system greatly reduces the vacuum time; Dynamic gas injection and adsorption balance self-detection increase the test speed by up to 50%.

Stable and Accurate Results

Unique ultra-high vacuum bistable valve body, "0" heating; The pressure test of B-ST technology, the most true feedback of the adsorption state after each injection; Leading temperature difference dynamic calibration technology, to achieve the test time and dead volume quantitative dynamic calibration; The gas path constant temperature system is also a necessary condition for micro test technology and data stability; The 32-bit digital-to-analog conversion accuracy greatly improves the resolution of the pressure sensor.

Very Low Probability of Failure

SSA-7000 adopts high quality and high performance brand parts, each part is around our core technical service, and we have superb manufacturing process, we are the "maker" of the instrument, rather than the "porter" of the parts.

BUILDER

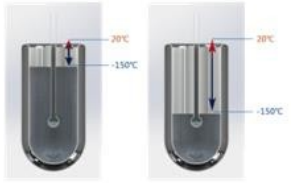
SSA-7000 Technological Advancement

B

Criterion of Equilibrium of Absorption and Desorption

Scientific Criteria for the Balance of sorption and desorption ensure the accuracy of data.

The physical adsorption instrument records the pressure value after each adsorption and desorption equilibrium, and converts it to the adsorption amount to obtain the adsorption and desorption isotherm. Therefore, the criterion of absorption and desorption balance is one of the key factors to ensure the accuracy of data. SSA-7000 and Kubo-X1000 support four kinds of equilibrium criteria for adsorption and desorption. The curve of pressure change within a certain time is introduced, and the slope value of the curve is used to determine whether the equilibrium of adsorption and desorption is more scientific.



Advanced Temperature Difference Dynamic Calibration Technology

The influence of liquid nitrogen volatilization on quantitative measurement is solved, and the stability of the instrument is significantly improved.

With the evaporation of liquid nitrogen, there is always a temperature difference between the liquid level and the sample tube and the liquid level and the Dewar bottle mouth, so that the pressure value generated by the same amount of gas is different, which affects the test accuracy and stability. Piaud introduced the dynamic calibration technology of temperature difference, and correctly corrected the pressure change caused by temperature change by measuring the coefficient of thermal expansion, effectively improving the test accuracy and stability of the instrument.

Advanced Self-Locking Valve Technology

Solve valve heating and leakage problems.

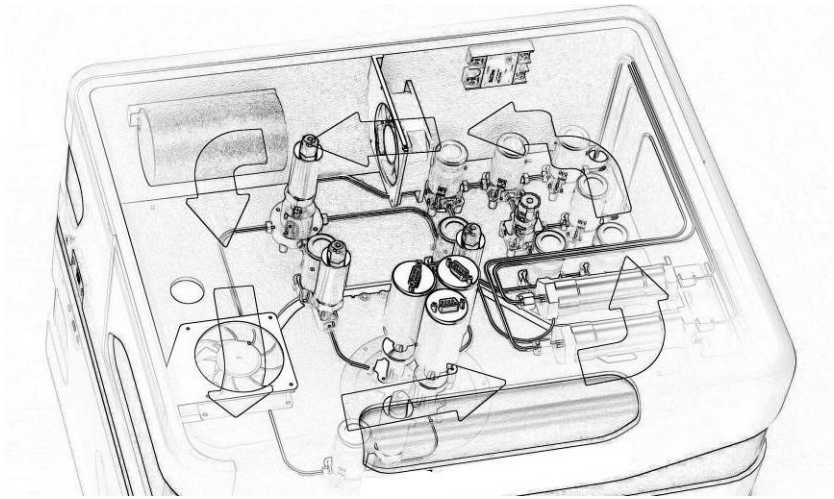
In the field of adsorption analysis, the problem of heating and air leakage of universal solenoid valves has a long history, which seriously affects the accuracy of gas quantification and pressure readings, especially in the analysis of ultra-small specific surface area and micropores, especially in order to solve this problem, our company has developed a self-locking function of the valve, the heat equivalent of zero, so that the analytical performance has been greatly improved.

High Vacuum Closed Gas Module Technology

Modular gas path reduces contact points, improves vacuum degree and efficiency.

Our company's adsorption instrument series all adopt highly integrated gas path system, so that the entire instrument interconnection pipeline is reduced by 70%, a large number of gas path contacts are removed, the system vacuum is improved, the overall leakage rate of the system is $< 10^{-8} Pam^3/s$. The matrix is made of high-quality stainless steel, which has excellent reliability and corrosion resistance.

SSA-7000 Technological Advancement

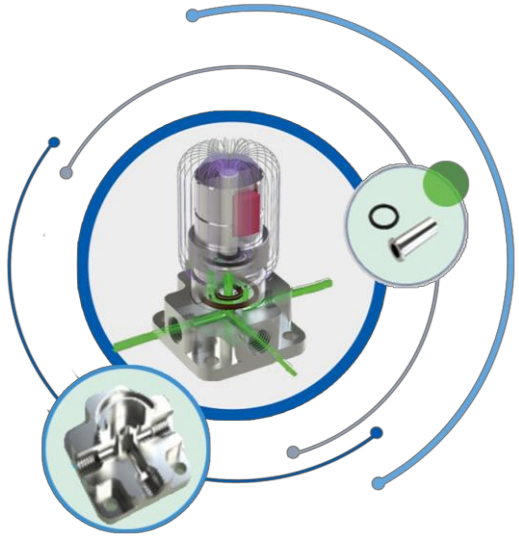


Advanced PFC Pressure Electronic Control

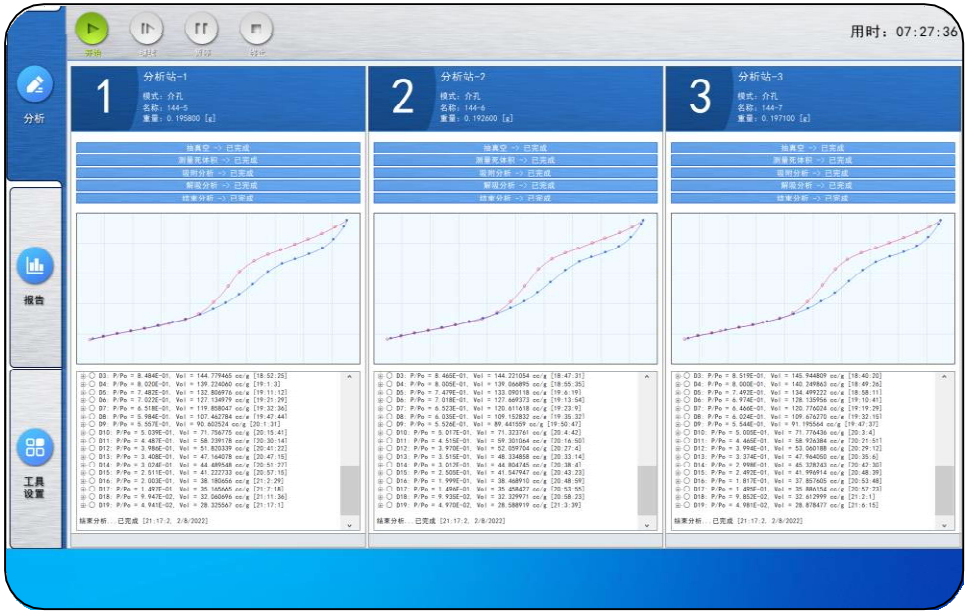
Our company's physical adsorption instrument series adopts advanced PFC pressure electronic control system, which increases the analysis efficiency by more than 50%. It can accurately control the amount of inlet and outlet air, and automatically adjust the inlet and outlet air rate. Solve the problem that the traditional vacuum pumping speed is slow, especially when the sample volume is large and the specific surface area is large, the test time is too long; PFC system to achieve the "constant pressure mode" more accurate (precise control of different pressure intervals, the number of data points); Prevent samples from contaminating instruments.

High Stability Constant Temperature Gas Path System

Physical adsorption instrument is based on the quantitative method of gas capacity, through the sensor to read the change of pressure to calculate the adsorption amount. Accuracy and effective accuracy are extremely sensitive to temperature changes, especially in the analysis of micropores (0.35-2nm) and ultra-low specific surface area (< $1m^2/g$), temperature changes not only affect the calculation accuracy of adsorption capacity, but also cause the sensor zero drift, resulting in a large deviation of the control value of the converted micropores. Therefore, constant temperature is very important for high-precision analysis.



Advanced Control Software, Powerful

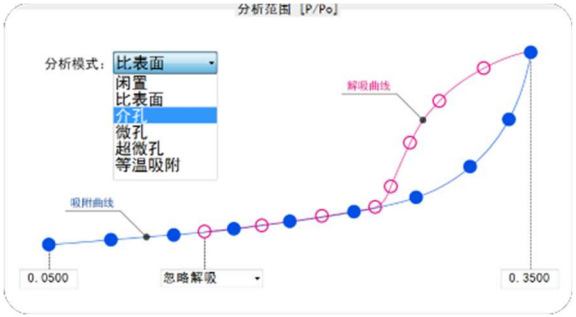


The fast use of software, for different samples set templates, and a key call.

▲ Select analysis type with one click according to analysis requirements.

▲ According to different materials, one-click call test template.

▲ Provide dozens to hundreds of analysis templates to meet all users.



- Visual display, setting window, in line with the needs of contemporary users, better use experience.
- Automatically save, without worrying about data loss.
- The adsorption/desorption equilibrium is determined automatically according to the sample adsorption characteristics.
- One-key automatic leak detection and automatic calibration.
- In case of failure, automatic pop-up prompt, help users quickly troubleshoot the fault.

AI intelligent degassing station to solve the problem of sample preparation

1. For the initial analysis, it is not clear how much time can be set before the water in the sample can be cleaned?

▲ One key select "AI" intelligent mode, automatically judge the completion of processing, automatically stop, automatically record the total time, to provide conditions for the next preparation.

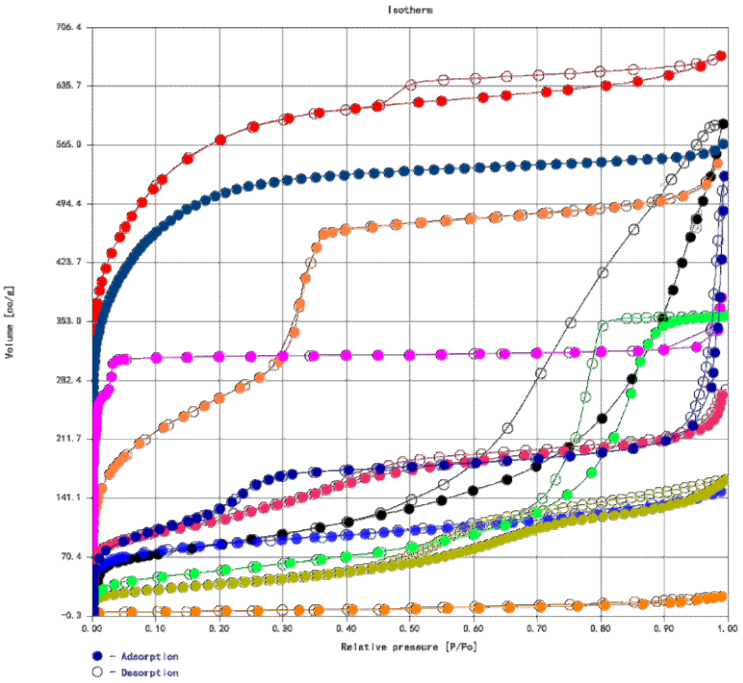
2. My sample has a large water content, which is easy to "boil/analyze" under vacuum. How should I deal with it?

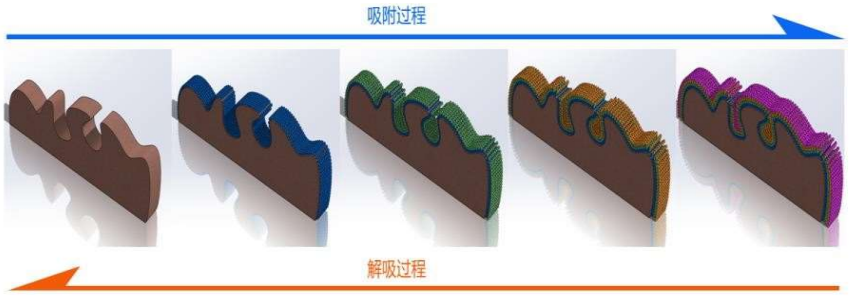
▲ One key to select the "multi water" mode, to solve the problem of failure in the preparation of chromatography.

3. Boehmite/alumina and other ultra-fine powder, graphene/white carbon black and other ultra-light powder, easy to "boil" under vacuum should be how to deal with?

▲ One key to select "ultra-light" mode to solve the problem of boiling preparation failure.

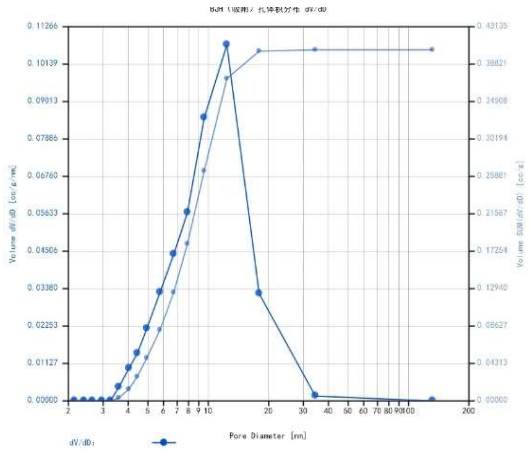
SSA-7000 Test Performance

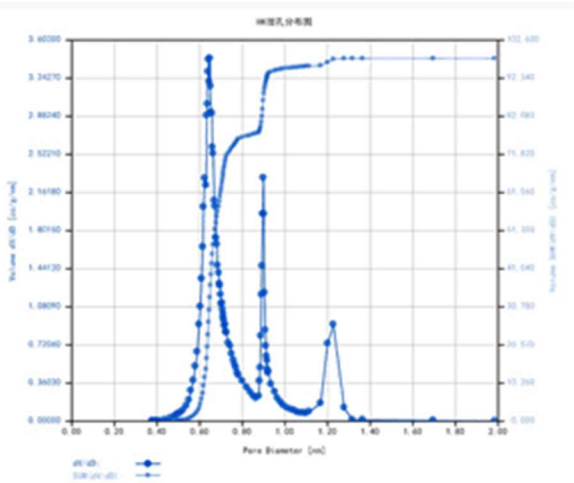




After soaking in liquid nitrogen, the whole system is vacuumed first, and then nitrogen is injected into the sample tube at a certain pressure. After adsorption equilibrium, the pressure at this time is detected, and the adsorption amount is calculated according to the change of pressure difference before and after adsorption. The adsorption isotherm was obtained when P/Po≈1. The desorption process is on the contrary. The system that has been adsorbed and saturated is vacuumed to discharge nitrogen, and the desorption amount is calculated according to the pressure difference between the front and the back until all nitrogen is discharged and the desorption line is obtained.

Analysis model:
Adsorption and desorption isotherm gas adsorption curve
BET specific surface area measurement of pore volume aperture distribution by BJH method Langmuir specific surface area
HK/MP/SF micropore analysis
t-plot /αs aperture analysis DR Method microhole analysis
t-plot/αs surface area analysis DFT micromesoporous analysis





BUILDER

SSA-7000 Test Parameter

1 **Analytical Functions:** vacuum static volumetric method, adsorption and desorption isotherm, BET/Langmuir specific surface area, BJH pore volume/pore area/total pore volume/total pore area analysis. Micropore analysis such as t-plot/MP/HK/SF/DR/Argon or carbon dioxide analysis of special micropore samples/isothermal adsorption (adsorption amount) test.

2 **Test Range:** specific surface area ⩾0.0005m2/g, aperture analysis 0.35nm-500nm; Relative pressure P/P0 partial pressure range can be controlled to -0.998; 10-8 ~ 0.998 or 10-6 ~ 0.998.

3 **Analysis Accuracy:** specific surface area, ±1%; Aperture repetition deviation ⩽0.02nm.

4 **Analysis Station:** 1 or 2, can carry out ultra-micro pore, micro pore, mesoporous, large pore and ultra-low adsorption material accurate analysis, equipped with 4L super-large capacity dewar bottle.

5 **Po Test Station:** 1 liquid nitrogen saturated vapor pressure test station equipped with an independent sensor for real-time detection. In order to obtain the true value of Po, it is necessary to share the same liquid nitrogen bath with the analysis station.

6 **Adsorbed Gas:** N_2/Kr/Ar/CO_2/CH_4/H_2/CO_2/C_2H_2/NH_3/SO_2.

7 **Instrument Specifications:** length 700mm, width 480mm, height 905mm; Total power 1000W (main engine and pump); Operating voltage 220.

8 **Hardware System Control.**

8.1 **Gas path control system:** adopting an integrated gas path to reduce "leakage points".

8.2 **Data acquisition system:** high-precision 32-bit analog-to-digital conversion system, usb communication and transmission interface.

8.3 **Pressure detection system:** equipped with multiple pressure sensors of different ranges and independent pressure sensors for steam pressure testing, real-time collection of saturated steam pressure; The software can display and view pressure values in real-time.

8.4 **Vacuum system:** The host is equipped with an imported two-stage rotary vane mechanical pump and a turbomolecular pump, with a maximum vacuum of 10-8Pa; The molecular pump is equipped with an independent pressure assistance system, which improves its service life and analysis efficiency.

8.5 **Dynamic calibration technology of temperature difference:** solves the impact of liquid nitrogen volatilization on quantitative measurement, effectively improving the testing accuracy and stability of the instrument; Can be applied to coolants at different temperatures.

8.6 **Control system:** High vacuum self-locking valve, "0" heating, solving the impact of heating on detection.

9 **MD-200S Intelligent Sample Degassing Station:**

9.1 Vacuum heating and degassing of 2 samples can be carried out at the same time, with the upper temperature of 400℃.

9.2 The degassing station is equipped with an independent vacuum system and vacuum pump, which improves the efficiency of degassing and testing.

9.3 Using an isothermal heating furnace, the sample is heated more evenly and has a longer service life.

9.4 **AI Intelligent Degassing System can Select "Multi-Water",** "ultra-light", "standard" and other treatment solutions according to the sample type.