V-Sorb 4800TP™

Turbo Vacuum Pumped Surface Area & Porosity Analyzer

Turbo Molecular Vacuum Pumped

Surface Area & Porosity Analyzer V-SORB 4800TP Parameters

Analysis Method: Static volumetric nitrogen adsorption principle

Versatility: Adsorption and desorption isotherms, Single and multi-point BET surface area, Langmuir surface area, Average particle diameter estimation, T-plot external surface area, True density analysis, BJH mesopore total pore volume and pore size distribution, T-plot micropore, Horvath-Kawazoe (HK) micropore, Saito-Foley (SF) micropore, Dubinin-Radushkevich (DR) micropore, Dubinin-Astakhov (DA) micropore, carbon black (STSA) etc.

Vacuum System: V-Sorb unique *stainless steel micro welding vacuum manifolds system, metal-to-metal (VCR) fittings,* reduce dead space in maximum degree and also keep long duration high vacuum; the *VCR metal fittings' vacuum leak rate can reach $1x10^{-10}$ (Pa*m³/s),* absolutely without usage of any O-ring sealing which will release gas to affect vacuum purity when under high vacuum condition

Vacuum Cavity: V-Sorb unique *monolithic manifolds and pneumatic valve control system,* greatly reduce the dead volume; improve the adsorbate micro-change sensitivity; enhance pore size distribution analysis resolution; decrease connecting points; strengthen sealing performance and prolonged instrument life

Measuring Ranges: $0.01 m^2/g$ (Nitrogen)/ $0.005 m^2/g$ (Krypton) to no known upper limit (surface area);
0.35 to 500nm (pore size)

Accuracy: repeatability errors ≤1.0%

Coolant Level Controller: V-Sorb original *coolant level control system with temperature probe,* ensure the coolant level unchanged when compares with sample cells in the whole analysis process, completely eliminate the analysis errors caused by dead volume change

Data Acquisition: high-precision and high integration data acquisition and archiving system, minimal error, strong anti-interference ability

Sample Ports: four samples' analyzing and four samples' degassing concurrently

Control System: programmable pneumatic valve system with high integration and strong anti-interference ability, enhance instrument's stability and life

Pressure Measurement: imported *sectional measuring dual pressure transducer,* notably improve the measuring accuracy at low P/P_o point, *0-1000Torr, 0-1Torr and 0-0.1Torr* equipped.

Transducer Accuracy: imported *silicon thin film pressure transducer,* accuracy can reach 0.1% of real reading, better than 0.1% of F.S.(full-scale), far accurate than Pirani resistance vacuum gauge(general error is 10%-15%)

Vacuum Pump: built-in *bipolar Atlas Copco vacuum pump* controlled by patented software which can auto control pump's start/stop

Dewar Vessel: imported *4 liter stainless steel Dewar* can provide at least 72 hours of unattended measurement without refilling the Dewar
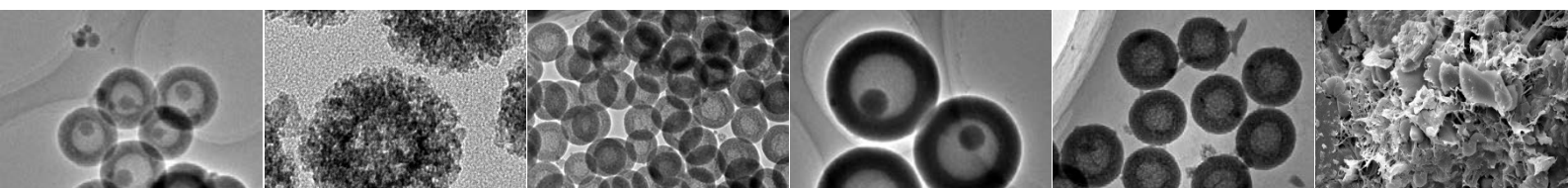
Partial Pressure: P/P_o controllable accuracy range is $5x10^{-8}$-0.998

Ultimate Vacuum: bipolar pump: $4x10^{-2}$Pa ($3x10^{-4}$Torr), molecular pump: $5x10^{-8}$ mbar

Sample Types: powders, particle, fiber, flakes and other materials

Adsorbate Gas: high purity nitrogen (≥99.999%), Ar, Kr, CO, CO_2, C_4H_{10} etc. non-corrosive gases are optional

Data Reduction: Windows®-based independent developed Gold APP Instruments software™, perfect versatility, produced full featured and multi-model reports
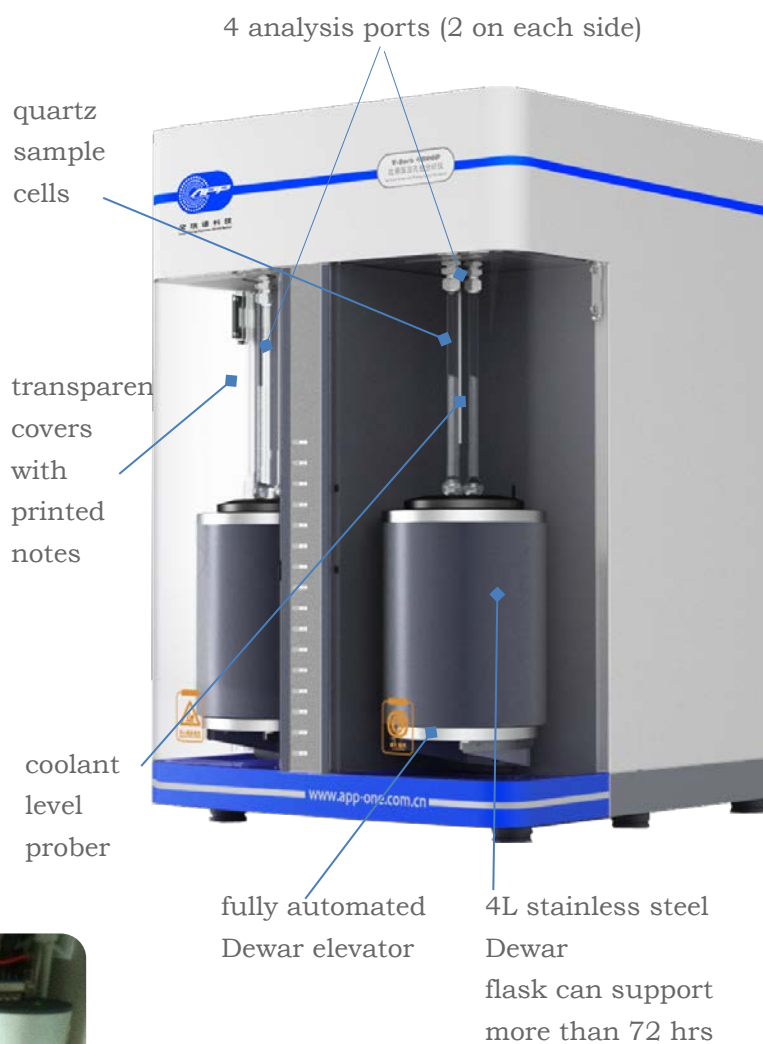
Turbo Molecular Vacuum Pumped Surface Area & Porosity Analyzer V-SORB 4800TP Features

1. *Stainless steel micro welding vacuum manifolds* system can reduce the leak rate apparently, improve ultimate vacuum, without daily maintenance and enhance stability.

2. Micro welding vacuum system can decrease manifolds' volume, increases measuring sensitivity and raise accuracy.

3. Imported with *original packaging turbo molecular vacuum pump,* ultimate vacuum can reach 5×10^{-8}-0.998, maintenance free, convenient to use, reduce latter utilization cost.

4. Micro welding vacuum system, *high vacuum pneumatic valve* and high ultimate vacuum molecular pump unite perfectly, bring each accessories performance into full play, precision degree can reach until 5×10^{-8}.

5. Imported *high vacuum pneumatic valve*'s sealing performance is up to 5×10^{-12} (Pa * m^3/s), can completely remove analyzed gas temperature change caused by valve heat.

6. Fully *metal-to-metal VCR* connecting can eliminate O-ring self gas release problem when under high vacuum circumstance, efficiently improve ultimate vacuum and analysis reliability.

7. Imported high-precision silicon thin film capacitive transducer, the core part, can realize auto zero by software; the *0.1 Torr full-scale (F.S.) transducer* assists micropore to achieve a more accuracy data for low P/P_o points.

8. *Monolithic design* can configure as customer requests, benefits future functions extension and instrument maintenance.

9. Programmable pneumatic valve system with high integration and strong anti-interference ability, speed and easy for upgrade and maintenance.

10. *Fully auto and modularity design*, equipped with dedicated software, can realize unattended operation at night.

11. Multi calculating methods for data reduction provides all-round sample analysis options; powerful data archiving and searching system helps a lot for data management.

4 analysis ports (2 on each side)

quartz sample cells

transparent covers with printed notes

coolant level prober

fully automated Dewar elevator

4L stainless steel Dewar flask can support more than 72 hrs

Japan Fujinkin Pneumatic Valve

Inficon brand Pressure Transducers

Testing Reports

Reports formats PDF+Excel+TXT+Word
Data cover BET/Langmuir/BJH/SF/T-plot/HK/DR/DA...
Selective P/Po points over 1000
Detailed adsorption & desorption points are available
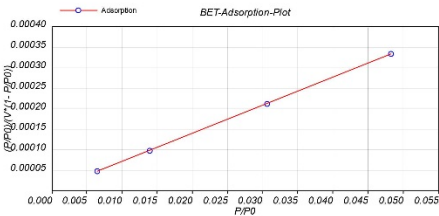

Surface Area and Pore Analysis Report
V-Sorb 4800TP Porosimetry Analyzer

Sample Information

Sample ID: micropore RM		Model: V-Sorb 4800TP Porosimetry Analyzer	
Submitter: Analyzer calibration		Company: GAPP Instruments China	
Operator: QIN QiaoYun		Report Time: 2013-11-16	

Analysis Information

Mass: 0.33280 (g)
Method: Multi-Point BET
Room Temp.: 25℃
Analysis Time:
Pretreatment: 350 ℃ vacuum heating for 4h
Multi-BET: 634.125950(m2/g)

BET-Adsorption-Plot

BET Tabular Report

P/P0	Quantity Adsorbed(ml/g)	(P/P0)/(V*(1- P/P0))	Single point BET
0.048291	152.036882	0.000334	629.712049
0.030691	149.380959	0.000212	630.195420
0.013915	144.782611	0.000087	621.326155
0.006428	139.434426	0.000046	602.917794
Slope	Intercept	Vm(ml)	C Value
0.006862	0.000002	145.693148	3426.679771
R	Multi-BET Area	Langmuir Area	
0.999993	634.125950(m^2/g)	670.918843(m^2/g)	

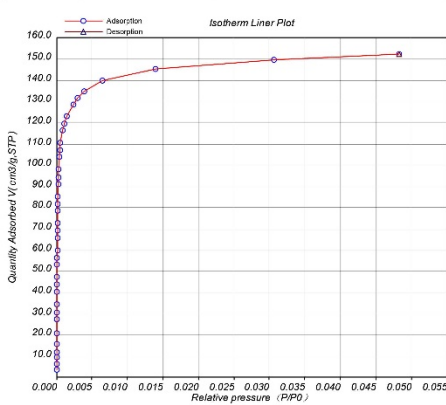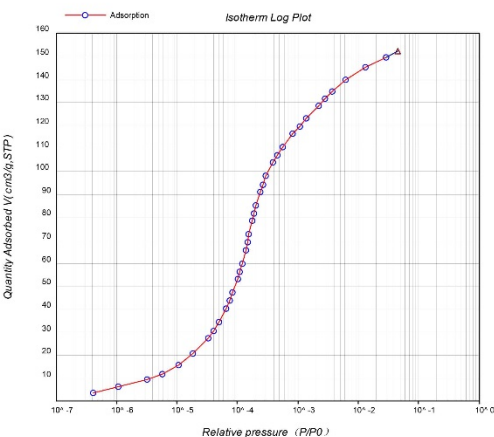## Surface Area and Pore Analysis Report
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Operator: QIN QiaoYun		Report Time: 2013-11-16	

Analysis Information

Mass: 0.33280 (g)
Method: Pore size
Room Temp.: 25℃
Analysis Time:
Pretreatment: 350 ℃ vacuum heating for 4h

Isotherm Liner Plot

Surface Area and Pore Analysis Report
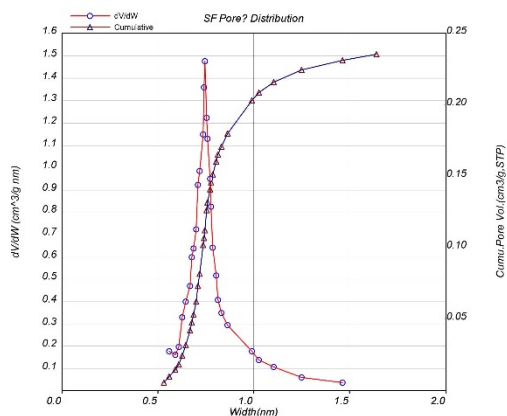### V-Sorb 4800TP Porosimetry Analyzer

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Operator: QIN QiaoYun		Report Time: 2013-11-16	

Analysis Information

Mass: 0.33280 (g)
Method: Pore size
Room Temp.: 25℃
Analysis Time:
Pretreatment: 350 ℃ vacuum heating for 4h

Isotherm Log Plot

Surface Area and Pore Analysis Report
V-Sorb 4800TP Porosimetry Analyzer

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Submitter: Analyzer calibration		Company: GAPP Instruments China	
Operator: QIN QiaoYun		Report Time: 2013-11-16	

Analysis Information

Mass: 0.33280 (g)
Method: Pore size
Room Temp.: 25℃
Analysis Time:
Pretreatment: 350 ℃ vacuum heating for 4h
Median Pore: 0.74494 (nm)

SF Pore? Distribution

Sample Degasser V-Sorb

Importance of sample pretreatment:

Surface area and porosity measurement is closely connected with particle external surface area. Besides, the key of gas sorption is the adsorbates can be efficiently attached onto particle surface or be filled into pores, thus, no more important than particle surface purity. The purpose for sample pretreatment is to remove atmospheric contaminants on samples' surface and make room for adsorbates.

Specifications:

A. Up to 4 samples pretreatment currently, independent temp controller;
B. Max temperature is up to 450℃, accuracy ±1℃;
C. Programmable heating process, step is 1-10℃;
D. User-defined analysis gases (N2 or He are more normally used);
E. 48 hours uninterrupted/unattended operation, Surface area analysis less than 30 mins (based on sample property);
F. 0-1000Torr and 0-1Torr pressure transducers, capacitance diaphragm gauge;
G. PT100 with resolution 0.01℃, analysis software integrated PID theory.

Features:

A. Adopts stainless steel vaccum system, perfect sealing performance, high vacuum, stable working, long service duration;
B. Speedy heating process, saving time and improving pretreatment efficiency;
C. Easy installation and uninstallation for sample cells;
D. Unique sample splash proof system;
E. Modularity inner structure design, convenient for installation, uninstallation and future upgrade;
F. Each sample station has its own adjustable evacuation control.

Environmental:

✧ Ambient temperature: 10 to 50℃;
✧ Maximum relative humidity: 90%.
✧ *Electrical:*
✧ Voltage 100 - 240 VAC;
✧ Frequency: 50 or 60 Hz.

Physical:

✧ Height 15.7 inches (40 cm)
✧ Width 11.8 inches (30 cm)
✧ Depth 19.7 inches (50 cm)
✧ Weight 33 lbs (20kg)

Sr. No.	Supplier	Parts	Qty.
1	Manufacturer Supplied	V-Sorb 4800TP Analyzer (with vacuum pump)	1 set
2		Rubber O-rings for Sample Cells Sealing	10 pcs
3		Spherical Sample Cells	10 pcs
4		V-shape Sample Funnel	10 pcs
5		Certificated Reference Material (large value)	10 g
6		Certificated Reference Material (medium value)	10 g
7		Certificated Reference Material (small value)	10 g
8		Copper Gas Pipe	2 m
9		Analysis Dewar	2 pcs
10		Fuse	2 pcs
11		RJ 45 Cable	2 pcs
12		Protective Gloves	1 pair
13		User Manual (English)	1 copy
14		Software CD (English)	1 copy
15		Po Cell	4 pcs
16		Filling Rod	8 pcs
17		Sample Cell Cleaning Brush	1 pc
18		Funnel Cleaning Brush	1 pc
19		Sample Weighting Cup	1 pc
20		V-Sorb Sample Degasser	1 pc
21	Customer Prepared	0.0001 Precision Balance	1 set
22		Computer (all Window® systems)	1 set
23		Printer (not a must)	1 set
24		Gas Regulator (should fit 1/8" NPT gas pipe, max reading is larger than 0.6 Mpa)	2 sets
25		Liquid Nitrogen (purity upper 99.999%)	1 pot
26		Power Cable	1 pc
27		He Gas (purity upper 99.999%)	1 cylinder
28		N_2 Gas (purity upper 99.999%)	1 cylinder

Static volumetric principle analyzers:
V-Sorb X800 series

Gas pycnometer true density analyzers:
G-DenPyc X900 series

High pressure volumetric analyzers:
H-Sorb X600 series

Sample preparation degassers:
F-Sorb & V-Sorb

A WORLD OF APPLICATION

activated carbon, silica gel, active alumina oxide, molecular sieve, sepiolite, zeolite, alumina oxide, silicates, quartz, silicon carbide, lithium cobalt oxide, lithium manganese oxide, black lead, lithium nickel and cobalt, cobaltous oxide, lithium iron phosphate, lithium titanate, polymer, corrosion resister, silica, nano-calcium carbonate, zinc oxide, magnesium oxide, barium oxide, iron oxide, copper oxide, ferroferric oxide, ferrite, silver/ iron/copper/ tungsten/nickel/aluminate powder, filler, inorganic filler, calcium carbonate, silica, deposited matter, suspended matter, titanium dioxide, rare earth, coal, cement, energy storage materials, catalyst, diatomaceous earth, cleansing agent, filter aid, superfine fiber, porous fabric, composite material, methane, coalbed gas etc.