



# **H-Sorb X600 series**

**High Pressure & Temp. Volumetric Gas Adsorption Analyzer**

**Gold APP Instruments China**

**Lead You to Particle World Better**



# Introduction

## Working Procedures

The H-Sorb X600 series high pressure gas adsorption analyzers adopts the volumetric technique principle which consists of dosing a known amount of gas adsorptive into measurement tubes where lying samples (such as zeolites, carbon nanotubes, rocks, catalysts, activated carbons, molecular sieve, hydrides etc. ) to be analyzed.

When samples reach equilibrium with the adsorbate gas (such as hydrogen, methane, carbon dioxide, nitrogen, argon, krypton etc.), detailed and comprehensive final equilibrium pressures will be recorded automated by Gold APP Instruments company dedicated and patented software.

These data are used to calculate the quantity of gas adsorbed by samples. This measurement procedure automatically repeated by software under given temperature and pressure intervals until finalized the maximum preselected pressure.

Finally, each of the equilibrium points' volume adsorbed, equilibrium pressure, absolute pressure etc. data are plotted to produce the isotherm.

By using the isotherm data, operators can calculate further more isotherm reports.

## Be Used To

### Analysis:

Catalysts, zeolites, activated carbons, carbon nanotubes, hydrides, molecular sieves, metal organic frameworks (MOFs), fuel cell, hydrocarbon, hydrogen storage materials (like LaNi<sub>5</sub>, AB<sub>5</sub>, AB<sub>2</sub>, La<sub>2</sub>MgNi<sub>9</sub>, La<sub>5</sub>Mg<sub>2</sub>Ni<sub>23</sub>, La<sub>3</sub>MgNi<sub>14</sub>, La<sub>5</sub>Mg<sub>2</sub>Ni<sub>23</sub>...) etc.

### Application:

Hydrogen and NG Storage, carbon dioxide sequestration, fuel cells and batteries, stack gas scrubbers, hydrocarbon traps, hydrogen storage materials test, coal bed gas, shale gas adsorption capacity determination, methane storage, oil exploration industry and so on.

### Reports:

Langmuir fitting isotherm  
TPD (temperature-programmed desorption)  
PCT (pressure-composition-temperature)  
PCI (pressure-composition-isotherm)  
Adsorption concentration (wt%) vs. pressure  
Adsorption/desorption rate curve  
Adsorption capacity vs. pressure  
Adsorption capacity vs. time  
Kinetic curve  
Adsorption constant a and b value  
And so on.

*(Send email to us (sales@jinaipu.com) if you have further date requests.)*



# Overview

<div>Items</div> <div>Models</div>	Analysis Ports	Degassing Ports	Remark	Option
H-Sorb 2600	Two (at analyzer right side)	Two (at analyze left side)	Two analysis ports can work alternately, if one port running, another port will stop.	Analysis temperature can from -196℃ to 600℃;
H-Sorb 2602	Two (at analyzer right side)	Two (at analyze left side)	Two analysis ports can work parallel. Should install sample tubes simultaneously, and will start to test simultaneously.	
H-Sorb 2600P	Two (at analyzer right side)	Two (at analyze left side)	H-Sorb 2600 plus BET and mesopore size testing function.	
H-Sorb 4600	Four (2 ports in each side, totally 4 ports)	Four (separated degasser)	The left and right side analysis ports are separated; The left 2 analysis ports can work alternately, if one port running, another port will stop; The right 2 analysis ports can work alternately, if one port running, another port will stop.	Pressure can from atmospheric to 400 Bar.
H-Sorb 4604	Four (2 ports in each side, totally 4 ports)	Four (separated degasser)	The left and right side analysis ports are separated; The left 2 analysis ports can work parallel; The right 2 analysis ports can work parallel.	
H-Sorb 4600P	Four (2 ports in each side, totally 4 ports)	Four (separated degasser)	H-Sorb 4600 plus BET and mesopore size testing function.	
H-Sorb 2600T	Can be customized as your requests.			

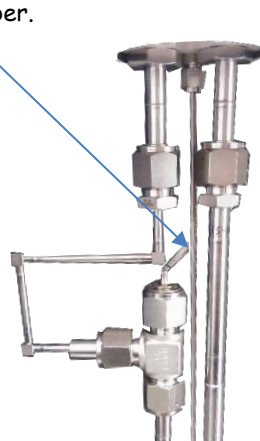
Big size sample cells  
(for shale rocks etc)



Middle size  
sample cells



Straight sample  
cells & with  
temp prober.



With isolating valve type sample  
cells (for H2 adsorption etc.)





# H-Sorb 2600 Series



Patented monolith 316L VCR stainless steel manifolds;  
Built-in with Germany Leyold vacuum pump, pressure  
transducers, pneumatic valves etc. inside.

Two degassing ports;  
Two analysis ports.

Transparent protective doors  
with operation notes printed.

Heating mantle temp. can up to 400 °C.

Provide recirculating temperature  
bath, cryogen Dewar, or furnace

Analyzer power on/off.

# H-Sorb 4600 Series



Two analysis ports in each side.



Separated Degasser unit  
with 4 ports.

# Parameters

- ❑ **Analysis Method:** static volumetric, high pressure gas sorption
- ❑ **Application:** adsorption/desorption isotherms measurement, Gibbs supercritical adsorption measurement
- ❑ **Data Reduction:** Langmuir model regression isotherm, TPD measurement, PCT(Pressure-Composition-Temperature) isotherm, Langmuir maximum adsorption constant L and adsorption pressure constant B measurement; Langmuir correction model loading-ratio correlation regression (LCR) isotherm; Ono-Kondo (OK) lattice model isotherm regression; adsorption capacity vs pressure, adsorption capacity vs time, adsorption concentration (wt%) vs time etc. reports
- ❑ **Measuring Ranges:** continuous adsorption and desorption measurement from atmospheric to 200Bar (400 Bar option) pressure
- ❑ **Accuracy:** repeatability errors <3%
- ❑ **Temperature Range:** atmospheric to 600°C, (-196 °C option) accuracy±0.1°C
- ❑ **Sample Ports:** two/ four sample ports and two/ four degassing ports, stainless-steel micro welding sample cells, software integrated temperature PID adjustment
- ❑ **Transducer Accuracy:** imported high precision transmitter, accuracy can reach 0.05% of F.S. (full-scale), long-duration usage stability is 0.025% of F.S.
- ❑ **Ultimate Vacuum:**  $4 \times 10^{-2}$  Pa ( $3 \times 10^{-4}$  Torr), molecular pump system ( $1 \times 10^{-6}$  Pa) is optional
- ❑ **Adsorbate Gas:** high purity nitrogen, CO<sub>2</sub> or others non-corrosive (Ar, Kr, H<sub>2</sub>, CH<sub>4</sub> etc.)
- ❑ **Data Acquisition:** high-precision and high integration data acquisition modules, minimal error, strong anti-interference ability
- ❑ **Specifications:** Height 22.05 inches (56cm)\* Width 20.87 inches (53cm)\*Depth 23.62 inches (60cm); 132 pound (60kg); 220V/5A

## ⚙️ Control System

Imported VCR interface high pressure pneumatic valve can realize auto on-off within 200Bar, sealing performance is top to  $1 \times 10^{-10}$  Pa.m<sup>3</sup>/s, can be used more than 500 million times; programmable logic controller (PLC) system, high integration and sound anti-interference, improve stability and prolong life.

## ⌚ Analysis Management

Parameters be set by software, fully automated, can realize unattended operation at night; H-Sorb mode is available for accurate control gas charging pressure points, gain ideal data points.

## ⌘ Manifold System

Imported 316L stainless steel thick-walled manifolds, micro welding sealing can reduce dead space largely; metal VCR connection is convenient for installation and uninstallation.

## 🧤 Safety Measures

H-Sorb asymptotic technology realizes auto gas-charging and degassing, prevents high pressure dangers caused by artificial mis-operation, and also minimizes large differential pressure's impact to pressure transducers.

## 👍 Top Quality

The H-Sorb 2600 combined with multi patented technologies; equipped with imported world famous branded accessories (such as vacuum pump, pressure transducers, pneumatic valves, VCR sealings etc.); pioneered and diligent tech engineers. All these guarantee a top quality analyzer with high accurate and trustable data.

*Japan Fujikin  
pneumatic valves*



*Atlas Copco  
Vacuum Pump*



*316L VCR Stainless Steel Manifolds*



# Reports

## High Pressure Analysis Report

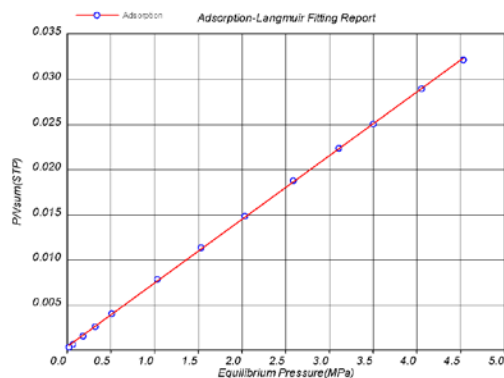
H-Sorb 2600 High Pressure Ads. Analyzer

### Sample Information

Sample ID: 929020-3#	Model: H-Sorb 2600 High Pressure Ads. Analyzer
Submitter: Tsinghua University	Company: Gold APP Instruments China
Operator: Hao HOU	Report Time: 2015-07-03

### Analysis Information

Mass: 1.49300 (g)	Pretreatment: no degassing
Method: High Pressure H2 Adsorption	
Ads. Temp.: 50°C	
Analysis Time:	



### Detail Report

Slope	Intercept	VL (cm <sup>3</sup> /g)	Langmuir Pressure PL (MPa)
0.007072	0.000263	141.404071	0.637248
R			
0.999847			

## High Pressure Analysis Report

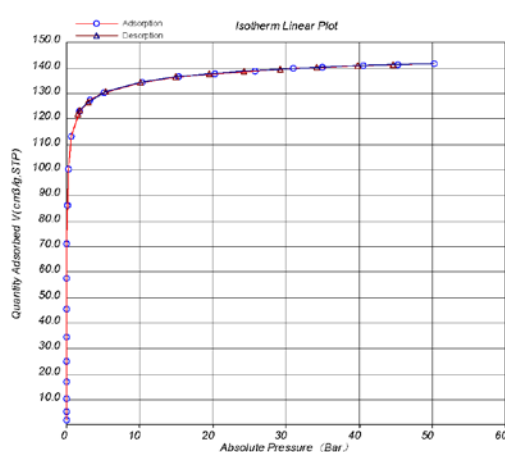
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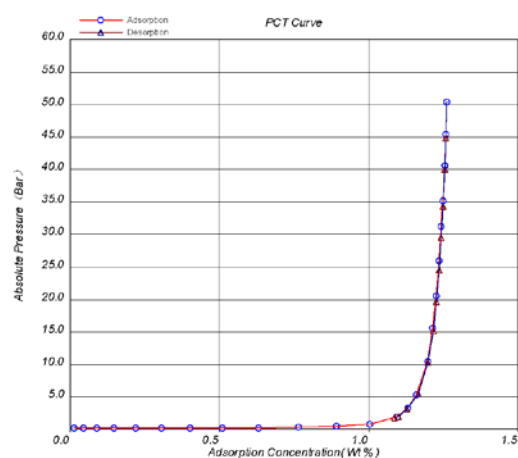
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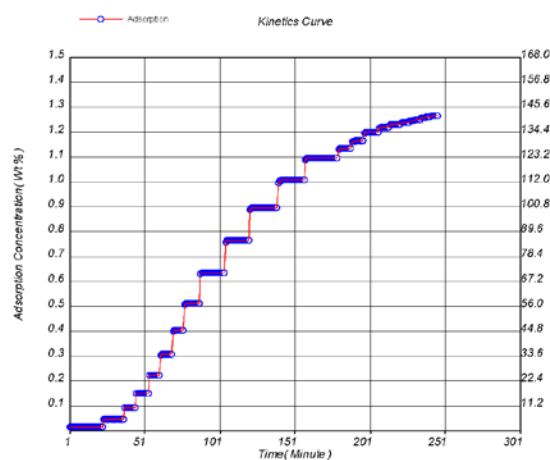
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# Accessories

Item No.		Accessories	Quantity
1	<b>Manufacturer Supplied</b>	H-Sorb 2600 Analyzer	1 set
2		Analysis Software (English)	1 set
3		Rubber O-rings for Sample Cells Sealing	10 pcs
4		Stainless Steel Sample Cells	4 pcs
5		V-shape Sample Filling Funnel	10 pcs
6		RJ 45 Cable	2 pcs
7		Stainless Steel Gas Pipe	2 m
8		Fuse	2 pcs
9		Protective Gloves	1 pair
10		User Manual (English)	1 copy
11		Vacuum Pump Package	1 set
12		Software CD (English)	1 pc
13	<b>Customer Prepared</b>	0.0001 Precision Balance	1 set
14		High Purity Adsorbates (N <sub>2</sub> , CH <sub>4</sub> , H <sub>2</sub> , CO <sub>2</sub> etc.) (99.999%, pressure upper than 15Mpa)	1 cylinder
15		High Purity He (99.999%, pressure upper than 10Mpa)	1 cylinder
16		High Purity N <sub>2</sub> (purity 99.999%)	1 cylinder
17		High Pressure Gauge (pressure upper 200 Bar)	2 sets
18		Pressure Regulator (pressure upper 0.6 Mpa)	1 set
19		Power Cable	1 pc
20		Computer (all Windows systems are OK)	1 set
21		Printer (not a must)	1 set



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[High pressure volumetric gas sorption analyzer](#)

Sample preparation degasser

# Gold APP Instruments

*Our policy of continuous development may cause the information and*

**(ES) Equipements Scientifiques SA - Département Bio-Tests & Industries - 127 rue de Buzenval BP 26 - 92380 Garches  
Tél. 01 47 95 99 90 - Fax. 01 47 01 16 22 - e-mail: [bio@es-france.com](mailto:bio@es-france.com) - Site Web: [www.es-france.com](http://www.es-france.com)**