

AMI-Vapor Series

Volumetric Vapor Adsorption Analyzer

INTRODUCTION

"Accurate, Accessible, Advanced Gas Sorption"

The AMI Vapor Series instruments are precision volumetric analyzers designed for advanced vapor and gas sorption characterization. These systems are ideal for analyzing adsorption isotherms, surface area, pore size distributions, and gas selectivity, using non-corrosive and safe adsorbates under controlled conditions.

Typical adsorbates include water vapor, benzene, carbon monoxide, ammonia, and other non-corrosive gases and vapors at room temperature.

Key Functions

- ✓ Vapor Adsorption Isotherms:
Evaluate adsorption behavior over a range of relative pressures for various vapor species.
- ✓ Gas Selectivity & Capacity:
Determine selective adsorption characteristics and quantify sorption capacity.
- ✓ Surface Area & Pore Size Distribution:
Low-temperature nitrogen adsorption method for BET and BJH analysis.



Figure 1. AMI-Vapor Series

FEATURES

Automated Vapor Generation and Delivery

- **Fully Automated Vapor Source Module:**
Eliminates manual handling. Ensures high-purity vapor via software-controlled delivery.
- **Vapor Source Thermostatic Control:**
Integrated water bath under software control for consistent vapor temperature and stability.

Advanced Analysis Capabilities

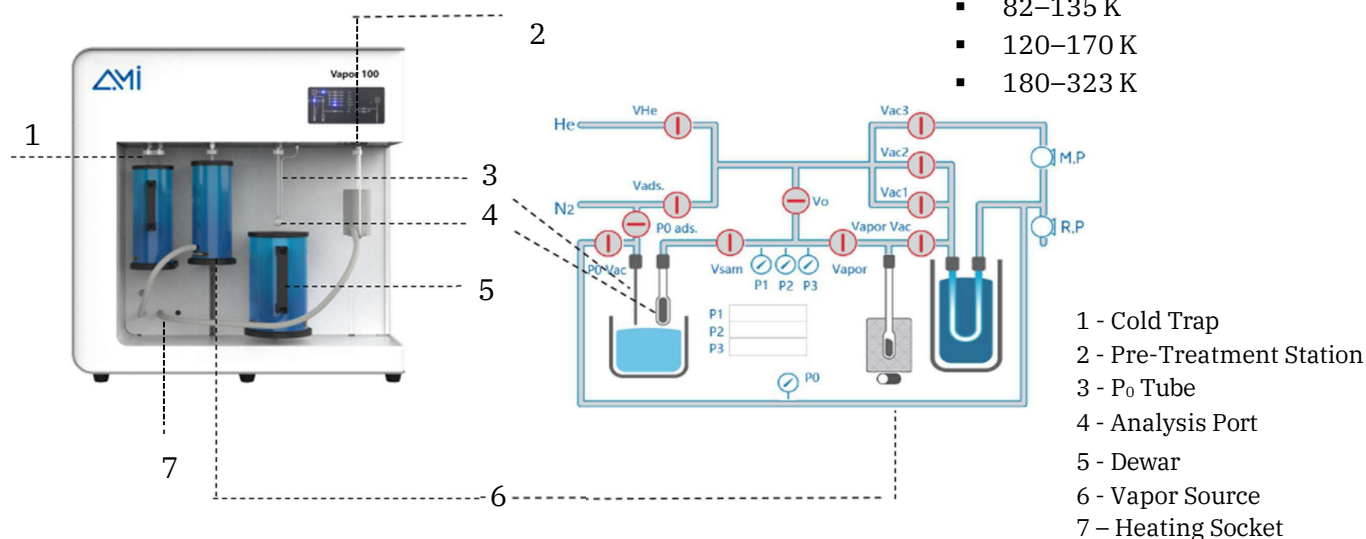
- High-precision pressure transducers (10, 100, 1000 torr) for accurate measurements across a wide pressure range.
- High-vacuum corrosion-resistant solenoid valves.
- Comprehensive software automation for sorption analysis and reporting.

Precision Vacuum Control

- **Ultra-High Vacuum System:**
Includes a turbo molecular pump to achieve pressures down to 10^{-7} – 10^{-8} Pa, optimizing desorption and system cleanliness.
- **Cold Trap System (Dual Stage):**
Standard dual cold traps minimize vapor back streaming and protect the vacuum pump, extending system longevity.

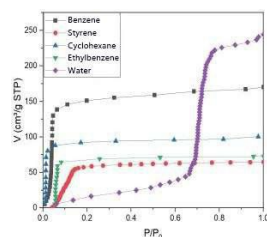
Thermal Stability and Sample Conditioning

- **Thermostated Analysis System:**
Built with corrosion-resistant materials and heated pathways to avoid condensation. Temperature range: ambient to 50°C.
- **Sample Temperature Control Options:**
 - Dewar Flask: 77 K (liquid nitrogen)
 - Water Bath (Optional): -10°C to 95°C
 - **CryoTune Cold Bath (Optional):**
Adjustable ranges
 - 82–135 K
 - 120–170 K
 - 180–323 K

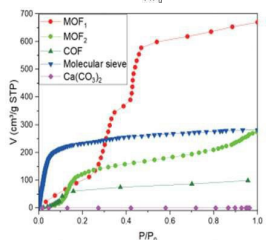


APPLICATIONS

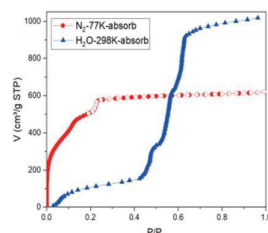
The AMI Vapor Series is designed for precise characterization of porous materials such as MOFs, COFs, zeolites, and activated carbons. It supports studies in gas storage, separation, catalysis, and environmental remediation by enabling accurate measurement of vapor and gas adsorption behavior. The system is ideal for evaluating sorbent performance, selectivity, and capacity under controlled temperature and humidity conditions.



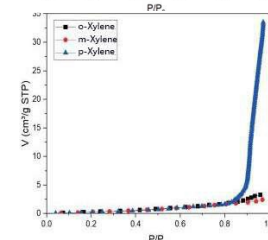
At 25°C, Adsorption Performance of MOFs for Water and Several Structurally Similar Organic Vapors.



At 25°C, Adsorption Curves of MOFs, COFs, Molecular Sieves, and CaCO₃ for Water Vapor.



Adsorption/Desorption Curves of MOF Material for Nitrogen at 77K and Adsorption Curve for Water Vapor at 25°C.



At 25°C, Adsorption Curves of MOFs for Three Isomers of Xylene (Ortho-xylene, Meta-xylene, Para-xylene).

AMI-Vapor Series Configurations



AMI-Vapor 100
Single Vapor Adsorption Station



AMI-Vapor 200
Vapor Adsorption Station + Physical Adsorption Station

SPECIFICATIONS

Vapor Series			
Specific Model	Vapor 100B	Vapor 200B	Vapor 200C
Analysis Ports	1 Vapor Sorption Port	1 Vapor Sorption Port ; 1 Gas Sorption Port	
P ₀ Transducer	1		
Analysis Pressure Transducer	3	4	6
Vapor Sorption Port	1000 torr, 100 torr, 10 torr	1000 torr, 100 torr, 10 torr	1000 torr, 100 torr, 10 torr
Pressure Transducer Accuracy and Resolution	Accuracy: 0.2% RDG, Resolution: 0.003% F.S.		
Gas Sorption Port	N/A	1000 torr	1000 torr, 10 torr, 1(0.1) torr
Pump	1 mechanical pump (ultimate vacuum 10 ⁻¹ Pa); 1 extra mechanical pump for degassing ports (optional)	1 mechanical pump (ultimate vacuum 10 ⁻¹ Pa)	1 mechanical pump (ultimate vacuum 10 ⁻¹ Pa) 1 Turbo molecular pump (ultimate vacuum 10 ⁻⁸ Pa)
P/P ₀ Range	10 ⁻⁶ - 0.998		10 ⁻⁸ - 0.998
Specific Surface Area	N ₂ : 0.05 m ² /g to upper limit; Kr: 0.0005 m ² /g to upper limit.		
Pore Size Range	0.35-500 nm (*Achieved with CO ²), test repeatability: ≤0.02 nm	0.35-500 nm(*Achieved with CO ²), test repeatability: ≤0.02 nm	
Pore Volume	≥ 0.0001 cm ³ /g		
Degassing Ports	1 in-situ; 1 ex-situ;	2 in-situ	
Adsorbates	Gas: N ₂ , CO ₂ , Ar, Kr, H ₂ , O ₂ , CO, CH ₄ , etc. Vapor: H ₂ O, Benzene, Olefins, etc.		
Cold Trap	2		
Dimensions and Weight	L 35.4 in (900 mm) × W 22.4 in (570 mm) × H 36.2in (920 mm), 209 lbs (95 kg)		
Power Requirements	110V or 200-240 VAC, 50/60 Hz, maximum power 300 W		