



Breakthrough Curve and Mass Transfer Analyzer

AMI-BTA 100



- ▲ Analysis of Breakthrough Curves
- ▲ Determination of Diffusion Coefficient
- ▲ Multi-component Adsorption Separation
- ▲ Adsorption Kinetics Acquisition

Altamira Instruments, LLC

24-hour service hotline

+1 (770) 680-2725

Please visit the official website

www.altamirainstruments.com

Breakthrough Curve and Mass Transfer Analyzer

The breakthrough curve and mass transfer analyzer of AMI-BTA 100 series launched by Altamira is a combination of breakthrough curve test, multi-component competitive adsorption, mass transfer kinetics analysis and other functions.

Comprehensive Function and Configuration

Flexible Test Solutions

Accurate Process control and Results

Provide new and comprehensive services and customer experience for advanced researchers in the fields of adsorption, catalysis, energy, etc.



Comprehensive functional configuration

- Breakthrough curve, multi-component competitive adsorption, adsorption isotherm, cyclic stability test and PSA pressure swing adsorption test, adsorption test functions are all available;
- The latest chromatography method for measuring diffusion coefficient function is fully upgraded;
- Up to 100 bar optional test pressure range, control accuracy 0.25% FS.;
- Multi-module collaborative control of low-temperature components, circulating water bath, electric heating package and electric heating furnace to achieve continuous and accurate temperature control of $-10^{\circ}\text{C}\sim 1000^{\circ}\text{C}$ full temperature range;
- Gas flow, system temperature, system pressure, flammable/toxic gas monitoring, all-round safety management module;
- The software has the function of different temperature isotherm fitting, competitive adsorption simulation, breakthrough curve fitting, PSA cycle fitting, diffusion coefficient analysis and other simulation functions, which can not only provide more comprehensive adsorption thermodynamics and adsorption kinetics information, but also save customers a lot of experimental time.

Flexible test scheme

- The independent gas inlet design of the main and bypass can perform different gas intake and purge actions at the same time, providing a more flexible test scheme;
- Rich standard experimental processes, customized experimental processes and experimental sequences, so that more diverse experimental needs can be satisfied;
- Flexible module configuration selection, rich upgrade space, to meet customers' experimental needs at different times and with different focuses.

Accurate result analysis

- The multi-dimensional signal balance judgment mechanism can achieve more precise control of the experimental process;
- It can synchronize data transmission and result processing with the mass spectrometer in real time, and realize accurate automatic calibration and calculation of the combined data;
- The self-calibration function of the TCD detector can standardize the detector according to the test requirements to achieve more accurate testing,
- Calibration functions including blank adsorption, gas concentration, gas flow and others, providing more real and accurate test result analysis.

AMI-BTA100

Series Features



Six-way valve

The system is equipped with a six-way valve, which can realize the determination of diffusion coefficient by chromatography and pulse calibration;



Pulse gas injection

Manual pulse injection port, no need to open the valve box, can be directly injected through the syringe;



Safety protection

The safety protection door can be raised and lowered and started and stopped at will, and is equipped with a device status display light in parallel. It is easy to operate and ensures the safety of the experiment and the stability of temperature;



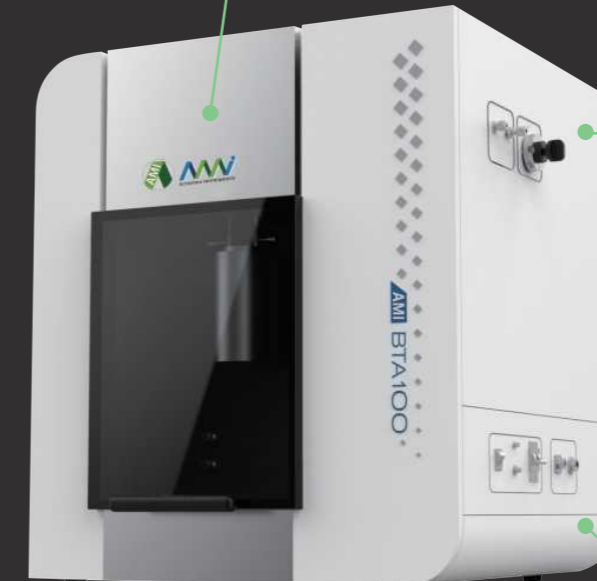
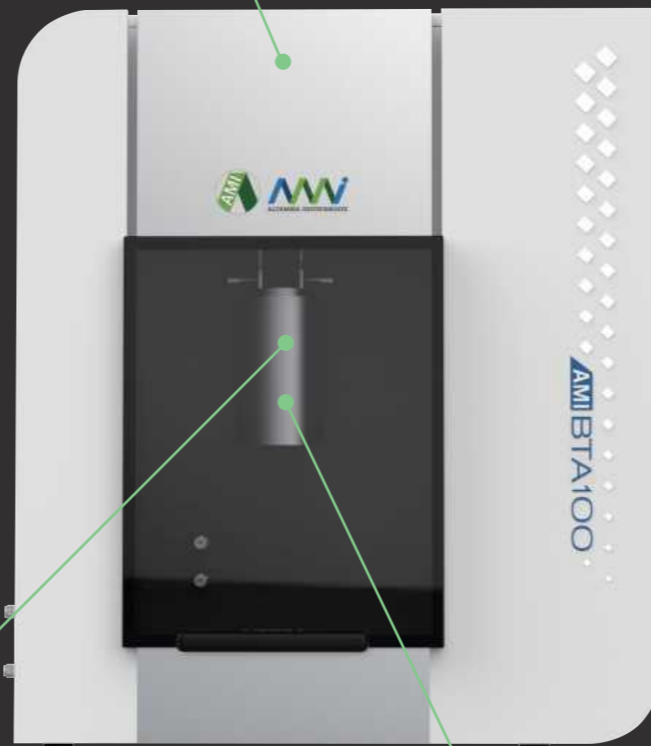
Gas circuit design

The independent gas path design of the main and bypass can independently perform different air intake operations at the same time, providing more experimental flexibility; The valve box of the entire experimental gas path is temperature-controlled, with no cold spots and a temperature range of room temperature to 120°C, which can adapt to most steam testing needs; The main and bypass synchronous pressure control can provide a test pressure environment of normal pressure to 100 bar;

Steam generator

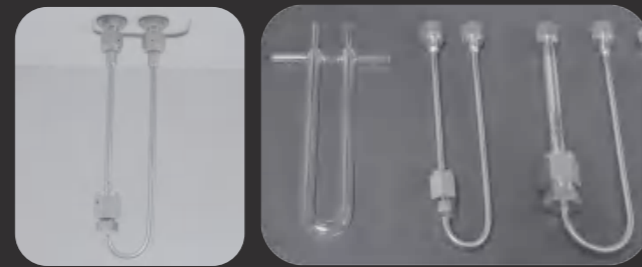
The built-in steam generators can be configured with up to 2 gas inlets, with an operating temperature range of -10°C-90°C, suitable for working under normal pressure/high pressure conditions, and can achieve precise steam control and organic liquid replenishment through temperature and liquid level precision control technology;

The steam generator feed port does not require hardware disassembly and assembly, and can be directly injected by syringe;



External detector

The external device connection interface can be used for mass spectrometry and chromatography. At the same time, it can flexibly choose whether the gas passes through the TCD detector during the connection process;



A variety of adsorption columns are available

Equipped with adsorption columns of different materials and different sample volumes, including 1 mL, 4 mL, and 10 mL sample volumes; Optional materials include 316L stainless steel and quartz glass, of which the standard configuration is stainless steel, which can be used for various pressure configuration ranges below 600°C; and quartz adsorption columns are mainly suitable for high temperature and normal pressure use requirements of room temperature to 1000°C;



Ultra-wide temperature control range

Multi-module, full temperature zone continuous temperature control, specific temperature control modules, including:
Electric heating package: room temperature to 450°C;
Electric heating furnace: high temperature from room temperature to 1000°C;
Circulating water bath: -10°C to 90°C;



External component interface

Water bath and low temperature component interface, directly connected to the inside of the protective door, the temperature control module does not need to frequently open and close the protective door, and is easy to install and operate;

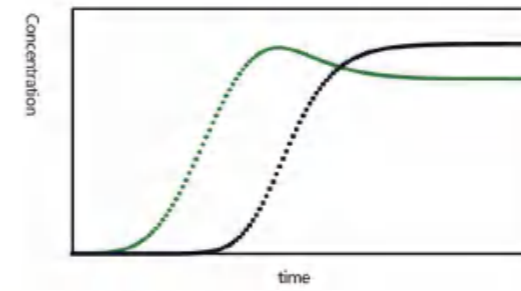
AMI-BTA100

Series Features

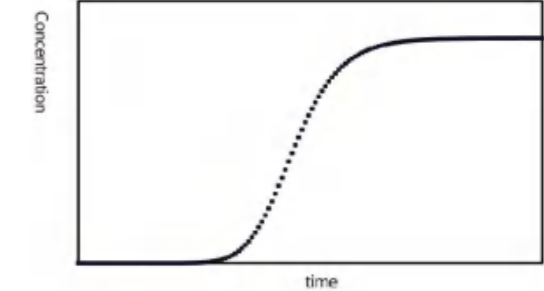
MIX Manager is a user-friendly software that provides 5 standard adsorption test functions, chromatography diffusion coefficient determination function and multiple scenario simulations. It also realizes real-time control of all system functions, automatic experimental process operation and programmable operation, and can display all relevant information such as the status of all sensors and valves, the path and direction of air flow, and safety and conveying operations in real time, and can perform corresponding operations on the control panel;



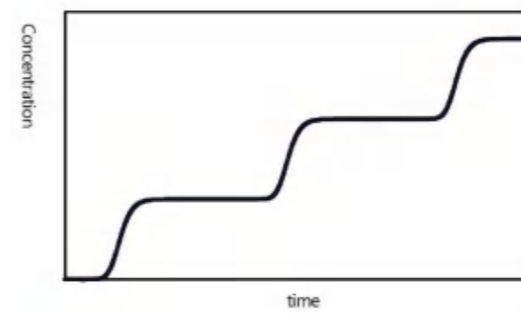
Competitive Adsorption



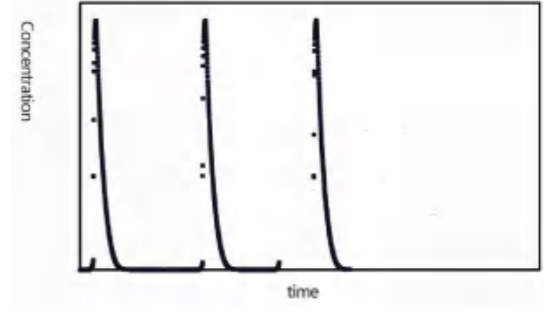
Breakthrough Curves



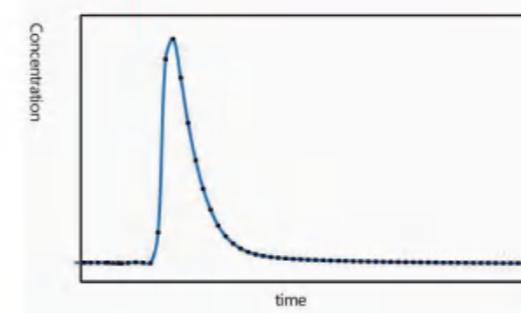
Adsorption Isotherm



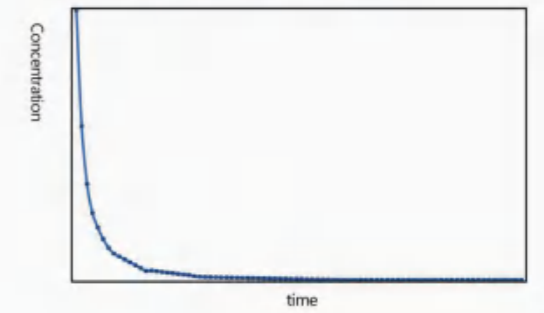
PSA Simulation



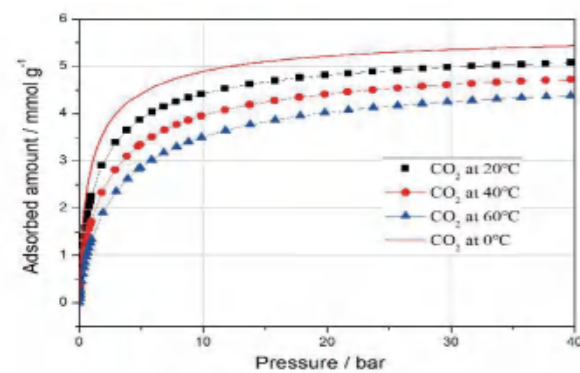
Cyclic Stability



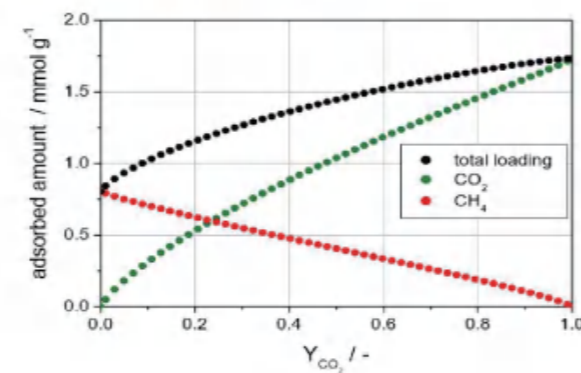
Chromatography



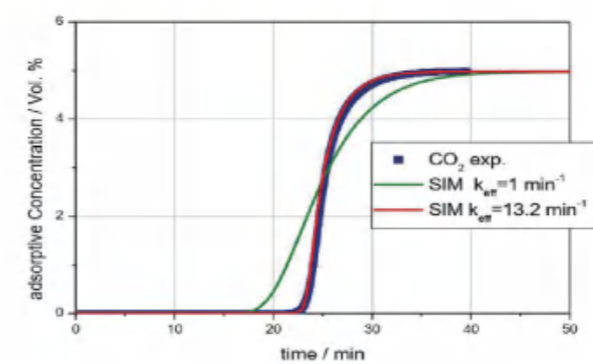
Isotherm fitting at different temperatures



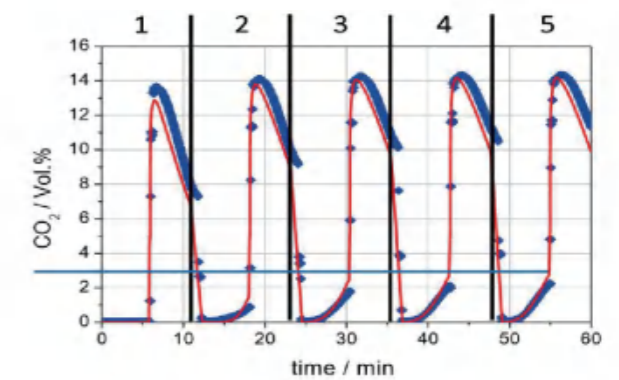
Multi-component adsorption equilibrium simulation



Breakthrough curve fitting

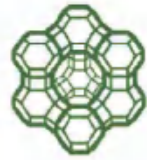


PSA cycle fitting



AMI-BTA 100

Related Applications



Zeolite



Silica gel



Porous membrane material



Activated carbon



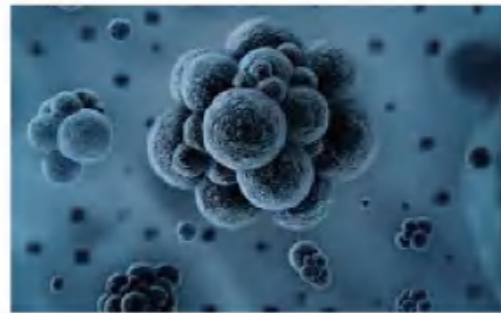
Carbon material



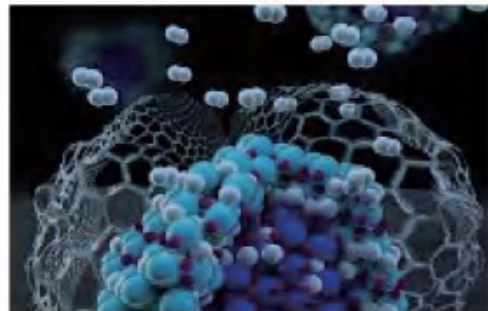
MOFs material



Gas separation



VOC gas treatment



Study on Hydrogen Storage Materials



Tail gas treatment

/ Dynamic airflow adsorption and desorption

/ Determination of adsorption selectivity

/ Research on co-adsorption and displacement

/ Study of thermal equilibrium in flow adsorption process

/ Chromatography for determination of diffusion coefficient

/ Research on adsorption kinetics

/ Determination and evaluation of breakthrough curves

/ Determination of mixed gas adsorption equilibrium

AMI-BTA 100

Parameter Configuration

Specification

BTA100 series products	Breakthrough Curve and Mass Transfer Analyzer			Breakthrough Curve Analyzer			
	100S Pro	100SLP Pro	100SMP Pro	100S	100SLP	100SMP	100SHP
Model							
Breakthrough Curve	√	√	√	√	√	√	√
Competitive Adsorption	√	√	√	√	√	√	√
Adsorption Isotherm	√	√	√	√	√	√	√
Cyclic Stability	√	√	√	√	√	√	√
Diffusion Coefficient	√	√	√				
Pressure Swing Adsorption		√	√		√	√	√
Simulation Software	√	√	√	○	○	○	○
Pressure Range	Up to 1 bar	Up to 10 bar	Up to 40 bar	Up to 1 bar	Up to 10 bar	Up to 40 bar	Up to 100 bar
Number of gas inlets	4						
Number of evaporators	Up to 2						
Temperature Control	Heating mantle: Ambient ~ 400°C; Heating furnace: Ambient ~ 1000°C (Optional) Circulating Baths: -10 ~ 90°C (Optional); (Different temperature controllers can be used together)						
Detection Unit	High precision Thermal Conductivity Detector (TCD)						
Adsorber	1 ml and 4 ml stainless steel adsorber 1 ml and 4 ml quartz adsorber (Optional)						
Corrosion Resistance	○	○	○	○	○	○	○
Air Compressor	○	○	○	○	○	○	○
Master 400 Mass Spectrometer	○	○	○	○	○	○	○
Appearance Parameters	Length 810 x Width 790 x Height 880 mm, 150 kg						

√ is standard, ○ is optional

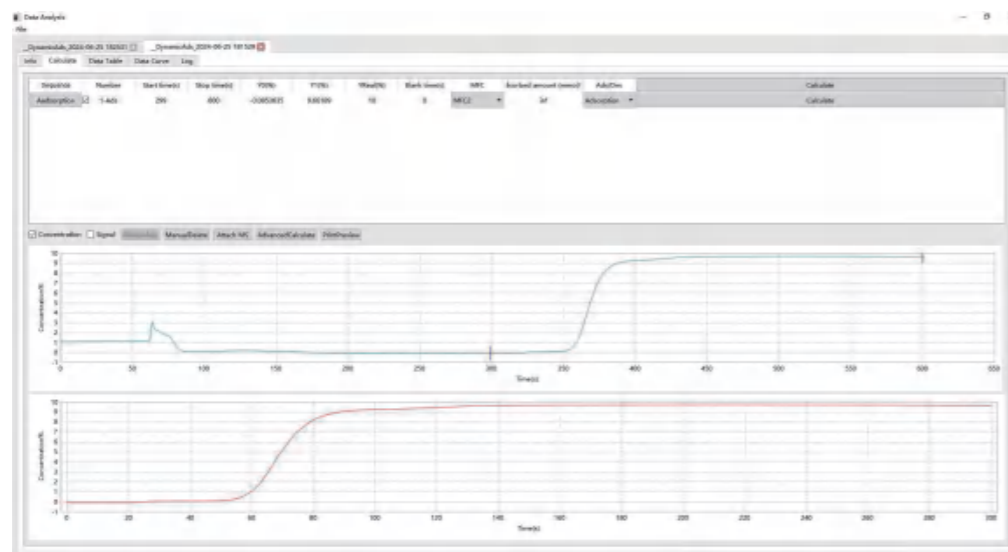
Software

Mix Manager

- Besides the standard experimental process, Mix manager can customize each process to meet the customer's testing needs.
- All experimental processes and data will be recorded, which is very convenient for customers to do the analysis of experimental results.
- As a truly automatic instrument, Mix manager can set judgment conditions for parameters such as time, temperature, pressure and detector signal in the experiment. In this way, we can precisely control the experiment to ensure the repeatability and accuracy of the experimental results.
- Mix manager has the functions of blank adsorption deduction, true flow correction, abnormal data recognition, TCD signal calibration and so on. Therefore, it can effectively eliminate system and environmental factors to make the test results more accurate.



Control interface of Mix manager



Data analysis interface of Mix manager

Customized Service

Adsorption Separation Performance Evaluation Device



- VOC reaction?
- Heavy oil hydrocracking?
- Denitrification catalyst solid waste purification?
- Fischer-Tropsch fixed bed reaction?
- CO₂ gas adsorption and capture?



Three-tube series breakthrough device



N₂-O₂ pressure swing adsorption and desorption device



Fully automatic MOFs adsorption and separation performance evaluation device



Desktop PSA reaction device

Tailored solutions for all your research needs—customized just for you.