

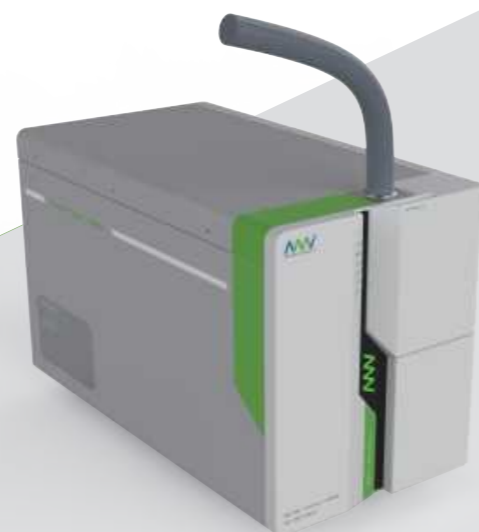
# Who We Are

Founded in 1984, Altamira Instruments is a manufacturer and supplier of chemisorption and physisorption instrumentation as well as bench-scale micro-reactor systems for industrial and research use.

AMI instruments have been installed at more than 300 locations around the world. Among these installations are leading national laboratories, influential academic catalyst research groups and major chemical research centers. Altamira Instruments is a company started by and is still staffed by catalysis people. We take pride in our ability to support the end-user with applications/methods development.

# What We Do

Altamira offers a variety of custom designed and fully automated chemisorption and physisorption analyzers and reactor systems. From instruments that conduct temperature-programmed characterization (TPR/TPO/T-PD) to micro-reactors designed for a specific chemical process to surface area analyzers, Altamira can provide the instrument solution to your laboratory needs.



## MASTER 400 Gas Analysis System



Accurate measurements, fast results for many of today's demanding applications

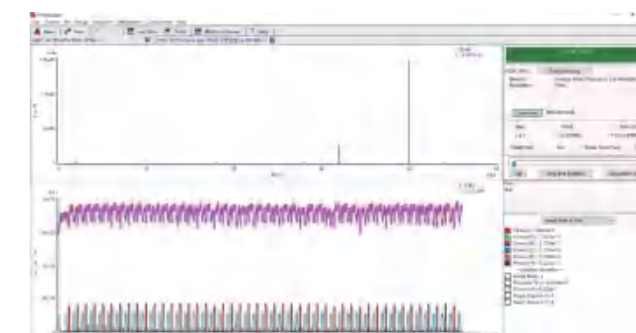
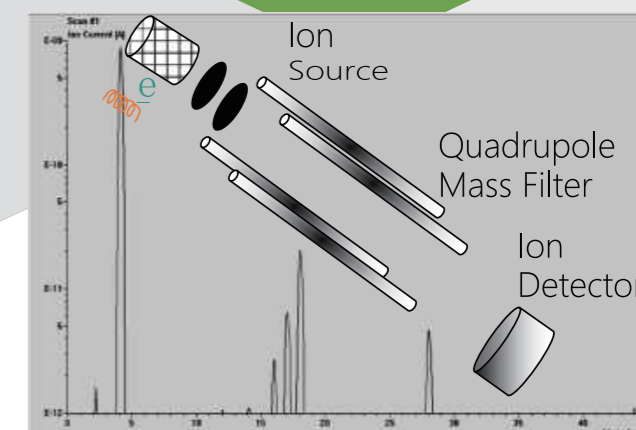
### Product introduction

Master 400 is a new desktop gas analysis system launched by Altamira Instruments (AMI Instruments) in 2022. Qualitative or quantitative analysis of gas components on-line or off-line related to gas can be realized. It features an intuitive design, precise measurements, fast results and is suitable for today's requirements in many application fields. It can be used in various characterization and analysis instruments such as chemical adsorption instrument, micro-reactor device, competitive adsorption instrument, thermogravimetric analyzer, etc.

### Structure and composition

Sampling system: stainless steel or quartz glass capillary and the corresponding filter membrane, adopts two-stage pressure reduction, with a heating jacket outside the capillary, and the heating temperature ranges from room temperature to 200 °C. Vacuum system: turbomolecular pump and oil-free diaphragm dry pump, equipped with a full-range vacuum gauge to control and monitor the pressure of the mass spectrometer to ensure the normal operation of the mass spectrometer. The material of the mass spectrometer is stainless steel, equipped with a heating jacket, and the maximum bakeable temperature it can reach 200°C and can be baked and degassed regularly. The heating jacket of the mass spectrometry chamber and the heating jacket of the sample tube are controlled by two independent temperature controllers.

Quadrupole system: composed of electron bombardment ion source, quadrupole mass separator and detector. Data processing system: multi-channel gas detection software, which can realize qualitative and quantitative analysis, and is suitable for Windows 7/10 system



### ALTAMIRA INSTRUMENTS

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	Master 400 mass spectrometer		
Mass range	1 ~ 100amu	1 ~ 200amu	1 ~ 300amu

## Technical Parameters

- |   |  |
|---|--|
| 1 Mass number range: 1-100amu; 1-200amu;1-300amu;     | 7 Scan time: 1ms-16s/amu                                       |
| 2 Ion source: open ion source, including 2 filaments; | 8 Communication method: TCP/IP Ethernet;                       |
| 3 filament material: iridium                          | 9 Injection pressure: can meet atmospheric pressure injection  |
| 4 Maximum measurement channels: 128;                  | 10 The maximum heating temperature of the sampling tube: 200°C |
| 5 Detection limit: better than 1ppm                   | 11 Maximum cavity baking temperature: 200°C                    |
| 6 Response time: less than 200ms                      | 12 High vacuum pump: turbomolecular pump, pumping speed 67L/S  |

## Instrument Features

The temperature-controllable inlet pipeline can effectively prevent the condensation of the injection gas during the injection process Bakeable mass spectrometry chamber effectively reduces background gas interference

Multiple input and output signals can realize automatic control with external instruments;

The built-in filament pressure protection setting prolongs the service life of the filament;

Response time in the order of milliseconds, scanning speed in the order of milliseconds, to achieve fast online analysis;

Faraday cup/electron multiplier dual detectors, high sensitivity, to achieve a wide range of detection from 100% to ppb; professional analysis software, multicomponent sampling, to achieve qualitative and quantitative analysis of gases;

Customizable sampling system, realize sample gas pre-treatment and multi-channel sampling detection according to requirements;



## Application fields

Thermoanalysis	Battery production
Programmed temperature	Fermentation
Desorption catalytic reaction	Hydrogen Purity Analysis
Automobile exhaust analysis	Chemical industry
Battery seal	On-line detection of fuel cell exhaust gas
Reaction process monitoring	CVD(chemical vapor deposition)

## Applications

### Combined with chemisorption instrument

Chemisorption instrument is an important instrument for dynamic temperature programming research, it can conduct TPD, TPO, TPR, TPS, TPSR research on catalysts, The Master 400 online mass spectrometer can be used in conjunction with a chemical adsorption instrument to perform qualitative and quantitative analysis of the outgassing during the temperature programming process. It can also realize synchronous triggering and temperature signal import with the chemical adsorption instrument.



### Combined with microreactor

Microreactor is an experimental device for small-scale, high-efficiency reactions, which can simulate the conditions of actual industrial reactions and achieve fast, efficient, and precise reaction control and product separation. The coupled mass spectrometer can detect the reaction products in the microreactor online, and then understand the composition and reaction mechanism of the reactants and products, explore the kinetics and thermodynamic characteristics of the reaction, and provide guidance for optimizing catalyst performance and developing new catalysts and reaction processes significance. Master 400 online mass spectrometer can be used in conjunction with microreactors for tail gas analysis and characterization.



### Combined with Breakthrough Curve Analyzer (BTC)

Breakthrough curve analyzer is an instrument used to measure the mass transfer performance of gas on adsorbent or catalyst, and the breakthrough curve can be obtained by measuring the change of the concentration of substances in the gas or liquid at the outlet. The combination of BTC and mass spectrometer can realize the in-situ research on the catalyst surface reaction, monitor the outgassing during the catalyst surface reaction process, understand the mechanism of the catalytic reaction and the characteristics of the surface reaction, and provide guidance for the development of new catalysts and reaction processes



### Combined with Thermogravimetric Analyzer (TGA)

The combination of Master 400 online gas mass spectrometer and TGA can quickly analyze the gas products released during the thermogravimetric test, and carry out qualitative and quantitative analysis of the products. Master 400 can also realize synchronous triggering and temperature signal import with TGA. TGA-MS combined technology has been widely used in the development of organic materials (especially polymers), inorganic materials and organic-inorganic composite materials.



### Online detection of gas components

The Master 400 online mass spectrometer can be used in conjunction with a chemical adsorption instrument to perform qualitative and quantitative analysis of the escaped gas during the temperature programming process. The online mass spectrometer can be used in conjunction with various catalyst evaluation devices, reactors, gas chromatography, liquid chromatography, etc. On-line real-time detection of gas composition and content in the process.