

AMI-300HP

High-Pressure Dynamic Chemisorption

INTRODUCTION

"Complete Chemisorption & Reactor Solutions—Precision Without the Premium"

The **AMI-300HP** is an automated high-pressure chemisorption and catalyst characterization system, engineered for advanced research under industrially relevant conditions. It performs dynamic temperature-programmed experiments at pressures up to 100 bar, enabling detailed studies of catalyst behavior under true process environments.

Designed for maximum flexibility, the **AMI-300HP** can also function as a high-pressure gas-phase reactor, providing a dual-purpose solution for laboratories requiring both chemisorption analysis and reaction testing in a single, integrated platform. This capability enhances its utility for catalyst performance evaluation, process development, and kinetic modeling.



**Temperature-programmed
desorption (TPD)**

**Temperature-programmed
reduction (TPR)**

**Temperature-programmed
oxidation (TPO)**

**Temperature programmed
surface reaction (TPSR)**

Pulse Chemisorption

**Ambient Vapor Dosing
(Option)**

Figure 1. **AMI-300HP** Chemisorption Analyzer

KEY FEATURES

Precision Heating and Temperature Control

clamshell furnace capable of reaching 1200°C (max. temperature dependent on reactor type), with precise ramp rates from 0.1°C to 50°C per minute.

Stable Gas Flow Control

High-precision mass flow controllers (MFCs) ensure stable flow control and consistent TCD baselines, even during temperature-programmed experiments.

Condensation Prevention

Heat-traced stainless steel flow path eliminates condensation risks, preserving gas-phase integrity.

High-Sensitivity Detection

A highly linear Thermal Conductivity Detector (TCD) provides exceptional accuracy and sensitivity across a broad range of conditions.

Software Alarm Matrix

A dynamic alarm matrix provides live feedback and alert notifications for all monitored parameters. Logging alarm events ensure traceability and compliance with lab safety protocols.

Advanced Safety and Protection

- Independent Over-Temperature Protectors on the furnace prevent thermal runaway.
- Resealable Pressure Relief Valves automatically vent excess pressure and reseal without damage.
- Check Valves prevent backflow and protect against gas cross-contamination.
- Fail-Safe Design ensures the system defaults to a safe state during critical failures or power loss.
- Positive Shut-off valves to ensure complete isolation of gas lines when not in use, enhancing safety and preventing cross-contamination.

Flexible Customization Options:

- Custom reactors in a variety of types and sizes,
- High-pressure MFCs with customizable flow ranges to suit specific gas delivery requirements.
- Vaporized liquid delivery systems for injecting volatile or condensable reactants.
- Sub-ambient operation down to -130°C, enabling low-temperature adsorption and reaction studies.

SOFTWARE

The **AMI-300HP** is fully automated to ensure ease of use, repeatability, and reliable operation. Its integrated software precisely controls and regulates valve positions, temperatures, gas flow rates, and detector parameters, providing seamless management of complex experimental setups.

Data acquisition is performed at a user-selectable rate, allowing for optimized resolution and performance. A front-panel status screen offers a real-time overview of the system, displaying valve positions, connected gas types, active temperatures, and detector signals—all at a glance.

The built-in data handling package enables users to:

- Display and integrate signal peaks
- Calculate chemisorptive parameters
- Overlay and compare datasets

Users can link up to 99 individual procedures in a single, continuous run, enabling fully automated, comprehensive catalyst characterization. Additionally, routine experiments can be designed and stored for quick and easy retrieval.

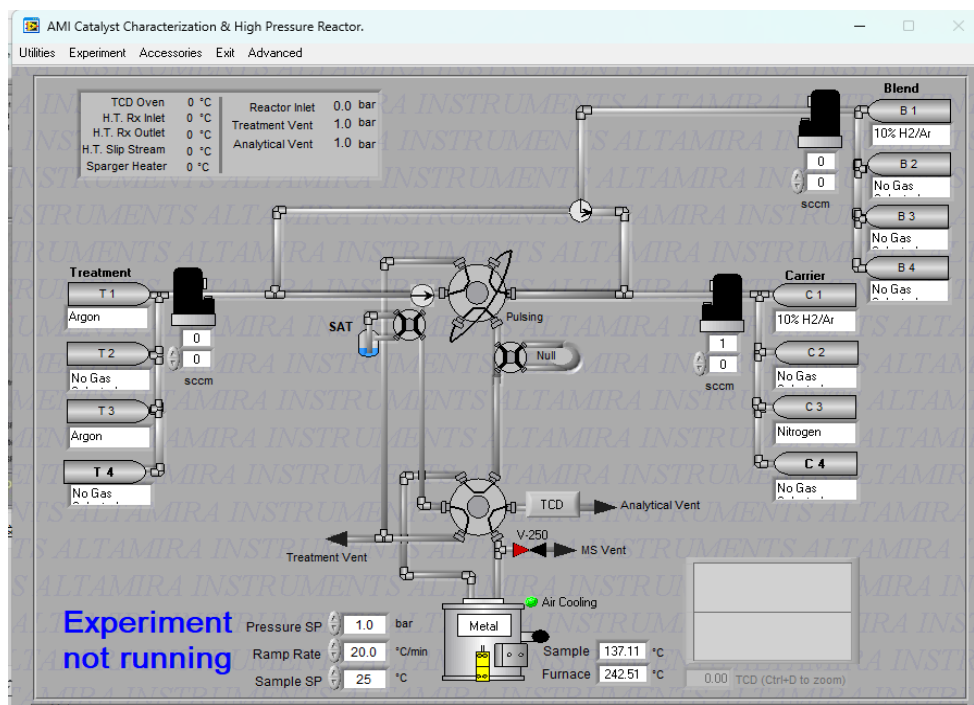


Figure 2. Operating Screen - A complete overview of all experimental parameters

SPECIFICATIONS

Catalyst charge*¹:	0.1 - 5 g
Temperature range*²:	RT-1200°C; -130°C (Optional) to 1100°C
Ramp rate:	0.1 - 50°C/min
Operating pressure*³:	100 bar
Gas inlets:	3; 4 (4, 10, or 14 optional)
MFCs*⁴:	Standard: 2 high-pressure MFCs; 1 Ambient MFC Optional: 1 high-pressure MFCs
Gas Flow Rates	High-pressure MFC: 2-200 sccm ; Standard MFC: 2-250 sccm; High-pressure MFCs: 2-100 sccm (Optional)
Reactor types*⁵:	Atmospheric pressure: Quartz U-shaped tube (6mm, 8mm, 10mm optional), bubble tube; High pressure: 316 stainless steel
Detector:	Tungsten-rhenium filament, temperature up to 200°C
Materials of construction:	Kalrez, 316 stainless steel
Heated Lines	130°C (Optional)
Vapor generator	100°C (Optional), Ambient Pressure Only
Mass Spectrometer:	Optional
FID:	Optional

Notes:

- *1 - Custom reactors available for increased loading.
- *2 - Standard temperature range is RT - 650°C, -130°C - 1200°C requires options.
- *3 - Higher pressure available in custom instruments.
- *4 - The number of MFCs can change to increase capability or lessen cost.
- *5 - Other reactor materials are available.