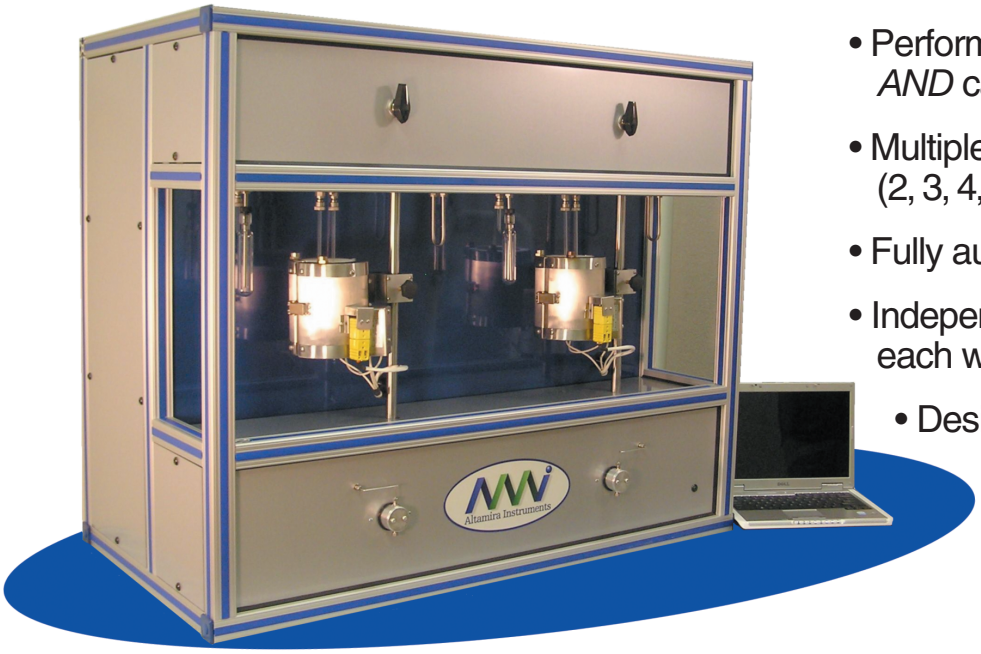
ALTAMIRA INSTRUMENTS

The First Name in Custom Reactor Systems

BenchCAT™ *X000R HP Hybrid*

A CUSTOM CATALYST TESTING INSTRUMENT



- Performs both reaction testing *AND* catalyst characterization
- Multiple workstations (2, 3, 4, 5, 6, or 8 workstations)
- Fully automated workstations
- Independent experiments on each workstation
- Designed for unattended operation

Reaction Testing:

- Temperature Programmed Reactions
- Isothermal reaction studies
- Pressures from ambient up to 50 bar
- Furnace temperatures up to 1200^{O}C
- Analysis via auxiliary MS or GC
- Quartz, 316 SS, or custom reactor tube
- Sample holder sizes to 25 mL

Catalyst Characterization:

- TPR, TPO, TPD, TPRx, Pulse Chemisorption
- Dynamic BET
- Furnace temperatures up to 1200^{O}C
- Ambient pressure operation
- Subambient testing to –100^{O}C
- Analysis via integral TCD or auxiliary MS (or GC)
- Quartz sample holder (to 1 gram)
- Monolith holder available (1”Ø x 2” long)

The Altamira Advantage:

- Altamira will customize this instrument to meet your exact research needs today.
- Altamira will customize this instrument in the future to meet your changing research needs.

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Technical Specification–BenchCAT™ 4000R HP Hybrid

System Capabilities:

Catalyst Characterization and Reaction Testing: The BenchCAT 4000R HP Hybrid is a four station automated reactor system designed to:

1. Conduct temperature-programmed or isothermal experiments with catalysts loaded in a straight tube reactor at ambient or pressure conditions. External analysis will be performed with a mass spectrometer.
2. Perform characterization experiments (TPR, TPO, TPD, Pulse Chemisorption) using catalysts at ambient pressures. Analysis will be made internally, using the TCD, or externally with a mass spectrometer.
3. The instrument is configured to perform either reaction experiments or characterization experiments on an automated basis. Reaction and characterization will always be performed as separate experiments.

Basic System Specifications

A. Reaction Testing

Number of Stations	4
System Operating Pressure	Ambient – 20 barg (higher pressures available)
MFC Inlet Pressure	350 psig (Varies according to operating pressure)
Maximum Furnace Operating Temperature	700°C
Maximum Post Reactor Line Temperature	150°C
Number of MFCs (Reaction Side)	3 (per station)
Number of MFCs (Shared)	3 (per station, blended)
Number of Vaporized Liquid Feeds	1 (HPLC pump per station)
Materials of Construction	
• Upstream Plumbing	316SS
• Downstream Plumbing	316SS
• Sample tubes	Glass lined stainless steel
• Sample tube option	316 SS monolith holder
• Wetted Parts	316SS
• Seal Materials	Premium
• Catalyst Charge	To 1 gram
Overall System Footprint	70” x 60” x 30” (H x L x W, approximate)
Utility Requirements:	
• Oil-free, Dry Air	Multiple 80 psig utility connections
• System power	208 VAC, 90A
• Computer power	110V/15A

B. Catalyst Characterization

Number of Stations	4
System Operating Pressure	Ambient
Gas Inlet Pressure Range	50 psig
Gas Outlet Pressure Range	near ambient
Maximum Furnace Operating Temperature	1200°C
Maximum TCD Operating Temperature	200°C
Materials of Construction	
• Plumbing	316SS
• Sample U-tubes	Quartz
• Wetted Parts	316SS
• Seal Materials	Premium seals
• Catalyst Charge	0.1 – 1 g
Number of Treatment/Carrier Ports	4 (per station)
Number of Blend Ports	2 (per station)

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