CDS Analytical, Inc.

Leaders In Sample Introduction Technology

Model 5200HP-R High Pressure Pyrolysis Mini-Reactor System

Scientists that study new biomass feedstock, coal, oil, or polymer reactions must understand how these materials break down in various conditions. Traditionally this process has been cumbersome, expensive, and time-consuming. Now, CDS is pleased to announce a better way; the world's first, and only, mini high-pressure pyrolysis reactor system – complete with a high temperature catalyst reactor.

By passing pyrolyzed gas through a catalyst bed, this high-pressure pyrolyzer enables users to study high temperature and pressure on a small scale. Substantial economies of time and money result, for scientists and chemical engineers alike, since they have a much better idea of what will happen before they scale up for pilot reactor tests. Convenience and adaptability are built in; for example, users can choose GC carrier gas, or reactant gasses like air or oxygen, as their backgrounds.

The system is built on our field-proven model 5200HP-R pyrolyzer, modified with a backpressure regulator and heated catalyst bed. Samples can be pyrolyzed at elevated pressures (500PSI max), passed through a user-selectable catalyst bed, and collected onto the built-in trap. When sample pyrolysis is complete, analytes are transferred from the trap to the GC at normal operating conditions.

Model 5200HP-R High Pressure Pyrolysis Mini-Reactor System Specifications

Compatible with all GC and GCMS makes and models

Resistively heated element with coiled platinum filament enables variable temperature control. Allows for fast & slow pyrolysis-heating rates, programmable in degrees-per-millisecond, per second, and per minute.

- Filament Temperature: 1°C increments to 1400°C
- Heating rates: 0.01°C/minute to 20,000°C/second
- Heating times: 0.01 second to 999.99 minutes

Interface: 1°C increments to 350°C

Trap: 1°C increments to 350°C

System Pressure: To 500 PSI (3400 kPa)

Reactor Conditions:

- **Temperature:** 1°C increments to 800°C (950°C with optional temperature controller)
- **Catalyst tube:** 3" x 1/4" 316 stainless steel (6 mm x 75 mm)
- User-interchangeable with different catalyst types

Steps per Sample: Up to eight temperature profiles with a GC start per step. Allows for multiple thermal desorption or pyrolysis steps on each sample.

Built-in trap allows the user to pyrolyze in a reactant atmosphere, such as air, trap the pyrolyzed components and then desorb them in the GC for analysis. The trap can also be used to do slow evolved gas studies on samples and be used as a thermal desorption chamber.

- **Trap Temperature:** ambient to 350°C
- **Trap Heating Rate:** programmable in 1°C/min increments to 600°C/min

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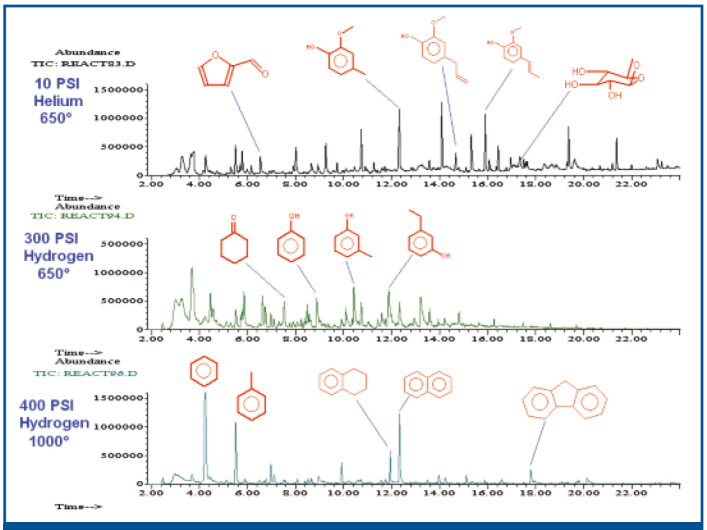
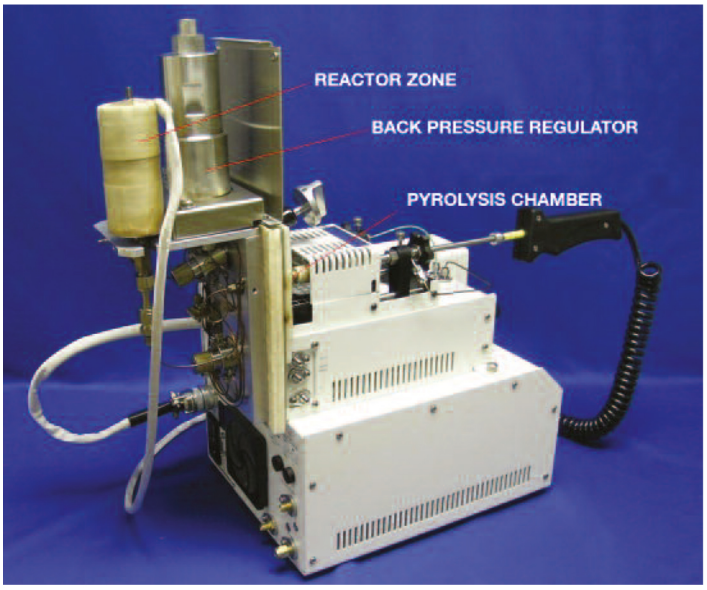
Model 5200HP-R High Pressure Pyrolysis Mini-Reactor System

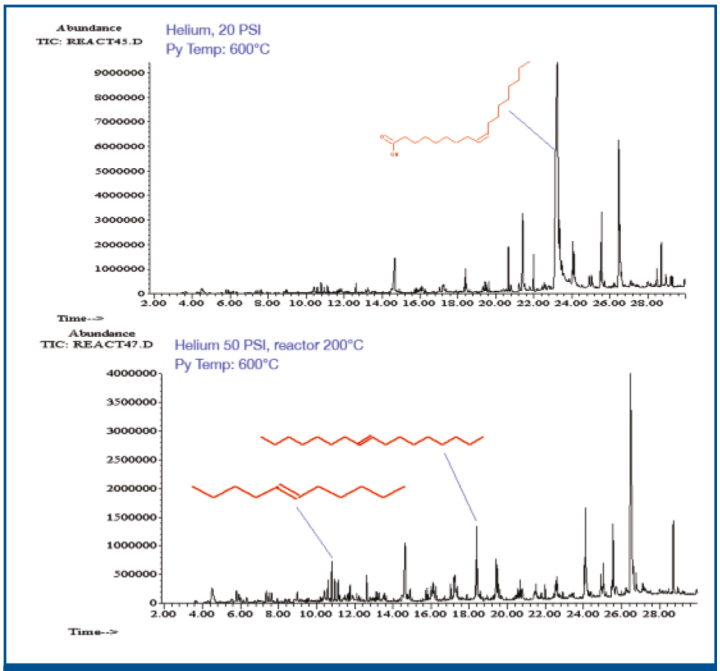
The CDS Model 5200HP-R High Pressure Pyrolysis Mini-Reactor System may be used in any of the following modes:

Feature	Benefit
Pyrolysis direct to GC	Provides standard Py-GC or Py-GC/MS analysis
Pyrolysis w/trapping	Allows low temperature work for thermal desorption and programmed heating rate pyrolysis
Reactant gas pyrolysis w/trapping	Permits pyrolysis in reactive atmosphere like air or oxygen
High-pressure pyrolysis w/trapping	Provides for evaluation of process conditions at elevated pressure & reactant gases
Pyrolysis to catalytic reactor w/trapping	Pyrolysis products pass through a catalytic reactor
High-pressure pyrolysis and reactor w/trapping	Pyrolysis products pass through a catalytic reactor at elevated pressures



Wood biomass pyrolyzed at temperature and pressures as noted in either He or H_2. Runs two and three were passed through a Pt catalyst at 200°C.





Vegetable oil was pyrolyzed at temperatures and pressures as noted in either He or H_2. Run two was passed through a Pt catalyst at 200°C.

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