



AutoChem 2950 HP Chemisorption Analyzer

Technique Overview

The AutoChem 2950 HP is a microreactor that may also be used to study catalysts up to 70 atmospheres using dynamic chemisorption techniques. Temperature-programmed reduction, oxidation, desorption, and reaction studies are easily and rapidly studied.

The gas delivery system allows the user to select either chemically active or inert species to flow through the sample bed. Typical inert gases that are used include nitrogen, helium, and argon. The most common active gases include hydrogen, carbon monoxide, ammonia, oxygen, and carbon dioxide. Hydrogen, carbon monoxide, and oxygen are commonly used to characterize supported metal catalysts. Ammonia is effective for determining the acidity of zeolites and other solid acids. Carbon dioxide may be useful for probing the basicity of oxide catalysts.

Gas flows are controlled using thermal, mass flow controllers. The use of flow controllers allows the analyst to specify different flows throughout the experiment without manual intervention. Gases then enter the temperature-controlled region of the AutoChem 2950 HP. Zero dead volume valves are used to allow either a preparation or analysis flow path. The preparation flow path provides a convenient route for dirty chemistry such as catalyst activation where corrosive compounds may desorb from the catalyst. This allows the analysis flow path to remain clean and avoid any exposure to contamination.



The analysis path features a dedicated gas supply, access to automated microdosing via a fixed volume loop, and internal gas blending. These features allow for both pulse microreactions and continuous reactions. A cold trap is also provided to allow a temperature-controlled region for the removal of condensable species that have been produced during microreactions. The AutoChem 2950 HP also allows the pressure of either the analysis path or the preparation path to be controlled via an electronic back-pressure controller. A thermal conductivity detector (TCD) is provided so that the gas concentration may be monitored for changes as it passes through the sample bed. The TCD features gold-plated, iron-nickel filaments and provides compatibility with a wide range of gases.

Special external ports also allow products from the reaction chamber to be directed to a mass spectrometer or other external detector.