



AutoChem II 2920

TECHNIQUE Pulse Chemisorption Analysis

A Pulse Chemisorption analysis (Figure 1) determines active surface area, percent metal dispersion, and active metal particle size by applying measured doses of reactant gas to the sample.

The injected gas chemically reacts with each active site until all active sites have reacted. The first few injections may be totally consumed and no change in signal from the detector will be recorded. As the sample approaches saturation, peaks representing concentrations of unreacted molecules appear. After reaction has completed, each of the discretely injected gas volumes emerge from the sample tube unchanged and the detected peaks are constant in area. The quantity of molecules chemisorbed is the difference between the total amount of reactant gas injected and the sum amount that did not react with the active sites of the sample as measured by the detector. The quantity of each pulse of reactant gas is determined by an injection loop on an electrically operated valve. Three loops of different sizes are provided with the analyzer. Controlling the temperature of the loop and valve assures that the quantity of injected gas (or vapor) can be calculated accurately and remains constant for each injection.

Figure 1. Signals produced by successive injections of equal volumes of adsorptive gas onto the sample. Peaks represent unadsorbed analysis gas. The AutoChem II 2920 automatically stops data collection when two or more peaks exhibit the same area, an indication of saturation.

