



## TGA-HP50 SPECIALTY GRAVIMETRIC ANALYZER

Designed to address the most demanding applications, the TA Instruments TGA-HP50 instrument is a specialty gravimetric analyzer which provides unique capabilities for High-Pressure, Ultra-High Vacuum, and High-Temperature under static or dynamic reactive atmospheres. These experimental conditions open new doors for the investigation of novel applications such as hydrogen storage materials, carbon sequestration technology, and catalyst development.

The TGA-HP50 employs a high-sensitivity balance with 5 gram capacity and sensitivity of 0.5 micrograms. The TGA-HP50 is the instrument of choice for high-pressure studies (up to 50 Bar) at measurement temperatures up to 800°C, and can accommodate a variety of gas compositions under high-pressure static or dynamic flow. Our standard Ultra High Vacuum (UHV) accessory provides atmospheres down to  $1 \times 10^{-6}$  torr. The TGA-HP50 is ideal for catalyst studies, hydrogen sorption, and CO<sub>2</sub> sequestration analysis. The effluent gas stream from the TGA-HP50 is reduced to ambient pressure to accommodate real-time evolved gas analysis using either mass spectrometry or FTIR analysis.

Balance



Reactor



# TGA-HP50 Technical Specifications

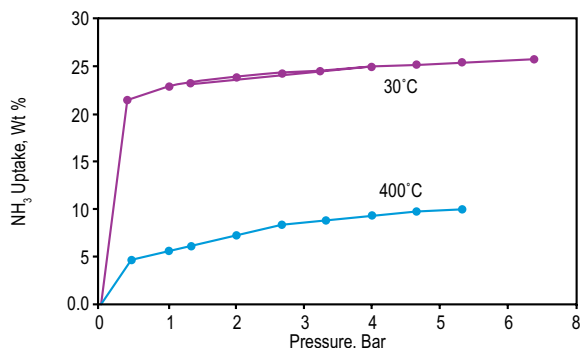
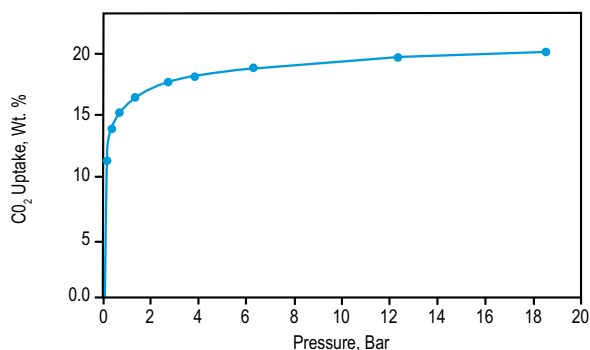
Balance	Recording Microbalance
Balance Capacity	5 g
Sample Capacity (with pan)	Approx. 2 g
Dynamic Range	500 mg
Weighing Accuracy	+/- 0.1%
Weighing precision	+/- 0.01%
Sensitivity	0.5 µg
Reactor Type	Single Block Inconel 625®
Upper Temperature Limit	800 °C
Pressure Limit	50 bar (725 psi)
Gas Inlets	3
Dynamic Flow-Dosing	Available
Steam Generator	N/A
High Vacuum	1 x 10 <sup>6</sup> torr
Corrosive Gas Compatibility	N/A

Inconel 625 is a registered trademark of Special Metals Corporation.

## Applications

### Carbon Dioxide Sequestration

Zeolite and other inorganic molecular sieve membranes have shown potential for gas sequestration because of their small pore size, typically less than 1 nm, and their narrow pore size distribution. The size of these channels controls the size of the molecules or ions allowing some ions to pass through while blocking others. This figure contains the TGA-HP data for the adsorption of CO<sub>2</sub> into raw chabazite at 60 °C and at pressures up to 20 Bar. Note how the quantitative gravimetric sorption is easily determined using the TGA-HP technology.

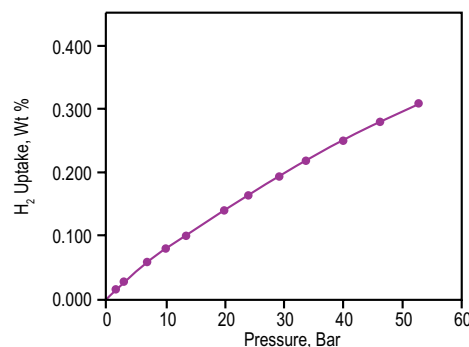


### Adsorption of NH<sub>3</sub> on Zeolite Catalyst

The data in this figure shows the TGA-HP data of the adsorption of ammonia gas onto a zeolite matrix at two discrete temperatures, 30 °C and 400 °C, at pressures up to 7 Bar (ca. 100 psi). The TGA-HP is used to measure the quantitative capacity of the zeolite to adsorb the ammonia, thus allowing for the effective design of an exhaust stream catalyst technology.

### Adsorption of H<sub>2</sub> on Carbon

Recent research has focused on the development of transportable reversible systems for hydrogen storage with a high capacity. These systems are critical to the large-scale application of hydrogen fuel cells, in particular for mobile applications such as automotive use. The TGA-HP is the ideal tool for measuring the adsorbent efficiency for hydrogen sorption. This data shows the adsorption of H<sub>2</sub> gas onto an activated carbon matrix at 25 °C (298 K). Note how the adsorption is quantified over the wide pressure range from sub-atmospheric to nearly 50 Bar (ca. 725 psi)



TA Instruments, 159 Lukens Drive, New Castle, DE 19720  
 Telephone: (302) 427-4000 • Fax: (302) 427-4001 • E-mail: info@tainstruments.com

[www.tainstruments.com](http://www.tainstruments.com)