

Gas sorption balance

Rubotherm GmbH, Magnetic Suspension Balance



www.tue.nl/mmp

Introduction

With the magnetic suspension balance (MSB) very accurately gravimetric measurements in a wide temperature and pressure range and under aggressive media can be carried out.

We have two different systems:

- Static, where a fixed pressure of a single pure gas or vapor is introduced to the sample.
- Dynamic, where a flowing gaseous environment is used.



Principle

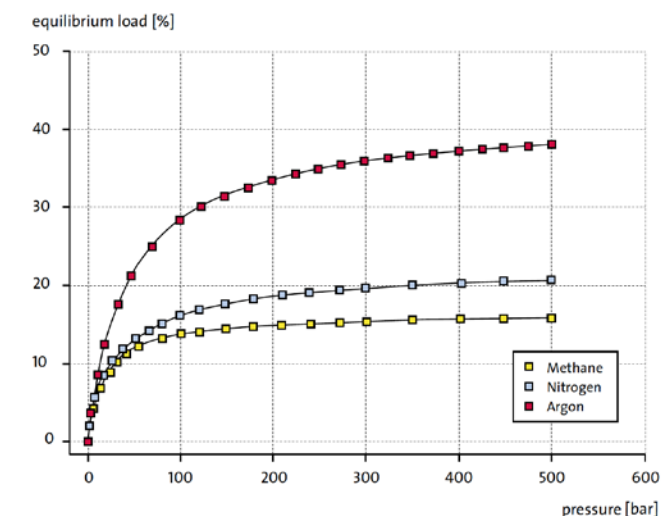
For each value of pressure or temperature, the weight of the sample is monitored until the sample reaches equilibrium with the gas or vapor. This weight value, at equilibrium, then gives a point on the sorption isotherm.

It is important to note that the measured weight includes contributions from various effects, in addition to the amount of sorption. To obtain the mass of sorbed gas, it is necessary to eliminate or correct the weight for these additional forces, which may include:



- The Buoyancy or Archimedes force, due to the displaced mass of gas.
- Forces due to movement of the gases around the sample.
- Interactions between the sample and ambient magnetic fields.

The contact-less transmission of the sample weight is realized "through the wall" of the measuring cell with a levitation magnet and a holding magnet.



The MSB is suitable for all gases, incl. toxic gasses like CO and H₂S, and can be applied at extreme conditions, e.g. ultra-high vacuum up to 150 bar and -20 up to 600 °C.

Applications

- Determining fluid density
- Measuring the sorption selectivity of gas mixtures
- Determining the gas storage capacity of porous materials
- Determining the solubility of gases in liquids
- Measuring reaction kinetics