AGAS

Advanced Gas Sorption Analysis System
What is AGAS

AGAS is an advanced gas sorption analysis system
AGAS is simple and user-friendly
AGAS combines the quasi-static (Sieverts) and dynamic measurement modes in a single device
AGAS comes with an integrated data analysis software

Specifications
- Measuring Pressure Range: 0-100 bar (standard), 0-200 bar (optional)
- Pressure measurement accuracy: ±0.35% of the full range
- Hydrogen flow rate in dynamic mode: 0 – 5 Nml/min (customizable)

Measurement Capabilities
- Dynamic pressure composition isotherms
- Pressure-composition quasi-static equilibrium isotherms (Sieverts)
- Kinetic Sorption Measurement (Arrhenius)
- Desorbed Gas Analysis (Mass Spectrometer)

AGAS is an advanced gas sorption analysis system for measuring pressure and temperature in a range of 0-100 bar and 298K – 473K. It offers a pressure measurement accuracy of ±0.35% of the full range and a customizable hydrogen flow rate of 0 – 5 Nml/min in dynamic mode.

Dynamic Pressure-Composition Isotherms (pcI) Measurement and Determination of the Enthalpy and Entropy of Reaction

The pcI are measured at a constant flow rate of 1 Nml/min·g and allows determining the enthalpy and entropy of reaction of (LaCe)(NiCoMn)$_5$

- Reaction Enthalpy: $-26.7 \pm 1.7 \text{ kJ/mol (Abs.)}, 28.2 \pm 1.7 \text{ kJ/mol (Des.)}$
- Reaction Entropy: $101.0 \pm 5.1 \text{ kJ/mol (Abs.)}, 101.8 \pm 5.1 \text{ kJ/mol (Des.)}$
Measurement Results

Comparison of the Quasi-Static (Sieverts) with the Dynamic (Mass Flow) pcI Measurement

Comparison of the quasi-static (Sieverts) method with the dynamic (Mass-Flow) method for the pcI (Absorption) measurement of (LaCe)(NiCoMn)\textsubscript{5} at 40°C.

Determination of the Critical Temperature and H-H Interaction Energy Using the Lattice Gas Model

The lattice gas model allows determining the interaction energy between two hydrogen atoms in the metal lattice and the critical temperature at which the two-phase mixture no longer exists.

- H-H interaction energy: \( \varepsilon_0 = 2.12 \text{ eV} \)
- Critical temperature: \( T_c = 542°C \)

Determination of the “True” Equilibrium Pressure by Extrapolation to Zero Flow Rate

The measurement of pcI curves at different flow rates allow determining the “true” equilibrium pressure by extrapolation to zero-flow.

Thermo-Desorption of Complex Hydrides

Measurement of the hydrogen desorption flow as a function of the different temperatures.