AGAS Mano

Advanced Gas Sorption Analysis System

Manual Version

GRZ Technologies

www.grz-technologies.com

What is AGAS Mano

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

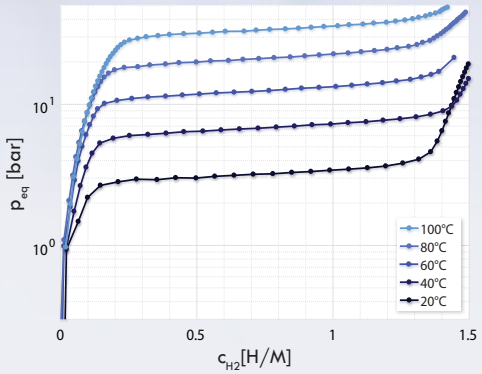
- **Measuring Pressure Range: 0-100 bar**
- **Measuring Temperature Range: 298K – 473K (standard), 77K – 773K (optional)**
- **Pressure measurement accuracy: ±0.35% of the full range**
- **Hydrogen flow rate in dynamic mode: 0 – 5 Nml/min (customizable)**

Measurement Capabilities

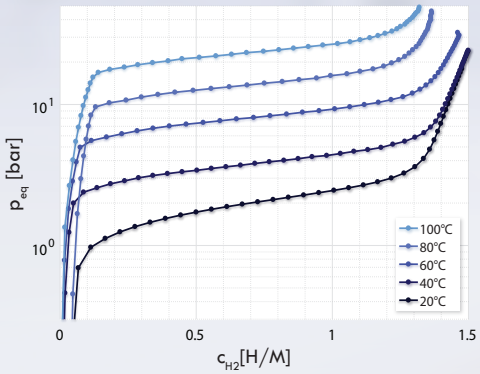
- Dynamic pressure composition isotherms
- Pressure-composition quasi-static equilibrium isotherms (Sieverts)
- Kinetic Sorption Measurement (Arrhenius)
- Desorbed Gas Analysis (Mass Spectrometer)

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

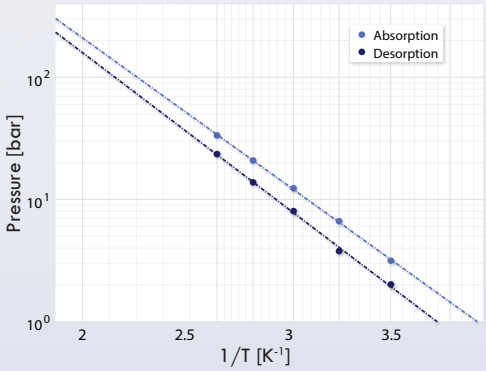
Absorption



Desorption



Van't Hoff plot



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

- **Reaction Enthalpy:**

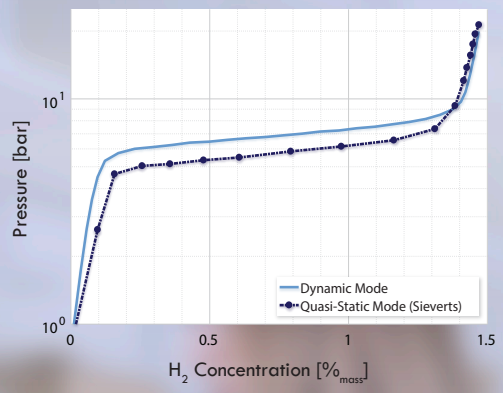
-26.7 ± 1.7 kJ/mol (Abs.), 28.2 ± 1.7 kJ/mol (Des.)

- **Reaction Entropy:**

101.0 ± 5.1 kJ/mol (Abs.), 101.8 ± 5.1 kJ/mol (Des.)

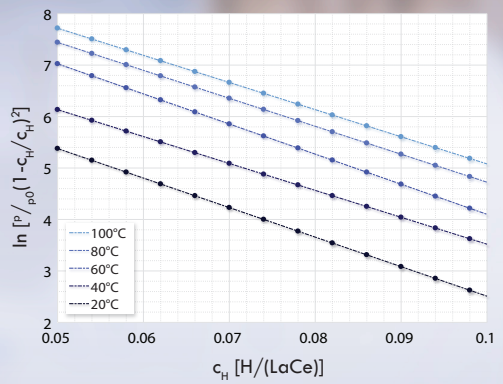
Measurement Results

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 $(LaCe)(NiCoMn)_5$ at 40°C.

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

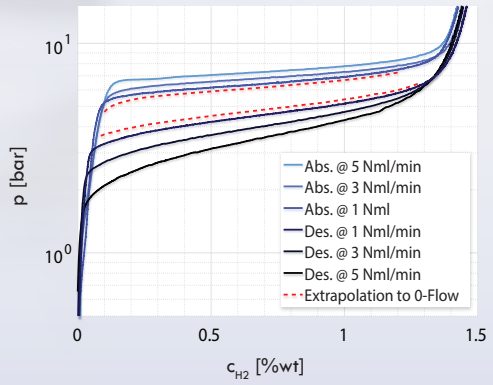


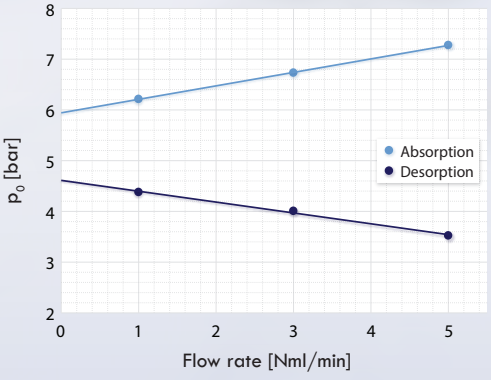
The lattice gas model allows determining the interaction energy between two hydrogen atoms in the metal lattice and the critical temperature at which the two-phase mixture no longer exists.

- **H-H interaction energy:** ε_0=2.12 eV
- **Critical temperature:** T_C=542°C

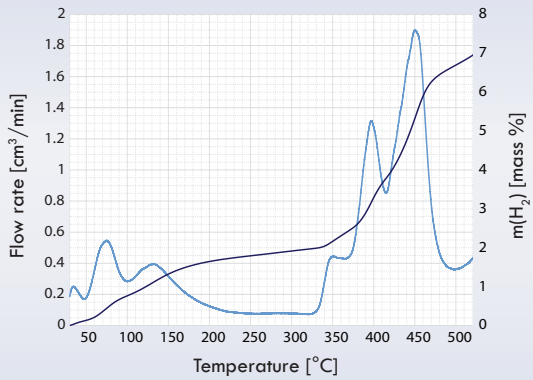
Determination of the "True" Equilibrium Pressure by Extrapolation to Zero Flow Rate

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.

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