



Characterization of
particles • powders • pores

is©Tune

The Next Generation in Sorption Science

designed to be

- Accurate
- Precise
- Flexible
- Scientific
- Sustainable



isoTune overview

The isoTune represents a groundbreaking advancement in sorption analysis technology, integrating the outstanding cryoTune principle with the convenience and versatility of a very compact standalone device. In addition the isoTune offering a unique fusion of a sorption analyzer and a gas pycnometer to redefine the possibilities of gas and vapor analysis. With unparalleled flexibility, precision, and innovation, the isoTune empowers researchers and industry professionals to explore the depths of sorption phenomena with unprecedented accuracy and efficiency.



Key Features

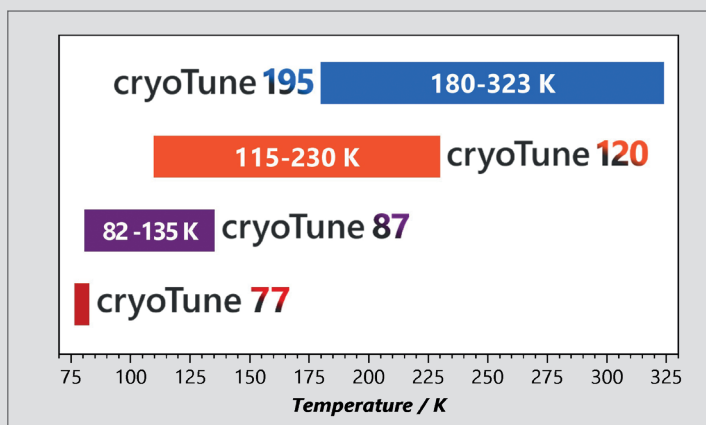
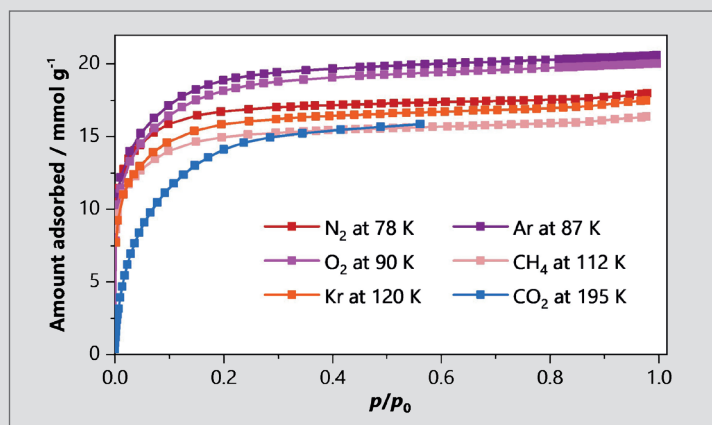
- Combination of a sorption analyzer and a gas pycnometer
- Sorption of gases and vapors in a wide temperature range (77–323 K)
- Integrated gas pycnometer can use vacuum and all connected gases and be converted into a vapor source
- Fully thermostated for highly reproducible density and sorption analyses
- Up to 4 pressure transducers for high accuracy and proportional dosing valve for precise pressure control
- Integrated furnace for most accurate in situ sample degassing procedures up to 600 °C
- Contaminant-free sample transfer
- Sample controlled thermal analyses (SCTA) preparation techniques
- Temperature-dependent adsorptive and adsorbate property database

The cryoTune principle

Inside the cryogenic unit of the isoTune, the measuring cell is not directly immersed in liquid nitrogen, but is located in a heat conducting block that can be heated close to the sample and allows heat transfer between measuring cell and liquid nitrogen. Through controlled heating, a temperature range above the boiling point of nitrogen as the measuring temperature can be precisely set and thus different temperatures can be maintained.

Possibilities

The cryogenic unit of the isoTune provides a substitution of expensive liquid gases by the consumption of low-cost liquid nitrogen for cooling. This enables the stepless adjustment of any temperature between 77–323 K with a temperature stability better than ± 0.004 K and long standing times. Sorption studies now extend beyond N_2 ; effortlessly measure Ar, O_2 , CH_4 , Kr, Xe, CO_2 , and numerous other gases with the same simplicity as a standard N_2 isotherm.



isoTune benefits

Unique combination

isoTune seamlessly integrates a scientific sorption analyzer and gas pycnometer, providing a comprehensive solution for diverse analytical needs.

Flexible adsorption temperature control

Sorption of gases and vapors is possible from 77 K up to 323 K ensuring precise analysis under varying experimental conditions. The isoTune offers unparalleled flexibility to adapt to your research requirements with ease.

Integrated gas pycnometer

Enjoy the convenience of an integrated, fully thermostated gas pycnometer for density and specialized sorption measurements. The isoTune's advanced pycnometer utilizes vacuum and all connected gases for sample preparation and specialized analyses, ensuring accuracy and reliability.

Fully thermostated system

The isoTune's fully thermostated system eliminates uncertainties due to the environment, a moving dewar or cryogenic liquids' temperature changes, guaranteeing consistent and reliable results. The cryoTune principle enables a constant small cold zone (-196°C – 50°C , blue) and allows the use of all gases in the respective temperature range. The temperature-controlled transfer zone provides a constant warm zone (30°C – 100°C) and the heatable tube (30°C – 100°C) eliminates condensation problems (both in red). The temperature in the manifold (yellow) can be set between 15°C and 50°C in order to carry out density measurements at well-defined analysis temperatures.

Up to 4 pressure transducers

You can choose between 0.1, 1, 10, 100, 1000 Torr to find the best combination for your specific application from standard measurements to the determination of smallest surface areas up to vapor sorption.

Proportional dosing valve

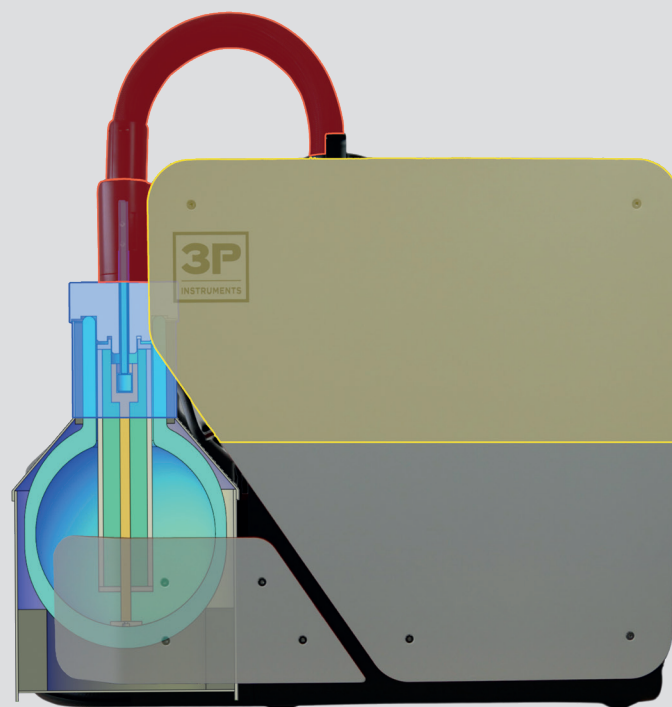
Precise pressure control of either dose amounts or evacuation rates enables fast measurements and secure sample handling.

Controlled sample transfer

The isoTune features a novel sample transfer mode. Upon triggering sample transfer in the software, the connecting hose is purged with inert gas. Once the sample is attached, the system is automatically evacuated immediately with a user defined evacuation rate. This procedure ensures the exclusion of sample contamination.

Controlled sample preparation

Utilizing the Sample Controlled Thermal Analysis (SCTA) routine described by J. Rouquerol et al¹, the isoTune ensures that sample preparation is precisely controlled by the sample itself.



Visualization of the different temperature regimes of the isoTune

Software-based temperature control

Temperature control of all thermostated system parts is completely software-based and offers enhanced precision and flexibility in all experiments. The isoTune's temperature-dependent adsorptive and adsorbate properties are based on NIST data, ensuring accuracy and reliability in all analyses.

¹ ROUQUEROL J. "Thermal Analysis: Sample-Controlled Techniques" in: Encyclopedia of Analytical Science (3rd Ed.)

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