



Antechamber lid for TTK 600

Easily perform non-ambient studies of air-sensitive samples with the antechamber lid for TTK 600 Low-Temperature Chamber. Load samples directly in a glove box and transport them in a sealed environment to TTK 600, which is already mounted on the diffractometer.

No more worries with air-sensitive samples!

Non-ambient XRD for air-sensitive samples

Recent developments in the field of hydrogen storage, the pharmaceutical industry, and many other research areas require the study of compounds which are air and/or moisture-sensitive using X-ray diffraction, even under non-ambient conditions.

One main problem in handling air-sensitive samples, however, is the preparation of the sample and its transport from the glove box to the non-ambient XRD attachment. Different solutions like cover foils or domes are available, but they lead to a certain amount of leakage and/or give additional peaks in the diffraction pattern.

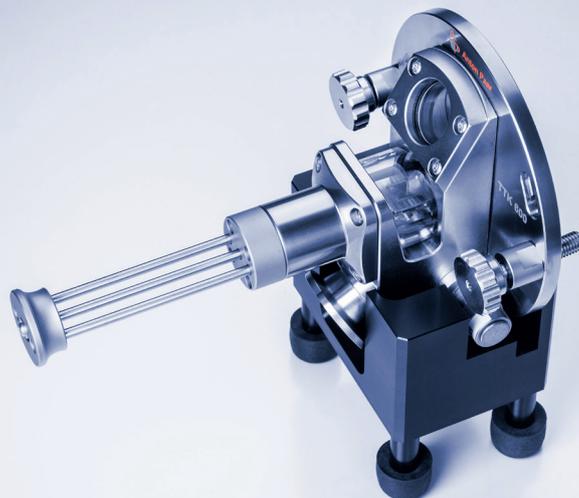
Innovative design concept

This is why a new approach was developed for TTK 600 Low-Temperature Chamber. The design of a special lid equipped with an antechamber allows easy preparation of air-sensitive samples and safe transport to TTK 600. The antechamber lid is quickly mounted to the temperature chamber with only two screws. As the sample remains uncovered during the measurement, there are no additional peaks in the XRD pattern.

The perfect solution for preparation and measurement

Preparation of the sample in the glove box is facilitated by a stand on which the antechamber can be placed. A shutter mechanism seals the sample compartment so that it is completely gas-tight. The antechamber lid can then be safely transferred to TTK 600 and is mounted instead of the standard lid. Before the shutter mechanism is opened again, TTK 600 can be cyclically evacuated and purged with inert gas. A guided sample holder loader places the sample in the correct position for the diffraction experiment.

The sample holder allows measurements in reflection geometry. Even with the antechamber lid the operator can benefit from the overall performance of TTK 600. It is possible to cool the sample down to $-190\text{ }^{\circ}\text{C}$ and heat it up to $600\text{ }^{\circ}\text{C}$, depending on the used setup (liquid nitrogen or compressed-air cooling) and atmosphere.



Applications

In-situ investigation of air-sensitive samples to obtain information on:

- Qualitative and quantitative phase contents
- Phase properties (lattice parameters, crystallite size, and strain)
- Crystal structure

Features and benefits

- Temperature range from $-190\text{ }^{\circ}\text{C}$ to $600\text{ }^{\circ}\text{C}$
- Gas-tight compartment for transport from glove box to the diffractometer
- Fast heating and cooling
- Accurate temperature measurement by a thermocouple inside the heater cryostat
- No additional signals from protective foils or capillaries
- Easy handling and exchange of samples
- Robust design

Technical specifications

| | |
|-------------------------------------|--|
| Temperature range | $-150\text{ }^{\circ}\text{C}$ to $450\text{ }^{\circ}\text{C}$ (N_2 , He) $-190\text{ }^{\circ}\text{C}$ to $600\text{ }^{\circ}\text{C}$ (vacuum) |
| Sample type | powder |
| Sample holder size (length x width) | 14 mm x 10 mm (0.8 mm depth) |
| X-ray geometry | reflection |
| Temperature sensor | TC Type K |
| Scan range | 0° to 164° 2θ |

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