



Anton Paar

::: Intelligence in Rheometry



Convection Heating Device CTD200/GL

Transparent convection heating temperature device (CTD) for flow visualization, SAXS/WAXS or SANS measurements simultaneous with rheology

Transparent convection heating device (CTD200/GL) for optical measurements up to 200 °C

Rheo-optical methods have attracted significant interest over the last few years because more and more examples have shown that the macroscopic material functions measured with the rheometer do not give a complete picture of the sample. It was also observed that the assumption of laminar flow is not always fulfilled when it theoretically should be. Rheo-optics as a tool to relate the inner structure to the flow behavior or for investigations into flow instabilities can therefore help to understand the measured phenomena.

An MCR rheometer is a versatile tool for a variety of rheological tests. Equipped with the corresponding fixtures, it can perform measurements in parallel plate or concentric cylinder configurations as well as DMA/DMTA tests on solid bars, films and fibers and extensional rheology. All these tests can show interesting rheo-optical phenomena such as flow- or temperature-induced crystallization, shear banding, turbulences, etc. The CTD200/GL is a temperature control device designed for these rheo-optical experiments up to 200 °C.

The setup

The CTD 200/GL is an optically transparent convection temperature-controlled oven. For DMA/DMTA, parallel plate and extensional rheology tests the system is equipped with two glass rings; for concentric cylinder measurement an additional cup is required.

Air at room temperature flows between the outer and inner ring so that the outer glass can be touched at any time. Within the inner glass ring the temperature is ensured by gas convection. It is possible to fix insets in the bottom of the device for parallel plate and DMA/DMTA measurements and a simple and quick positioning routine ensures the optimal position of the concentric cylinder.

Rheo-optical options

The following optical techniques can be used in combination with CTD200/GL:

Rheo-optics

The standard system comes with conventional glass rings allowing e.g. light scattering, birefringence/dichroism measurements, PIV or simple flow observation.

Rheo-WAXS/SAXS

The glass rings can be replaced by additionally available polycarbonate rings and cups for Rheo-WAXS/SAXS experiments.



Rheo-SANS

Using the optionally available quartz glass rings and cups, Rheo-SANS measurements are possible under temperature-controlled conditions.

Features and benefits

- ▶ Rheology and optical measurements simultaneously
- ▶ Rheo-WAXS/SAXS
- ▶ Rheo-SANS
- ▶ Convection-heated temperature control in the range from -50 to 200 °C
- ▶ Parallel plate and concentric cylinder geometries
- ▶ DMTA and extensional rheology

Specifications

Temperature

- ▶ Temperature range: -50 to 200 °C
- ▶ Temperatures below room temperature require liquid nitrogen
- ▶ Max. heating rate: 15 °K/min
- ▶ Max. cooling with liquid nitrogen: 5 °K/min

Scattering angles

SANS cylinder: Vertical $\pm 12.5^\circ$

WAXS parallel plate:

- ▶ PP25, vertical 30° , horizontal 50°
- ▶ PP50, vertical 30° , horizontal 35°

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Specifications subject to change without notice.

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