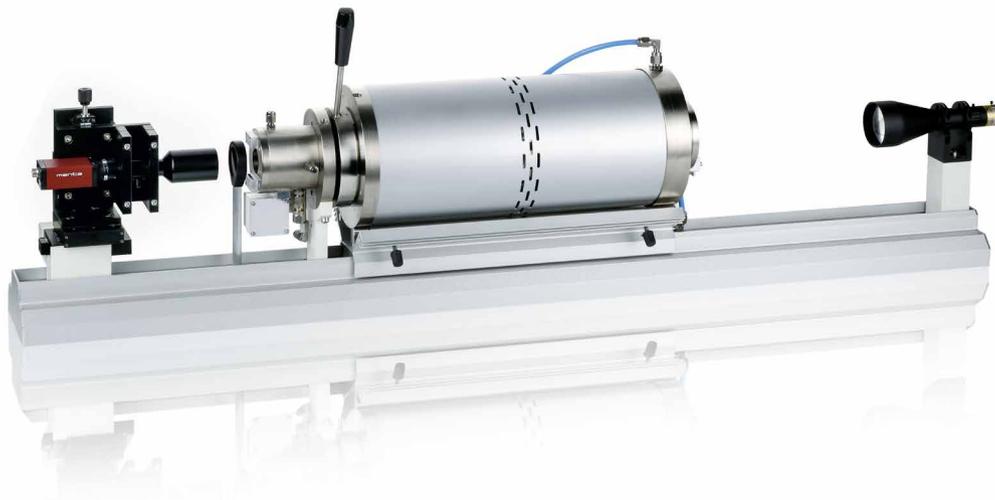


DROP SHAPE ANALYZER – DSA HIGH TEMPERATURE



WETTABILITY AND
DEFORMATION AT
EXTREME HEAT

KRÜSS

Advancing your Surface Science



GET DEEP INSIGHTS INTO THE THERMAL BEHAVIOR OF MATERIALS

- **Contactless analysis of material interactions at up to 2000 °C**
- **Contact angle measurement with sophisticated optical setup**
- **Large variety of thermal and atmospheric conditions**

Our Drop Shape Analyzer – DSA High Temperature goes to the extreme when it comes to wetting and deformation analysis of melts and combustion residues. With temperatures up to 2000 °C in a various range of atmospheric conditions, the instrument analyzes melting solids and helps to understand the interactions that occur when melts come into contact with solid material. This knowledge supports you in optimizing combustion, firing, or coating processes in order to create stable end products, save energy during the process or prolong the service life of your furnaces.

Wetting analysis using precise contact angle measurement

The instrument optically determines the contact angle between a liquid and a solid as a direct measure of wetting. It is equipped with a high-resolution CCD camera, which records the sample while being heated up. With special filters that shield the light emitted by glowing materials, a clear shadow image is achieved, ensuring precise contact angle measurement.

Loading the furnace with the sample is a matter of seconds thanks to the easy handling of the sample holder. Due to the contactless nature of video analysis with no mechanical stress applied, the shape of the sample only depends on chemo-physical alterations with respect to time and temperature, which are both assigned to each camera image. The powerful image analysis software documents exactly what happens with your sample when heated up.

Accurate heating and versatile instrument configurations

Thanks to precise and stable target temperatures as well as accurate control of temperature ramps, highly repeatable measurements are a matter of course. Depending on the task and desired temperature range, the setup of the instrument is optimized for analyses at temperatures up to 1600, 1800, or even 2000 °C.

Measurements can be carried out in oxidizing or reducing atmosphere, under inert gas or in vacuum. This makes it possible to simulate various industrial high temperature processes or to perform comprehensive material research, such as metallurgical studies.





OPTIMIZE YOUR HIGH TEMPERATURE PROCESS

- Investigating undesired interactions between materials
- Improving combustion processes
- Enhancing the quality of ceramics and enamels

The hotter process conditions are, the more reactive are the materials involved. This can be desired when improving the stability of the end product, but also unwanted when chemical interactions affect quality or the service life of furnaces. Analyses with the Drop Shape Analyzer – DSA High Temperature provide you with a deep understanding of thermal behavior and support you in improving your process.

EXAMPLES OF APPLICATIONS

Smelting plants

During smelting, liquid metal or slag comes into contact with walls to which it should adhere to as little as possible. Contact angle measurements with the DSA High Temperature reveal whether the degree of wetting is sufficiently low.

Glass production

Unwanted reactions between the glass and refractory bricks lead to material fatigue. The change in the contact angle as a function of time provides information about the extent to which such reactions are taking place.

Enamels

Optimal wetting of enamel coatings to the carrier material during processing is essential. A small contact angle is a prerequisite for a formulation with good wetting properties.

Ceramics

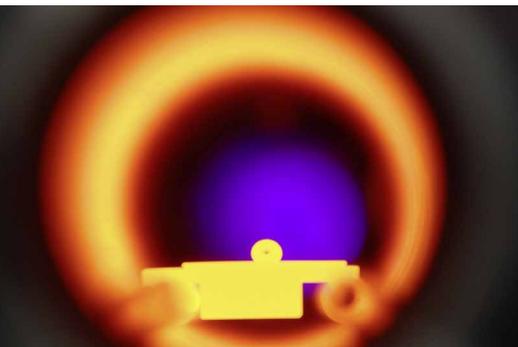
The behavior of the green body – the gradual change in shape from a cone or cylinder to a flattened drop – can be observed and recorded as a function of temperature and time.

Fossil fuels and biomass

Ash residues from combustion processes can coat reactor walls with a harmful ash layer. Ash cone tests carried out in accordance with ASTM D 1857 help to optimize reactor control.

MEASURING OPTIONS

- Contactless wetting analysis using contact angle measurement at temperatures up to 2000 °C
- Observing and recording material deformation as a function of temperature and time
- Measurement in oxidizing or reducing atmosphere, under inert gas, or in vacuum



ALWAYS CLOSE TO YOU

At KRÜSS, we combine technical know-how and scientific expertise with plenty of passion. That is why we not only produce high-quality measuring instruments for surface and interfacial chemistry – we offer a unique combination of product and scientific consulting. Our continuous know-how transfer ensures that not only we at KRÜSS keep pace with scientific developments, but also our customers.

In this way, we help you to optimize and make better use of your technologies. This has made us the global market leader in the field of surface and interfacial tension measurement. As a matter of course, we will gladly support you with further information as well. Feel free to ask us about publications, application cases, and helpful information about other KRÜSS products. We are always close to you.



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