



A sessile drop reveals the surface tension – new measuring method in the KRÜSS portfolio

Constrained Sessile Drop for efficient purity testing of contact angle test liquids based on surface tension and for its measurement at high temperatures.

Hamburg, April 2022 – Measurement of surface tension (SFT) using a single sessile drop: With the Constrained Sessile Drop (Constrained SD) technique, KRÜSS has added a versatile method to its portfolio of optical interface analysis. Rapid purity checks of contact angle test liquids and analyses of molten materials at high temperatures are the main areas of application.

The method observes how the opposing forces of SFT and gravity affect the shape of a droplet. If the density and dimensions of a dosed sessile drop are known, the SFT can be calculated by image analysis of its contour. For this purpose, the drop must be as large as possible, with a high curvature, while maintaining absolute symmetry. Both are achieved by placing the drop onto a perfectly circular pedestal, whose edges form a wetting barrier – hence the name *constrained*.

Checking the purity of contact angle test liquids without changing the measurement setup

The Constrained SD extends the range of methods available to KRÜSS instruments that focus on determining solid material wettability on the basis of the contact angle. Test liquids used for contact angle measurements are strongly influenced by even trace amounts of surface-active impurities, such as those left behind by rinsing agents, leading to false results. Checking test liquid SFT using the Constrained SD method provides an effective remedy to this problem. Such measurements are fast, require no change to the measurement setup, and can be seamlessly integrated into daily quality routines. The sample pedestals and associated adapters used in the measurement are available for both laboratory instruments and mobile measuring devices in the KRÜSS contact angle range.

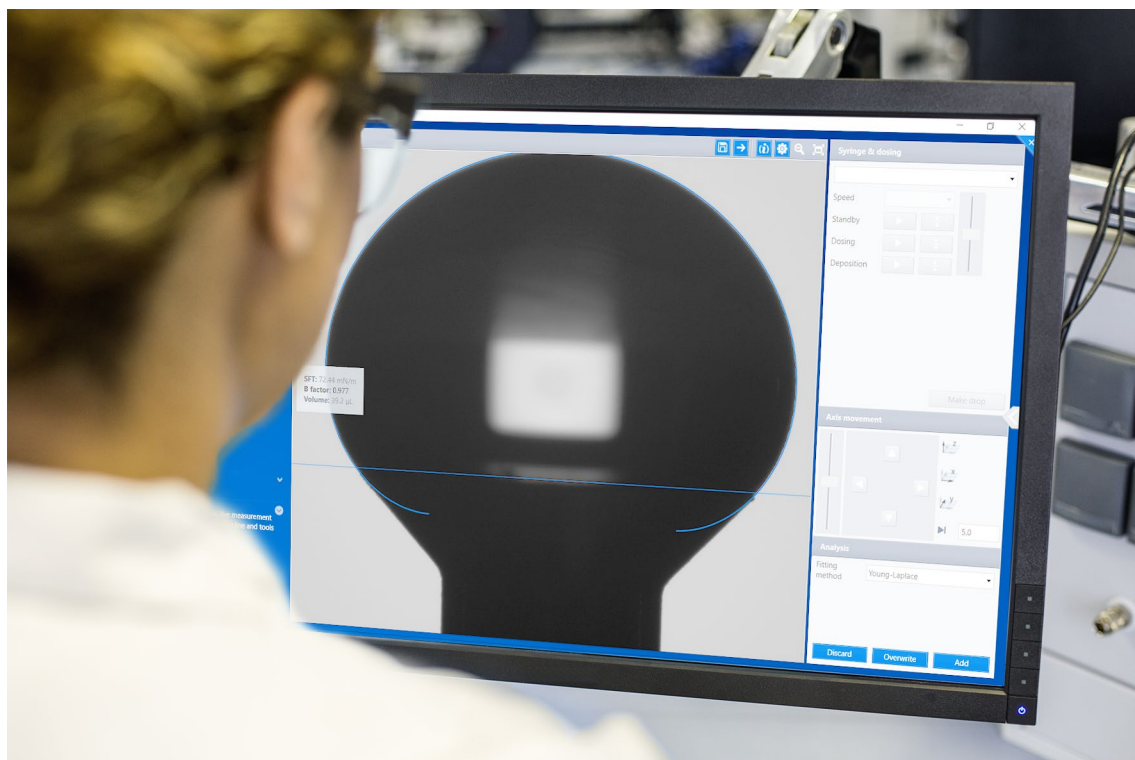
Special method for measuring surface tension at high temperatures

When it comes to measuring surface tension under standard conditions, classical mechanical tensiometry remains king. However, there are many non-standard cases where the benefits of Constrained SD become obvious. The strengths of the method lie primarily in the analysis of molten materials at high temperatures, for example hot melts whose SFT determines how they wet substrates prior to bonding.

Since a sample can be melted directly on the sample pedestal, no vessels or high-temperature dosing units are required. This, in addition to the small sample volume, prevent the need for time-consuming preparation and cleaning when using Constrained SD. In addition, the method also works well under thermally isolated conditions, which often make measurements in the high-temperature range impossible. The maximum temperature of 400 °C can be extended to 2000 °C using special sample platforms made of zirconium oxide in combination with a high-temperature measuring system.

Accessories for surface tension measurement using the Constrained Sessile Drop method, and the relevant module of the KRÜSS software ADVANCE, are now available from the manufacturer.

Image



Analysis of a Constrained Sessile Drop in the ADVANCE Software

About KRÜSS

Advancing your Surface Science. As specialists in interfacial chemistry and the world's leading supplier of measuring instruments for surface and interfacial tension, we not only provide high quality product solutions – our offer is a combination of technology and scientific consulting. These include seminars and technical service as well as our Applications & Science Center for trainings and professional measurement services. Our exclusive distribution network and our locations in Hamburg (Germany), the US, China, and many more countries allow us to provide fast, flexible support for R&D labs and in quality control throughout the world. Our expertise, precision, and passion have already convinced many prestigious companies in countless industries.

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