dataphysics

Understanding Interfaces

Laboratory Measuring Systems for Surface and Interface Analysis

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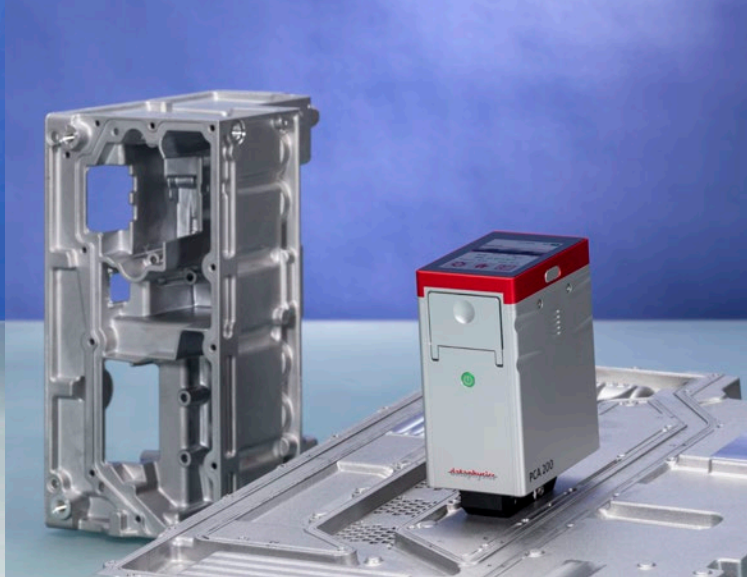


Optical Analysis of Surfaces and Interfaces

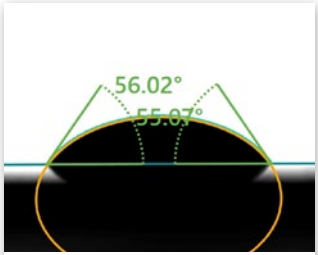
Contact Angle Meter of the OCA Series

The contact angle meter of the OCA series are measuring systems for the optical characterisation of surfaces and interfaces. They combine high-resolution optics, exact liquid dosing and precise sample positioning into reliable laboratory devices. The OCA series ranges from entry-level to automated, high-performance systems, which come with a broad accessory range.

Special attachments allow measurements with minimal drop volumes of 30 pl and at temperatures from -30 °C to 1800 °C.

OCA systems can be used to determine static and dynamic contact angles, the wetting behaviour and surface energy of solid surfaces, the interfacial tension of liquids, and rheological properties.

Contact angles provide information about wettability.



Contact angle measurement using the dpiMAX software

Mobile Surface Energy Analysis

PCA 200 Portable Contact Angle Meter

The PCA 200 portable contact angle meter is an innovative, hand-held device for the measurement of contact angles as well as the surface energy of solid surfaces.

The PCA 200 portable contact angle meter can be used for measurements on the largest surfaces in a non-destructive manner. This makes the PCA 200 especially interesting for quality control in the production line.

The on-board computer, battery, software, touch screen and barcode scanner enable the device to operate autonomously, untethered from a PC. For further analysis, all measurement results can be exported to the compatible dpiMAX software from DataPhysics Instruments.

Two test liquids are used to determine the surface energy.

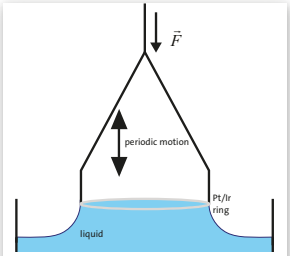
The PCA 200 is equipped with an integrated touch screen.

Force-based Analysis of Surfaces and Interfaces

Tensiometer of the DCAT Series

Tensiometer of the DCAT series are versatile measuring devices for the force-based characterisation of surfaces and interfaces. The DCAT series comprises different models, from entry-level systems to high-precision tensiometer, able to determine weight changes of single fibres.

With its large number of accessories, DCAT systems can be used for an extensive range of measurements, including the determination of dynamic contact angles, the interfacial tension of liquids as well as the surface energy of solids, liquid and solid densities, the critical micelle concentration (CMC) and adhesive forces.



Surface tension measurement with a Du Noüy ring

Analysis of wetting processes on a dental implant

Dynamic Surface Tension Measurements

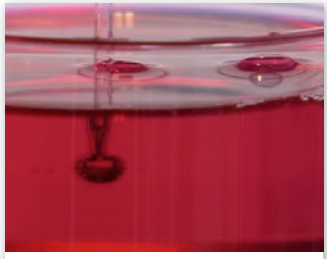
MBP 200 Bubble Pressure Tensiometer

The MBP 200 bubble pressure tensiometer is specifically designed to measure dynamic surface tensions.

Dynamic surface tensions can be determined between 10 and 100 mN/m as a function of bubble ages between 5 milliseconds and 200 seconds. This makes the MBP 200 ideal for characterising surfactants in a wide dynamic range. The pressure sensor of the device records up to 25,000 pressure values per second. The maximum possible overpressure is 7,400 Pa, which enables the analysis of highly viscous liquids.

Additionally, the MBP 200 is compatible with the LDU 25 liquid dosing unit, allowing dynamic surface tensions to be determined automatically as a function of the surfactant concentration as well as the bubble age.

With additional temperature control units, the temperature in the sample chamber can be adjusted to temperatures between -15 °C and 135 °C.



Bubbles are generated in a surrounding liquid.

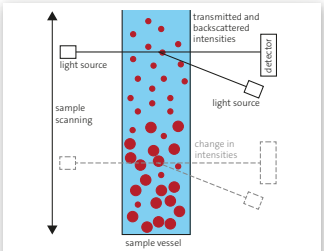
Long-Term Stability Analysis of Dispersions

MS 20 Dispersion Stability Analyzer

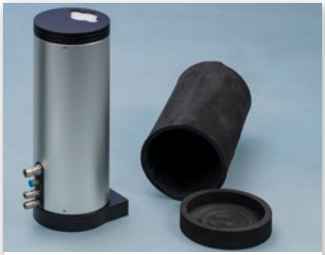
The MS 20 dispersion stability analyzer is a versatile measuring instrument for the optical stability and aging analysis of disperse multiphase mixtures. It can analyse suspensions, emulsions, and foams – undiluted and under realistic storage conditions.

The stability analysis method is non-destructive and time- as well as position-resolved.

With up to six discrete sample towers, various measurements can be performed at the same time, covering different time periods and temperature profiles between -10 °C and 80 °C. Destabilisation mechanisms like sedimentation, creaming, aggregation or agglomeration, as well as parameters like the particle size distribution, can be easily evaluated.



Time- and position-resolved optical analysis of dispersions



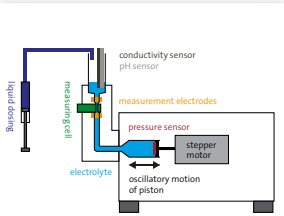
Thermal insulation sleeve for measurements below 4°C

Surface Potential Measurements

ZPA 20 Zeta Potential Analyzer

The ZPA 20 zeta potential analyzer is a laboratory measuring device for an accurate and fast zeta potential measurement, i.e., the measurement of the electrical potential near a solid's surface in a liquid solution.

The ZPA 20 uses exchangeable measurement cells to analyse plate-shaped samples, fibres and powders. The ZPA 20 uses a patented method based on a bidirectional flow of the liquid solution, realising results with high accuracy in less than a minute. In addition, an automatic measurement of the liquid solution's pH value allows to automatically determine the isoelectric point of the solid surface.



Schematic of the ZPA 20 zeta potential analyzer

The ZPA 20 can be used with different sample cells.

Controlling Humidity in Measuring Chambers

Humidity Generators of the HGC series

The humidity generators of the HGC series enable the automatic control of relative humidity between 5 % and 90 % in small and medium-sized, closed measuring chambers. The generators can be connected not only to the measuring chambers of many DataPhysics Instruments' laboratory systems, but also to laboratory measuring devices of other manufacturers.

The HGC 20 humidity generator can independently generate a dry air flow from ambient air, using its integrated pump and desiccant reservoir. Together with the heated water container, the desired humidity is then produced.

The HGC 30 can generate humidity not only by utilising ambient air, but also via an external gas supply of compressed air, nitrogen, or argon. Variable flow rates between 70 and 3,500 ml per minute are possible.

Humidity influences the surface properties of materials.

Determining Ultra-Low Interfacial Tensions

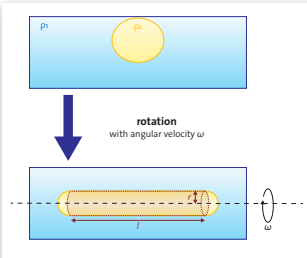
SVT 25 Spinning Drop Tensiometer

The SVT 25 spinning drop tensiometer is an optical instrument for measuring low to ultra-low interfacial tensions between two liquids and for investigating interfacial rheological properties such as the elastic modulus E′ and the viscous modulus E″.

The SVT 25 spinning drop tensiometer can optically evaluate the changing shape of rotating (or "spinning") drops. A highly dynamic measuring drive with up to 20,000 rpm allows oscillation periods of 0.5 s to ∞ and a maximum acceleration of 500 rev/s².

The device can be equipped with measuring chambers for temperatures between -30 °C and 180 °C. It is also possible to conduct measurements on superheated aqueous solutions at up to 130 °C.

Ultra-low interfacial tensions typically occur in so-called microemulsions. They are used, for example, in enhanced oil recovery (EOR) processes.



A drop changing its shape when rotating quickly

In-House Measurement Services

The Application Centre

DataPhysics Instruments is not only an instrument manufacturer, but also an expert in the field of surface science applications. In its in-house laboratory, the Application Centre, the company offers feasibility studies and contract measurements as well as trainings with all systems of its product range.

Measuring Services:

- surface tension of liquids
- interfacial tension between two liquids
- static and dynamic contact angles
- determination of the surface energy of solids
- wettability behaviour analysis
- adhesive force
- density of liquids and solids
- critical micelle formation concentration (CMC)
- sedimentation velocity
- penetration of soft solids
- surface pressure of monolayers and dip coating
- surface and interfacial rheological parameters
- stability and aging analysis of liquid dispersions
- zeta potential of fibres, powders and plate-shaped solids
- 3D surface profile and roughness analysis

Further Services:

- customised device operation trainings
- customised on-site, online or in-house seminars

DataPhysics Instruments GmbH

About Us

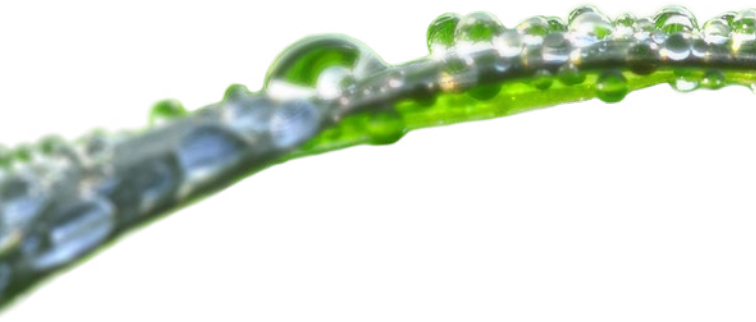
DataPhysics Instruments GmbH is a German company from the Stuttgart region. It has been developing, manufacturing, and distributing laboratory measuring systems for the characterisation of surfaces and interfaces for over 25 years.

“Where others regard interfaces as a mystery, we provide clarity.”

With about 50 employees and a worldwide distribution network as well as customers in over 80 countries, the company is one of the leading manufacturers of high-precision measuring systems in this field.

The company’s systems can analyse important chemical and physical properties of surfaces and interfaces. The measured parameters help determine material properties whenever a liquid meets another liquid or a solid surface. Systems from DataPhysics Instruments are therefore used in a wide-ranging field of practical applications, in the industry and research institutes alike.

DataPhysics Instruments’ Managing Director Team



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