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instruments

OCA 40Micro

Automatic Contact Angle and Contour Analysis instument for Microstuctures

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Holder for single fibres FHO 40plus

Interfacial measurement techniques in a world of Micro and Nano an **dimensions**
The micro system and nanotechnology are en vogue since several years. In many new technical applications the wetting behavior of micron size liquid drops or even tinier droplets on solids affects the quality of recent products and the related production processes. Wetting and de-wetting on a very small scale play a key role frequently. In particular the biotechnology and the genetic engineering profit already significantly from the latest progress and improvement in this exciting area of science.
State-of-the-art optics, precise mechanics, fast electronic controllers as well

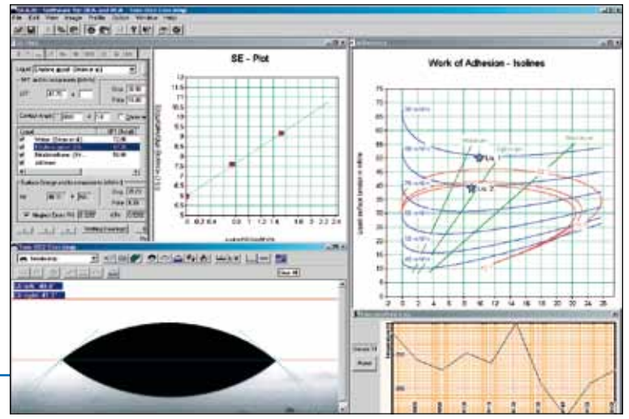
Nanoliter dosing systems

as high-resolution video measurement technology ensures the right view in microscopic dimensions in any situation. Due to the high degree of automation simple and complex structured samples can be measured and analyzed fast and with high reproducibility —'just at the push of a button'.

OCA 40 Micro with high-speed image processing system UpHSC 2000, top view video system and electronic picoliter dosing system

Components and accessories
- measuring lens with 55-fold (optional 137.5-fold) Zoom and software controlled, motorized focus and adjustment of the observation angle
- video measuring system with USB camera (52 images/s sample rate), easily upgradable with the high-speed option UpUSB52H (max. 146 images/s sample rate), or the high-speed video system UpOCAH (max. 1000 images/s sample rate), or UpHSC 2000 (max. 2200 images/s sample rate)
- measuring table with software controlled, motorized X-, Y- and Z-axis for the high-precision sample positioning and droplet pickup
- High efficiency lighting without hysteresis with software controlled light intensity and special heat eliminating appliance
- electronic multiple dosing systems E-MD for the precise automatic positioning of up to six dosing liquids
- direct dosing systems SD-DM and SD-DE
- up to six electronic syringe units ES,
- electronic micro dosing systems for the precise dosing of the test liquids in the nanoliter and picoliter range,
- electronic tilting base unit TBU 90E for a maximum tilt angle of 90° and tilting base attachment TBA 60E for a maximum tilt angle of 60°,
- electronic turn tables with vacuum fixation ETT/VAC up to 200 mm diameter,
- temperature and environmental control systems (-30...700 °C),
- wide range of sample holding and positioning units like holders for foils or papers FSH 30 and FSC 80/150, for single fibers FHO 40plus, or the suction plate SP 100 for holding thin flexible samples flat on the stage with an adjustable suction area,
- oscillating drop generators ODG 20 and ODG 20P for the measurement of surface elasticities and for relaxational studies at phase boundaries,
- electro-wetting platform EWP 100 for the analysis of sessile and pendant drops in an electrical field,
- top view video system TV-VS for the qualitative documentation of the drop position (USB camera with 52 images/s sample rate, 6x parfocal zoom lens and adjustable observation angle)
- refill and rinse system with liquid pump cleaner RRS-LPC 3/1.

Software for efficient work
The SCA software assists you in the intuitive use of the fully automatic video-based optical contact angle measuring instrument OCA 35 by specifying measurement procedures and in collecting, assessing, and evaluating the measured data. DataPhysics is specialised in the development of high-precise and reliable methods for evaluating drop contours in combination with statistical error analysis. The SCA software is designed as a modular program for all OCA instruments. Under Windows 7® / Vista® it works in 32- and also in 64-bit mode; under Windows XP® only in 32-bit mode. The available software modules for the OCA 40 Micro models are:



Software module SCA 21
Analysis of the wetting properties of printer ink

SCA 20 — contact angle
- video based measurement and presentation of the static and dynamic contact angle on plane, convex, and concave surfaces
- automatic measurement of the contact angle hysteresis
- record/store of image sequences
- statistics and measurement error analysis
- Liquids and solids database with currently more than 170 records for all surface energy analysis methods including related citations

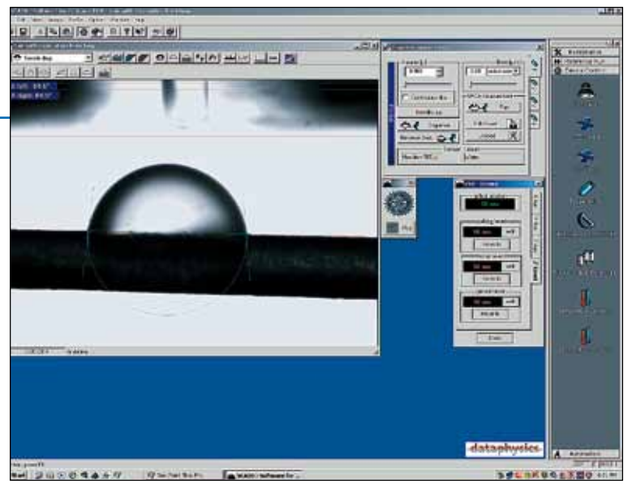
SCA 21 — surface free energy
- analysis of the surface free energy of solids as well as their components (e.g. dispersive, polar and hydrogen bond parts, acid and base portions) according to nine different theories
- presentation of wetting envelopes and work of adhesion/contact angle diagrams

SCA 22 — pendant drop
- analysis of the surface and interfacial tension, as well as their polar and dispersive contributions, based on the analysis of the drop shape of pendant drops

SCA 23 — lamella contour
- analysis of the surface and interfacial tension based on the evaluation of the lamella contour

SCA 24 — drop on fiber
- analysis of the static contact angle according to the generalized length-width-method for the drop-on-fiber or wetted fiber setup.

SCA 26 — oscillation / relaxation
- analysis of the real and imaginary part of the interfacial dilatational modulus based on the oscillating or relaxing contour of pendant drops



Software modules SCA 20 and SCA 24
analyzing a single droplet wetting a human hair (diameter about 80 µm)

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Technical data

Max. sample dimensions (L x W x H):	• 195 x ∞ x 70 mm
Sample table dimensions:	• 100 x 100 mm
Traversing range of x-y-z sample table:	• 100 x 100 x 50 mm
Positioning resolution:	• ± 0.65 µm in the sample plane • ± 0.65 µm perpendicular to the sample plane
Measuring range for contact angles:	• 0...180°; ± 0.1° measuring precision of the video system
Measuring range for surface and interfacial tensions:	• $1 \cdot 10^{-2}$... $2 \cdot 10^{3}$ mN/m resolution: min. ± 0.05 mN/m
Max. sample weight:	• 3 kg
Optics:	• 7-fold zoom lens with integrated fine focus (± 4 mm) and - Mikro lens 20-fold with 7.5 ... 55-fold magnification; Working distance 20.5 mm; Field of View with 1/2“ standard camera 0.85 x 0.64...0.116 x 0.087 mm Alternatively: - Mikro lens 50-fold with 18.75- ... 137.5-fold magnification; Working distance 13.9 mm; Field of View with 1/2“ standard camera 0.34 x 0.256...0.046 x 0.035 mm • Optical distortion: < 0.05 %
Image processing system:	• USB-CCIR camera, max. pixel 768 x 576 resolution, max. sample rate 52 images/s, field of view 1,32 x 0,99...8,50 x 6,38 mm
Measuring methods:	• Static and dynamic contact angles after the generalized Length-Height-method for the „Drop on Fiber“ arrangement • Sessile Drop-method • Pendant Drop-method • Lamella-method
Temperature measurement and range:	• Integrated temperature measurement and display; 2 x Pt 100 inputs for -60 – 700 °C
Dimensions (L x W x H):	• 590 x 220 x 550 mm
Weight:	• 30 kg
Power supply:	• 100...240 VAC; 50...60 Hz; 350 VA

The Construction Kit Philosophy

The OCA 40 Micro extends the proved OCA construction kit for the interfacial analysis by an unique measurement device for the automatic determination of wetting and immersional wetting properties on micro and nano structures. These become feasible by the new developed dosing and contour analysis of smallest test liquid quantities in the range of nanoliter and picoliter.
For the solution of your special problem the OCA construction kit, developed in cooperation with our customers, provides a multitude of system components, which guarantees comfortable and efficient work.
In the OCA construction kit you'll find software modules for the application of all relevant measuring methods, electronic software controlled dosing systems, sample tables and sample holders for various different geometries, temperature controlled units as well as PC-systems, peripherals and accessories.

For more information about a tailor made solution to your surface chemistry requirements, please contact us.
We will be pleased to provide a quotation, obligation free, for your instrument system.

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