

**OCA 20**  
Video-based optical contact  
angle measuring instrument



~~dataphysics~~



OCA 20LHT with high temperature furnace HTFC 1800

#### Features of the OCA 20

The video-based optical contact angle measuring system OCA 20 is the most versatile instrument for the contact angle measurement and drop shape analysis. For larger samples the **OCA 20L** with a long x- and y-axis and for thicker and heavier samples (foremost high temperature furnaces or pressure cells) the **OCA 20 LHT** with a long x-axis and a special sample table are available.

#### Components and accessories

- sample table with manual adjustment in three axis via high-precision mechanics for an accurate sample positioning, easily upgradable with a software controlled y- and z-axis (UpOCA 20/30)
- high performance 6x parfocal zoom lens with an integrated continuous fine focus, and adjustable 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)
- lighting with software controlled intensity without hysteresis



OCA 20XL with TEC 300XL

- high-speed video system UpHSC 2000 (max. 2200 images/s sample rate) with high efficiency lighting 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, software controlled dosing vol-

- ume (min. 50 nl) and dosing rate (0.06  $\mu$ l/s...26.4  $\mu$ l/s)
- electronic tilting base unit TBU 90E (maximum tilt angle of 90°) and tilting base attachment TBA 60E (maximum tilt angle of 60°)
- electronic turn tables with vacuum fixation ETT/VAC (top plates up to 12" diameter)
- temperature and environmental control systems (-30...1800 °C and from



OCA 20/6 with electronic multiple dosing system E-MD/6 and high-speed video-system UpOCAH

- 1 mPa...5106 Pa)
- wide range of sample holding and positioning units like holders for foils or papers FSH 30 and FSC 80/150, for single fibers FHO 40 plus, or the suction plate SP 100 for holding thin flexible samples flat on the stage with an adjustable suction area
- oscillating drop generator 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 under a well definable 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



High-speed video-system UpOCAH — Absorption of a water drop

- 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
- representation of wetting envelopes and work of adhesion/contact angle diagrams

#### SCA 22 — pendant drop

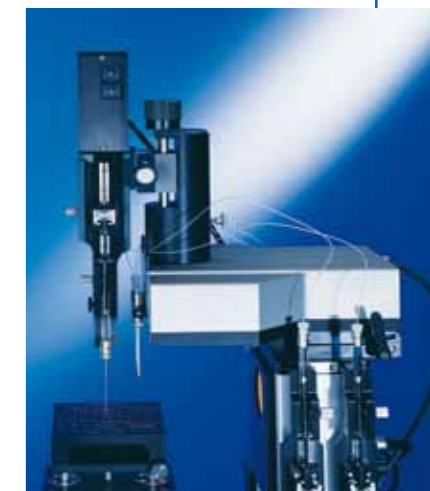
- analysis of the surface and interfacial tension, as well as their polar and dispersive contributions, based on the analysis of the drop shape of pendant drops

#### SCA 23 — lamella contour

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

#### SCA 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.



SD-DE single dosing direct system for E-MD



Needle heating device NHD 400 with an electrical temperature control unit TEC400

#### Software for efficient work

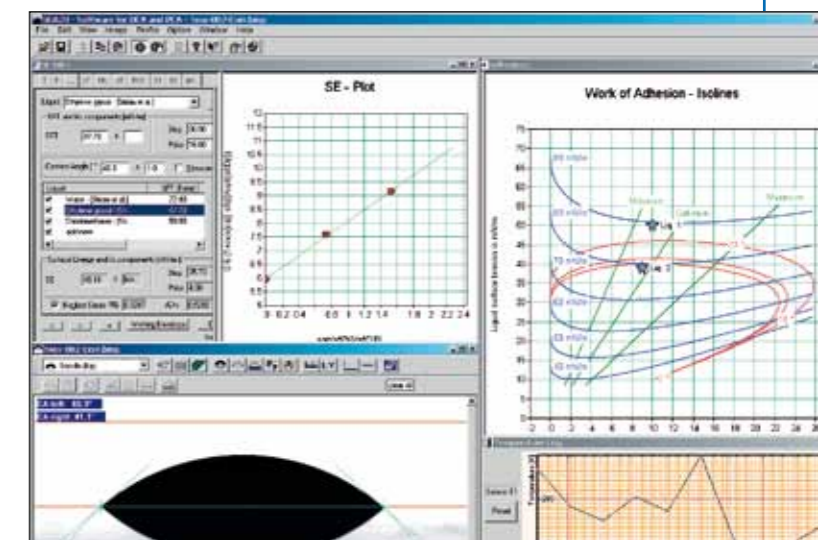
The SCA software assists you in the intuitive use of the video-based optical contact angle measuring instrument OCA 20 by specifying measurement procedures and in collecting, assessing, and evaluating the measured data.

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 20 models are:

#### SCA 20 — contact angle

- video based measurement and presentation of the static and dynamic contact angle on plane, convex, and concave surfaces



SCA 20 and SCA 21 — surface free energy and work of adhesion analysis

## Technical data

Max. sample dimensions (L x W x H):	<ul style="list-style-type: none"> <li>• 220 x ∞ x 70 mm, 8"-Wafer on WTP 8/VAC</li> <li>• 330 x ∞ x 70 mm, 12"-Wafer on WTP 12/VAC (OCA 2oL)</li> <li>• 330 x ∞ x 225 mm (OCA 2oLH)</li> <li>• 410 x ∞ x 70 mm, 12"-Wafer on WTP 12/VAC (OCA 2oXL)</li> <li>• 330 x ∞ x 70 mm, HTFQ 1200 or HTFC 1800 (OCA 2oLHT)</li> </ul>
Sample table dimensions:	• 100 x 100 mm
Traversing range of sample table:	<ul style="list-style-type: none"> <li>• 100 x 100 x 50 mm (in X-/Y-/Z-direction)</li> <li>• 210 x 150 x 50 mm (in X-/Y-/Z-direction) (OCA 2oL and OCA 2oLH)</li> <li>• 410 x 150 x 50 mm (in X-/Y-/Z-direction) (OCA 2oXL)</li> <li>• 210 x 100 x 50 mm (in X-/Y-/Z-direction) (OCA 2oLHT)</li> </ul>
Max. sample weight:	• 15.0 kg
Measuring range for contact angles:	• 0...180 °; ± 0.1 ° measuring precision of the video system
Measuring range for surface and interfacial tensions:	• 1·10 <sup>-2</sup> ...2·10 <sup>3</sup> mN/m resolution: ± 0.01 mN/m
Optics:	<ul style="list-style-type: none"> <li>• 6-fold zoom lens (0.7...4.5-fold magnification) with integrated fine focus (± 6 mm)</li> <li>• Lighting with software controlled adjustable intensity without hysteresis</li> </ul>
Video system:	<ul style="list-style-type: none"> <li>• 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</li> <li>• Image distortion &lt; 0.05 %</li> </ul>
Software SCA 20:	<ul style="list-style-type: none"> <li>• Video based measurement of static and dynamic contact angles according to the sessile and captive drop as well as tilting table / base methods, measurement of drop and lamella contours.</li> <li>• Operation of up to six ES electronic syringe units and other system components (E-MD, ETT/VAC, TBA 60E, TBU 90E, RRS-LPC) and of temperature control systems (TPC 150, TEC 400/700, NHD 400/700, HTFQ 1200, HTFC 1800), User level management system</li> </ul>
Software SCA 21:	<ul style="list-style-type: none"> <li>• Calculation of surface free energies on solids and their contributions with error limits based on measured contact angles, evaluation according to Fowkes (geometric mean), Wu (harmonic mean), extended Fowkes (including H bonds), Zisman (critical surface tension), Owens-Wendt (dispersive and polar), van Oss and Good (acid-base theory), Schultz I + II (two-liquid method), Neumann's Equation of State (EOS), calculation of dispersive and polar contributions of liquids based on measured surface and interfacial tensions as well as contact angles with error limits, calculation of wetting envelopes, work of adhesion, and other diagrams</li> </ul>
Software SCA 22:	• Calculation of surface and interfacial tensions based on pendant drop contours and rising bubbles
Software SCA 23:	• Calculation of surface tensions of liquids based on liquid lamellae on test spheres and rods
Software SCA 26:	<ul style="list-style-type: none"> <li>• Calculation of complex interfacial dilatational moduli based on oscillating or relaxing drop contours</li> <li>• Control of oscillating drop generator ODG 20 and ODG 20P</li> </ul>
Temperature measurement:	• Integrated temperature measurement and digital display 2 x Pt 100 inputs for -60...700 °C
Dimensions (L x W x H):	<ul style="list-style-type: none"> <li>• 590 x 220 x 550 mm</li> <li>• 700 x 280 x 550 mm (OCA 2oL)</li> <li>• 700 x 280 x 780 mm (OCA 2oLH)</li> <li>• 960 x 280 x 550 mm (OCA 2oXL)</li> <li>• 700 x 280 x 620 mm (OCA 2oLHT)</li> </ul>
Weight:	<ul style="list-style-type: none"> <li>• 18 kg</li> <li>• 20 kg (OCA 2oL)</li> <li>• 25 kg (OCA 2oLH)</li> <li>• 22 kg (OCA 2oXL)</li> <li>• 21 kg (OCA 2oLHT)</li> </ul>
Power supply:	• 100...240 VAC; 50...60 Hz; 70 W (350 W with UpHSC 1000 or UpHSC 2000)

The contact angle measuring instruments from the OCA series share a common feature – the successful *OCA accessories construction kit*, designed to help solving your interfacial problem. This extensive range of accessories consists of various dosing systems, temperature and environment control systems, turn and tilting tables, sample positioning systems, and tilting base units.

**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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