UiB NanoStructures Laboratory

Standard Operating Procedure

Dataphysics OCA 20L Contact Angle System

Purpose of the instrument:

The OCA 20L is an optical contact-angle and interfacial tension measuring device. Whatever substances you examine, whether they are surfactant solutions, liquid phases of micro-emulsions or molten metals and polymers, the OCA will calculate the surface and interfacial tension from the contours of pendant and sessile drops as well as of liquid lamellas on plates, bars and fibers. To make this possible OCA is equipped with the most up-to-date optics, precise mechanics and a high-resolution video measuring technique.

Location of the instrument:

Allégaten 55, room 286 (entrance via 276, E-Beam lithography Lab)

Primary Staff Contacts:

Sabrina Eder (Mob: 9420 47 33, E-mail: sabrina.eder@uib.no)

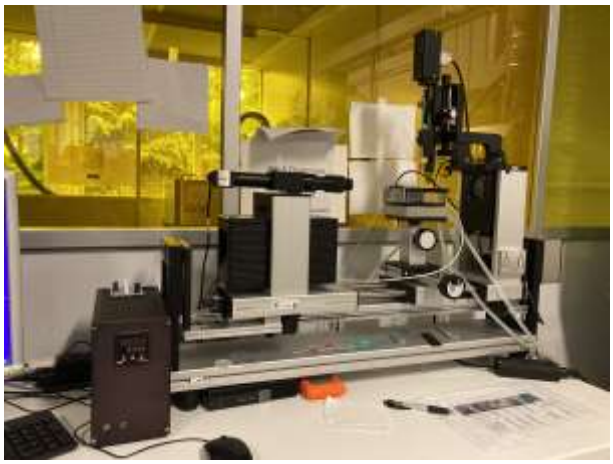
Martin Greve (Mob: 900 79 974, E-mail: martin.greve@uib.no)

Instrument booking:

No booking required.

Instrument access:

The instrument can be used by approved users after an introduction by UiB personnel. For introduction requests please contact primary staff.



WARNINGS

Some accessible surfaces can become very hot. Therefore, please wait until the system has cooled down sufficiently and the temperature allows you to touch the system without danger, or use specific hand protectors. The OCA must never be lifted by the measuring stage, optics, video camera or dosing units!.

The UiB NanoStructures Lab is operated for the benefit of all researchers. YOU MUST HAVE RECEIVED PERSONAL TRAINING ON THE INSTRUMENT TO BE PERMITTED TO OPERATE IT! IF YOU HAVE BEEN TRAINED AND ARE STILL UNCERTAIN AS TO HOW TO OPERATE THE INSTRUMENT CONTACT ONE OF THE STAFF MEMBERS. If you encounter any problems with this piece of equipment, please contact the staff member listed above immediately. There is never a penalty for asking questions. If the equipment is not behaving exactly the way it should, contact a staff member. This SOP only serves as a quick reference. For further details consult the manual and/or service engineers.

Measuring methods and results

The OCA can do more than just determine the wetting angle. It permits not only to precisely determine the surface or interfacial tension of liquids, but also the surface free energies of solids. In the software developed for Windows NT, Windows 2000 or Windows XP, beside the standard evaluation methods, e.g. Owens-Wendt, Wu, Schultz, Zisman, also evaluations according to new and extended theories (e.g. Acid-Base, Extended Fowkes, and Equation of State) have been implemented.

Starting point is always the simplified Young-Dupré's equation for the balance of forces in the so-called "three-phase point" between liquid, solid and vapor.

The most important measuring principles feasible with the OCA are listed below:

- Sessile drop method
- Captive drop method
- Tilting plate method
- Pendant drop method (not with OCA 5/10)

The obtainable measuring results are:

- Static contact angle
- Dynamic contact angle (not with OCA 5/10)
- Surface and interfacial tension (not with OCA 5/10)
- Surface free energy
- Dispersion and polar contributions of the surface free energy
- Acid and base contributions

Figure 8: Sessile Drop-method

Figure 9: Pendant Drop-method

Figure 10: Lamella-method

1. General operations

(a) see manual

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Document History

Version 0.1, OCT-2023, Author: Sabrina Eder, Changes: Basic Usage Procedure and Layout