OEG
Optik
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SURFTENS^{HL} Contact angle and free surface energy measurement in semiconductor technology

SURFTENS ^{HL} - Overview

The contact angle meter **SURFTENS^{HL}** is designed for use in semiconductor industry and research, in particular for process control of wafer coating and in the photolithographic process.
It is characterized by the following features:
- fast and easy measurement of contact angle;
- space-saving construction
- special table construction for fast mapping of contact angle distribution on the wafer
- software with intuitive operation
- comfortable documentation of the measuring results in protocols and in the video images;
- if required computation of free surface energy by the theory of Wu;
- optional use with laptop or PC

SURFTENS ^{HL} - applications

The modification of the wetting behavior of silicon wafers is a standard process step in the semiconductor technology. For process characterization, adjustment of technological parameters and production control. It is therefore absolutely necessary, to measure the contact angle and the surface free energy objectively and accurately before and after the modification process.
For this purpose a robust and easy to use contact angle measuring instrument is needed. **SURFTENS^{HL}** was developed to meet the needs in semiconductor technology and research The operation is simple and for everybody possible after a short training. The manual operation ensures an attractive price.
Thus **SURFTENS^{HL}** is used as well as in standard process control as well as in research and development.
In connection with the software "SURFTENS" the contact angle and, if required, the free surface energy of solids can be measured. The comfortable documentation functions are a powerful help in quality assurance and research.

„SURFTENS“ – the measuring software

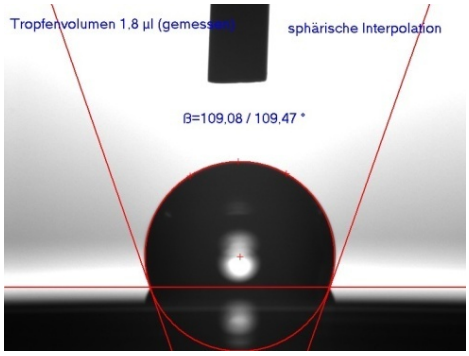
Basically the measuring software "SURFTENS" makes possible the fully automatic measurement of the contact angle of a sessile drop by different fitting methods of the drop shape. The drop is automatically detected by image processing methods. Specimen dependent the contrast of the drop image can be critical for an automatic detection. For such cases the software offers additional options for the drop detection like the manual setting of the baseline and the completely manual measurement of the contact angle by setting of measuring points on the monitor.
The scope of services is extended by additional measuring and service functions like:
- real time display of current contact angle at the live video image;
- automatic measurement of the time dependent contact angle and display in diagrams (cycle time freely selectable, minimum cycle time 50ms);
- measurement of advancing- and receding-contact angle at the live video image;
- simultaneous measurement of left- and right-side contact angle;
- measurement on curved surfaces with angular baseline;
- drop volume detection during dispensation and after drop placement

The software contains an evaluation module (theory by Wu) for computation of the free surface energy of solids from the measured contact angles of 2 known measuring liquids.. A very useful feature is the

acquisition of AVI-files from the live video stream. All measuring- and documentation functions are afterwards applicable to the complete film or any single image of the film.
The measuring results can be stored comfortable in protocols or the video image.

SURFTENS HL - measuring accuracy

The measuring accuracy is determined by using the live video image. Because a real drop of liquid changes itself permanently due to environmental influences like evaporation, the given technical parameters are related to the measurement of a contact angle standard.
Parameters:
- resolution of contact angle measurement: 0,05°
- reproducibility of contact angle measurement: +/- 0,1°
- accuracy of contact angle measurement: +/- 0,5°



SURFTENS HL - addional hardware and software

On inquiry numerous additional hardware options are available like double dispenser or automatic dispensation system. Other options like thermal chamber, tilting stage, software for pendant drop measurement or a fully automatic measuring equipment are available with other instrument types. Please check for this options our SURFTENS^{UNIVERSAL}, SURFTENS^{AUTOMATIC} and SURFTENS$^{WH\ 300}$.

SURFTENS HL - Technical data

specimen table:	diameter 200mm or 300mm x/φ positioning
specimen thickness	0... 5 mm
contact angle measuring range	1°....180°
resolution / accuracy of contact angle measurement	±0,05°/ ±0,5° on the live video using the contact angle standard
optics (standard equipment)	1x magnification, motorized focusable
Frame Grabber	PCI Frame Grabber 440.000 Pixel or comparable Video to USB converter for use with Laptop
Camera (standard))	b/w video camera 440.000 Pixel
tilting angle of measuring optics	fixed to around 1°
dispensation system (standard)	manual single dispensation system
dispensation system (alternative)	manual double dispenser or fully automatic system
drop volume reproducibility	0,1 µl
light source	long life light pad
software	SURFTENS for Windows 2000/XP/Vista

This features are for the standard equipment and can be adapted to other technical requirements.
The technical parameters are subject to change without notice.
Binding are the technical specifications as per quotation.

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