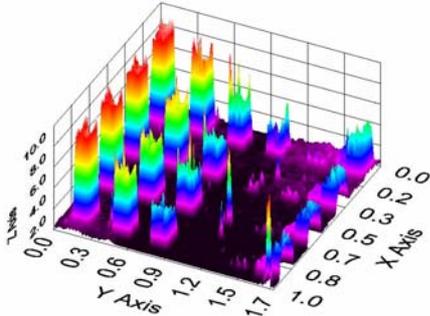


Scanning Probe Electron Microscope EP³ SPEM

Two instruments in one!



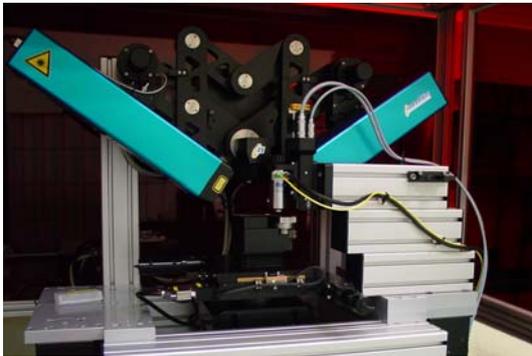
Microcontact-printed array:
Mercaptan on Au surface

Applications:

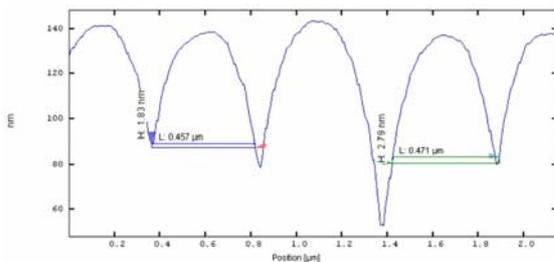
- Nanoparticles
- Photonic crystals
- Micro- / nanocontact-printed films
- Structured SiO₂ films
- Thin polymer films

Your value:

This combination allows measurements of 2 methods within the same field of view.



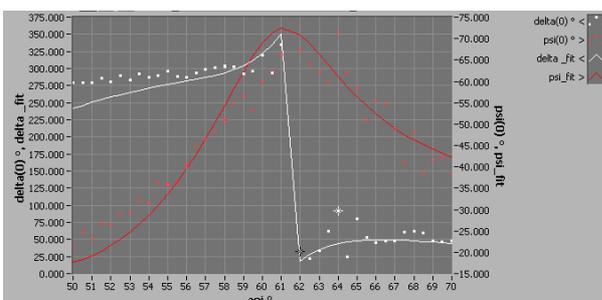
EP³ SPEM



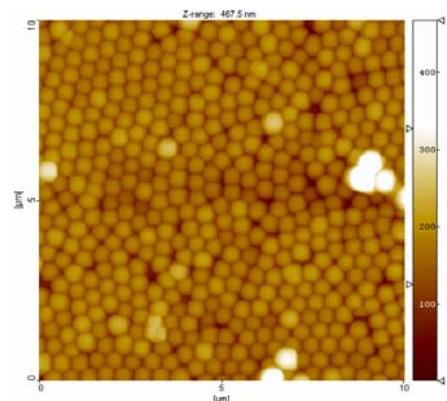
Profile of AFM image: due to the > 20 nm diameter of the AFM needle, only the lateral diameter is calculable, not the thickness (achieved with

Description:

The EP³ SPEM ensures rapid evaluation of optical properties with Imaging Ellipsometry and subsequent zooming-in with sub-micron lateral resolution by means of Scanning Probe Microscopy. In order to simplify the search for regions of interest on a sample, the preparatory work in terms of identification of thickness variations is performed by the Imaging Ellipsometer. This is not only time-saving, it also circumvents the artefacts produced by the SPM. Once a region of interest has been defined, the sub-micron lateral resolution of the SPM overcomes the constraints of the



Delta / Psi angle of incidence spectra, 2-zone average at 532 nm wavelength, fit with 4-layer optical model



Scanning Probe Micrograph of silica spheres, recorded in contact modus

Scanning Probe Electron Microscope EP³ SPEM

Two instruments in one!

Technical specifications:

| | |
|--|---|
| Ellipsometer type: | Single-wavelength Imaging Ellipsometer EP ³ SW Auto-nulling Imaging Ellipsometer in PCSA configuration |
| Ellipsometric resolution: | Resolution: Delta: 0.002 deg. Psi: 0.001 deg. Absolute accuracy: Delta: +/- 0.2 deg. Psi: +/- 0.05 deg. <i>The above values apply under optimal conditions only!</i> |
| Thickness relative error (SiO₂ / Si): | 0.002 nm |
| Thickness absolute accuracy (SiO₂ / Si): | < 0.1 nm |
| Imaging system: | 768 x 572 pixel CCD camera |
| Electronics: | Pentium-based embedded controller with Matrox Meteor II frame grabber, Embedded Linux operating system (internal only), Communication with host PC via dedicated 100 Mbit Ethernet |
| Light source: | 532 nm, 20 mW internal solid state laser (others on request) |
| Imaging optics: | High-resolution real-time focussed images are achieved with an automatic focus scan. |
| Proprietary motorised goniometer: | Angle-of-incidence range: 40 – 90 deg. Angle resolution: 0.001 deg. Absolute angle accuracy: 0.01 deg. Speed of motion: ca. 5 deg./s |
| Automatic sample handling stage: | Automatic sample alignment: typically 2 s/deg. Motorized XYZ stage: travel range 90 mm (X/Y), 10 mm (Z) Repeatability: 1 µm |
| EP³View software: | Automation: <ul style="list-style-type: none"> - Powerful macro language EP³script allows the user to simplify complex measurements into push-button operation - User-controlled function buttons - Software-controlled X/Y stage Image processing: <ul style="list-style-type: none"> - Auto-scan for optimal full field of view images - Real-time geometrical correction for angle-dependent image aspect ratios - Supported image formats: TIFF, JPG, PNG - Image browser Analysis: <ul style="list-style-type: none"> - Multiple region-of-interest - Micro-Mapping for high-resolution maps of Delta / Psi, thickness, refractive index etc. - Optical modelling package for simulation and analysis of thin film systems that supports multiple-angle analysis - Data export to external software packages for analysis or visualisation - Drop profile recording at 90° angle of incidence for contact angle measurement |
| AFM: | |

| | |
|-----------------------------|---|
| Scanning range: | 80 x 80 μm^2 , hardware scanner linearization |
| Vertical range: | 5 μm |
| Modes: | Contact / non-contact (others on request) |
| Electronics: | ScanControlC (contact mode, 16 bit resolution, evaluation software for roughness, profile evaluation etc. |
| Active vibration isolation: | Vario Basic 40 (2 short elements, separate control unit, max. Load 100 kg) |

The system may be easily upgraded to a:

- Spectroscopic EP³ SPEM