

## NANOPTICUM

### NEW CONCEPT OF IMAGING ELLIPSOMETRY AT SOLID/LIQUID INTERFACES

- The nanofilm\_spr\_mircolab concept
- View on Literature – Hydrogels – silent stars in surface chemistry
- New product: halcyonics\_supportframe-bam/ie
- LB13 – Accurion presents the nanofilm\_ultrabam

Dear Sir/Madame,

After introducing the nanofilm\_ultrabam in the previous nanopticum, we also presented the instrument at the LB13 in Québec to the community of Langmuir-Blodgett scientists. We look forward to continuing the introduction of the nanofilm\_ultrabam at the 24<sup>th</sup> Conference of European Colloid and Interface Society meeting in Prague.

The foci of this month's newsletter are hydrogels and our new concept for imaging ellipsometry at the solid-liquid interface. The view to literature is, consequently, focused on characterizing hydrogels by imaging ellipsometry. Hydrogels are frequently used for biochip applications. In this context, we would also like to introduce our new cell concept for imaging ellipsometry using a Kretschmann setup (or, as it is termed in literature, 'imaging SPR in the ellipsometric mode').

Since a solid and rigid table is essential for working at the microscopic scale, we are now offering a new support frame tailored for the nanofilm\_ep3 and the nanofilm\_ultrabam.

Please enjoy our new Nanopticum.

Best regards

Yours,

### *Accurion team*

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nanofilm\_ultrabam @ work

# September 2010

24<sup>th</sup> Conference of European Colloid and Interface Society,  
September 5-10, Prague, Czech Republic  
[www.ecis2010.org](http://www.ecis2010.org)

Annual meeting of the German Biophysical Society (DGBM) 2010  
October 3-6, Bochum, Germany  
[www.biophysiktagung2010.rub.de](http://www.biophysiktagung2010.rub.de)

Annual Meeting of the German Society for Biomaterials (DGBM) 2010  
November 18-20, Bad Heiligenstadt, Germany  
[www.conventus.de/dgbm2010](http://www.conventus.de/dgbm2010)

Accurion is looking for a

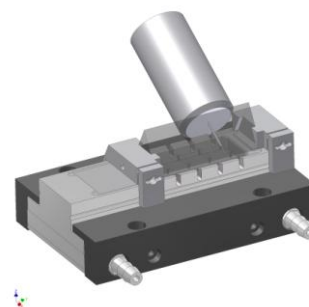
#### **Scientist / Programmer**

to strengthen our division nanofilm surface science. Experiences with LabView and Ellipsometry are highly appreciated

<http://www.nanofilm.de/employment>

### COMING SOON: nanofilm\_spr\_mircolab

Our new concept is based on the combination of a very flexible and modular cell concept in combination with micro liquid handling. Part of the set will be a template for the microfluidic block of the cell so that the researcher can consistently produce a fresh and clean PDMS-microfluidic block for the cell. The institute of microtechnology Mainz (imm) will be our partner for tailored designs of the micro liquid handling. Our goal is to provide not only a Kretschmann cell but a microlab for imaging spr in the ellipsometric mode.



Prototype of the cell nanofilm\_spr\_mirco including a micro fluidic block and prism of variable size.

- Five channels in parallel
- Flexible channel design
- Template for preparation of microfluidic block work always with a new and clean microfluidic

### VIEW ON LITERATURE: HYDROGELS – SILENT STARS IN SURFACE CHEMISTRY?

Hydrogel is a network of polymer in which water is the dispersion medium. They are superabsorbent (can contain over 99% water) natural or synthetic polymers. At the solid-liquid interface hydrogel layers are promising because of their “smart” adsorption properties. Microcontact printing (mCP) has been used by Zhou et al. [1] to introduce temporary hydrophobic barriers on carboxymethylated dextran (CMD) hydrogels on gold. Imaging ellipsometry was used as one method in the characterization of the overall fabrication process.

Schmaljohann et al. [2] demonstrated a number of advantages of imaging ellipsometry for the characterization of a patterned hydrogel. The gel was immobilized on a polymer substrate using a low-pressure argon plasma treatment via a masking technique. The micropatterned, thermoresponsive hydrogel film has been characterized with imaging ellipsometry. The characterization was carried out on the dry film as well as on a swollen sample in water. The thermoresponsive behavior was studied in deionized water by temperature-dependent measurements in a solid-liquid cell. Through imaging ellipsometry, it was possible to distinguish the different regions of interest on a micrometer scale, to follow the swelling of the hydrogel part as a function of the temperature, and to visualize the swelling as 3D profiles of  $\Delta$  at various temperatures. Long-term changes of the sample could also be detected, which cannot be observed with conventional ellipsometry.



Images of the month: Fully focused BAM images – and even more impressive videos at: <http://www accurion.com/bam>

Since 2004, a number of additional papers have been published in the field of characterisation of hydrogels with imaging ellipsometry. Using Google Scholar, for example, you will find more than a hundred hits for a query containing “imaging ellipsometry” and “hydrogels”.

[1] Zhou Y., Andersson O., Lindberg P., Liedberg B. (2004) Protein Microarrays on Carboxymethylated Dextran Hydrogels: Immobilization, Characterization and Application. *Microchimica Acta* 147, 21–30  
 [2] Schmaljohann D., Nitschke M., Schulze, R., Eing A., Werner C., Eichhorn K.-J (2004) In Situ Study of the Thermoresponsive Behavior of Micropatterned Hydrogel Films by Imaging Ellipsometry. *Langmuir* 21, 2317-2322

### NEW PRODUCTS: support frame halcyonics\_bam/ie

The support Frame halcyonics\_bam/ie is welded steel frame optimized for the nanofilm\_ep3 platform and the nanofilm\_ultrabam. In order to make use of the complete performance of an active vibration isolation system, a solid and rigid table, such as the halcyonics\_bam/ie, is strongly recommended. For the water interface, adjustable legs offer the advantage that the entire table can be leveled – making ellipsometry at the air-water interface much easier.

- Dimensions: 810 x 600 x 984 mm<sup>3</sup>, adjustable height, transport wheels, shelf for electronics box, black powder coated



Support frame halcyonics\_bam/ie

### ACCURION @ LB13: Presentation of the nanofilm\_ultrabam

During the LB13 in Québec, Canada we introduced our new nanofilm\_ultrabam with fully focused high resolution imaging. For those who missed the demonstrations, please visit [www accurion.com/bam](http://www accurion.com/bam) to convince yourself by watching some video. With the nanofilm\_ultrabam, the entire field of view is now in focus in real-time. This enables you to investigate floating monolayers. We also want to thank all the scientists who stopped by our booth for their discussions, impressions, and interest.



The nanofilm\_ultrabam in Quebec at the LB13  
 Video of floating monolayers:

<http://www accurion.com/bam>