



Thursday,

16th January
2014

at: 5.15 pm

Gustav-Mie-
Hörsaal,
Theodor-Lieser-
Str. 9, 06120
Halle

*Coffee will be
served from
4.45 pm!*

Prof. Jürgen Rühle

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versity of Freiburg*

Tailormade Polymer Monolayers and Networks for Microsystems and Engineered Biointerfaces

All interactions of materials with their respective environments are controlled by the topography and chemical composition of their surfaces. Examples are the adhesion between different objects, wetting of surfaces by contacting liquids and the adsorption of molecules from the surrounding medium. Accordingly it is important to develop chemical tools which allow the attachment of tailor-made polymer molecules to surfaces of different chemical composition. In the presentation a new strategy will be presented which allows to generate novel, micropatterned polymer coatings with tailor-made properties with high spatial resolution on a variety of different substrates, ranging from typical oxides to polymers and biological materials [1-5].

We show that thin polymer coatings can be used for example to control the wetting properties or the fouling of surfaces and prevent the formation of biofilms on surfaces. The focus of the presentation will be exclusively placed onto systems in which the polymer molecules are covalently attached to the surfaces of the substrates.

Applications of such layers try to answer questions as to how polymer coatings can be used to increase the sensitivity of DNA chips or as to how the wetting properties of surfaces can be effectively controlled from superhydrophilic to superhydrophobic through a combination of polymeric coatings and micro- and nanostructuring of surfaces. We give examples how the surface properties of materials can be adapted according to an external stimulus and describe how the obtained materials can be used for the generation of new bioanalytical devices, such as DNA, RNA, protein or polysaccharide chips.

References

- (1) Prucker, O.; Naumann, C. A.; Rühle, J.; Knoll, W.; Frank, C. W. *J. Am. Chem. Soc.* **1999**, *121*, 8766-8770;
- (2) Toomey, R.; Freidank, D.; Rühle, J. *Macromolecules* **2004**, *37*, 882-887
- (3) Dorrer, C.; Rühle, J. *Langmuir*, *23* (6), **2007**, 3179-3183
- (4) Belardi, J. Schorr, N., Prucker, O., Rühle, J. *Adv. Funct. Mat.*, **2011**, *21*, 3314-3320

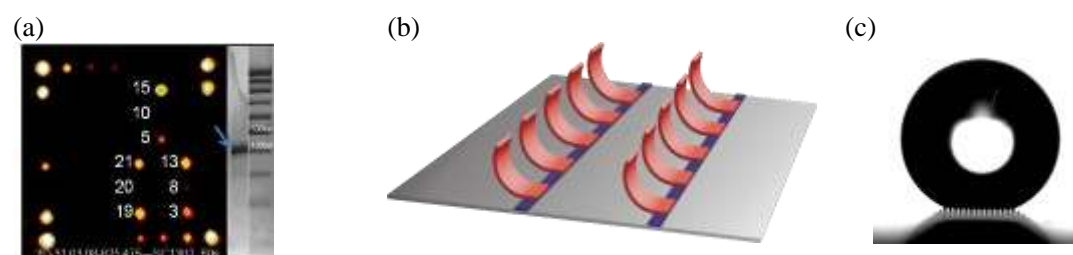


Abb.1: Examples for surfaces with tailor made properties: a) DNA-Chip for HPV diagnosis, b) artificial cilia: magnetic actuation of "hairy" surfaces and c) a superhydrophobic, microstructured surface.