Hauptthema "Interfacial Systems Chemistry: Out of the Vacuum, Through the Liquid, Into the Cell"

Posterpräsentation

Kintetics of surface conditioning and colonization in marine biofouling

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Biofouling is the undesired growth of marine organisms on submerged devices. It is a ubiquitously occurring phenomenon in tidal zones worldwide [1]. To prevent unwanted effects caused by biofouling, suitable non-toxic coatings for the marine environment are required. Surface chemistry is one of multiple properties influencing the settlement of marine organisms [2]. In the presented work we study the time dependence of algal settlement on different surfaces. Self-assembled monolayers (SAMs) on gold provide access to highly controlled surface chemistries and allow to fine tune physicochemical surface properties. In agreement with previous work, chemical termination of the surface affects the settlement kinetics of spores of the macrofouler *Ulva linza* [3]. However all investigated surfaces tend to saturate at a similar level after sufficiently long observation times. As different SAMs have different affinity towards macromolecules, settlement could be a combined effect of surface chemistry itself and the formation of a conditioning layer. To disentangle both effects, formation of conditioning layers depending on the surface chemistry was investigated in greater detail by spectral ellipsometry and IRRAS. Algal settlement is significantly changed if such conditioning films are pre-formed. Thus we quantitatively revealed that fouling kinetics is a delicate convolution of surface conditioning and fouling kinetics.

[1] M.E. Callow, J.A. Callow, J.D. Pickett-Heaps, R. Wetherbee, “Primary Adhesion of Enteromorpha (Chlorophyta, Ulvales) Propagules: Quantitative Settlement Studies and Video Microscopy”, *J. Phycol*., **1997**, *33*, 938.

[2] A. Rosenhahn, "Advanced nanostructures for the control of biofouling: The FP6 EU Integrated Project AMBIO.", *Biointerphases*, **2008**, *3*, (1), IR1-IR5.

[3] M. E. Callow, J. A. Callow, L. K. Ista, S. E. Coleman, A. C. Nolasco, G. P. López, “Use of self-assembled monolayers of different wettabilities to study surface selection and primary adhesion processes of green algal (*Entero-morpha*) zoospores“, *Appl. Environ. Microbiol*., **2000**, *66*, (8), 3249-3254.