ESPCI
Laboratoire PMMH
10 rue Vauquelin, 75231 Paris Cedex 05

Séminaire café - PMMH

Bureau d'Études, Batiment L, 2 ème étage

Jeudi 22 septembre 2016, 13h30

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Role of a liquid interface to prevent bacterial adhesion on silicone gels

Biofilm formation on medical devices remains a serious cause of complication due to microbial infections. Silicone elastomers are widely used biomaterials as catheters, implanted medical devices and healthcare devices but are susceptible to bacterial surface attachment. Crosslinked silicone elastomers, immersed in linear silicone oil, swell to an equilibrium concentration to form a gel, and then maintain a liquid layer at the surface acting as a physical barrier layer against bacterial attachment [1]. Figure 1 shows the topographic evolution over time of the forming liquid interface by optical profilometry. The release kinetics of the liquid interface were measured by atomic force microscopy. The impact of the surface nano and microscale roughness on the adhesion and friction behavior of the gels was also investigated. A model was developed to describe the initial evolution of the thickness of the liquid layer in air as a function of the time, the amount and the viscosity of the infused liquid, and the crosslinking degree of the polymer network. The non-fouling properties were tested with Pseudomonas aeruginosa for 30 days of flow culture in a bioreactor, showing a reduction of cell attachment by at least three orders of magnitude for the silicone gel, compared to conventional silicone materials.

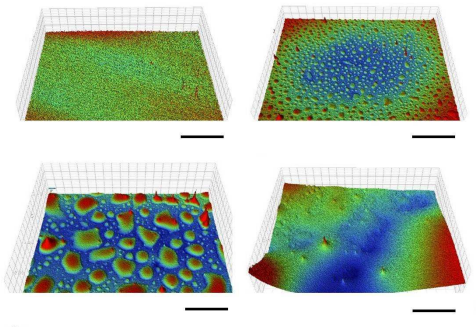

Figure 1 : 3D topography of the surface of the gel over a period of 10 days using optical profilometry (at 30 minutes, 1, 3 and 10 days). The scale bar shows 100 micrometers.

Prochain séminaire : jeudi 29 septembre 2016 **à 13h30**,
Guang-Yin Jing (Visiting professor at PMMH).

Programme des séminaires café : www.pmmh.espci.fr, onglet *Séminaires PMMH>Séminaires café (internes)*
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