

UniCat Colloquium

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Nanoporous Ultra-thin Membranes formed via Self-Assembly of Protein-Polymer-Conjugates

Self-assembled membranes offer a promising alternative for conventional membrane fabrication, especially in the field of nano-filtration. However, recent advances pushing the developments in self-assembled membranes towards thinner membranes with more selectivity are still limited with respect to active permeation area, stability and responsiveness. Here we introduce a new pore-making strategy which involves stimuli responsive protein-polymer conjugates self-assembled across a large area of 5 cm² using drying-mediated interfacial self-assembly. Proteins are used as a sacrificial template which - upon denaturing - provide hydrophilic pores of identical size. The permeation is controlled by temperature switching below and above the lower critical solution temperature of the polymer. The membrane is flexible and easily assembled on porous supports. A high mass transport was measured and a size-selectivity of particles below 20 nm was determined, which is in very good agreement with the size of protein used. This approach diversifies membrane technology since various sizes and shapes of proteins can be used, in addition to different responsive polymers generating a platform for “smart” self-assembled membranes.

References

- [1] N.C. Mougín, P. van Rijn, H. Park, A.H.E. Müller, A. Böker *Adv. Funct. Mater.* 2011, 21, 2470.
- [2] P. van Rijn, N.C. Mougín, D. Franke, H. Park, A. Böker *Chem. Commun.*, 2011, 47, 8376.
- [3] P. van Rijn, N.C. Mougín, A. Böker *Polymer*, 2012, 53, 6045.
- [4] P. van Rijn, H. Park, K. Özlem Nazli, N.C. Mougín, A. Böker *Langmuir*, 2013, 29, 276.
- [5] P. van Rijn, M. Tutus, C. Kathrein, N.C. Mougín, H. Park, C. Hein, M.P. Schürings, A. Böker *Adv. Funct. Mater.* 2014, 24, 6762.

Wednesday, January 27, 2016 at 5:15 PM

TU Berlin, Institute of Chemistry
Straße des 17. Juni 115, 10623 Berlin

Building C, Lecture Hall **C 264**

Prof. Leimkuehler (UP)

Organizer

Coffee and cake will be served 30 minutes before the lecture. Guests are cordially invited to attend!
Prof. Dr. Matthias Driess - Chair of the Cluster of Excellence UniCat - www.unicat.tu-berlin.de



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