

Séminaire

Vendredi 31 mai 2024 à 10h30
Amphithéâtre Henri Benoît

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Engineering Polyion Complex Micelles for Hybrid Functional Materials

Soft templating of porous silica materials synthesized by sol-gel offers several advantages in terms of tailored nanotextures, pore accessibility and fine control of the pore diameters. In this context, polyion complex micelles (PICs) are emerging as a novel structure directing agent in alternative to traditional cationic surfactant or amphiphilic polymer micelles. PICs are obtained by reversible electrostatic complexation of a multi-hydrophilic block copolymer containing a polyacid block with a micellization partner of opposite charge such as oligochitosan [1]. The sol-gel co-condensation of silica precursors with PIC micelles yields hybrid mesoporous silica (HMS) materials that are intrinsically functional with mesopores grafted with hydrophilic copolymer chains.

Through engineering of the nature, architecture and functionality of each block of the multi-hydrophilic block copolymer and of its micellization partner, we investigated how PIC micelles can modulate the structure and shape of functional HMS materials.

First, size modulation of PIC micelles based on poly(acrylic acid)-*b*-poly(oligo(ethylene oxide) methyl ether acrylate) complexed with oligochitosan will be demonstrated to adjust the mesopore diameters in hybrid silica materials and their protein sorption properties. Next, modified PIC micelles containing surfactant molecules (i.e. SPIC micelles) will be introduced to assemble HMS materials for pH-responsive antiseptic release.[2] Finally, PIC micelles based on triple-hydrophilic block copolymers, namely polyacrylamide-poly(acrylic acid)-poly(poly(ethylene oxide) methyl ether acrylate), will be introduced to control the shape of HMS, yielding 0D mesoporous nanoparticles and 1D mesoporous nanostructures.

[1] C. Gerardin et al., Microporous Mesoporous Mater.,2022,111915.

[2] A. Witecka et al., Microporous Mesoporous Mater.,2024, 112913.

Les personnes souhaitant rencontrer les orateurs sont priées de prendre contact avec Fouzia Boulmedais.