

Self-assembly of DNA and polymer hybrids

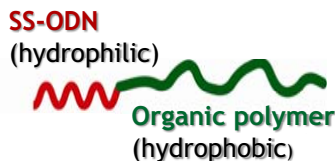
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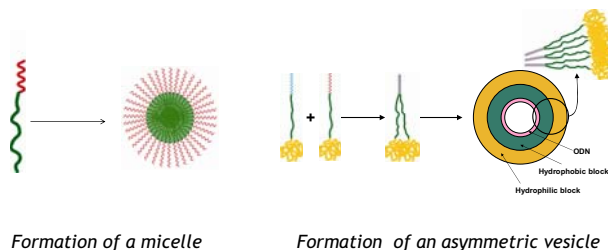
Introduction

We have synthesized amphiphilic DNA-polymer hybrid based on short single stranded DNA (oligonucleotides « ODN ») covalently linked to organic polymer segments (linear, block copolymers). These DNA hybrids can self-associate in aqueous solution to form many structures: micelles, vesicles and others structures. They can be used as:

- drug delivery carriers
- gene delivery system
- Oligonucleotides detection
- Materials

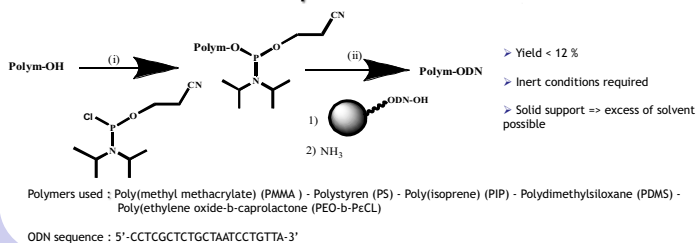


DNA block copolymers self-assembly

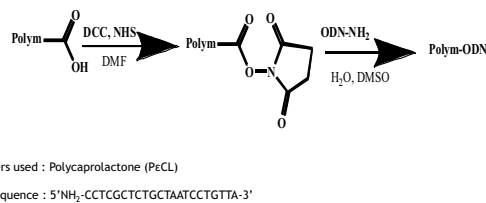


Synthesis

Phosphoramidite Method¹

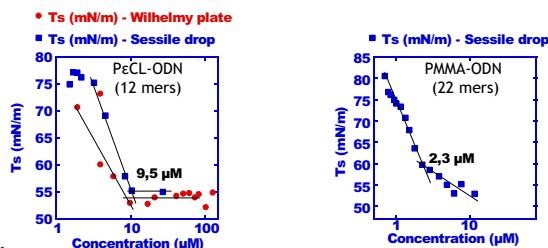
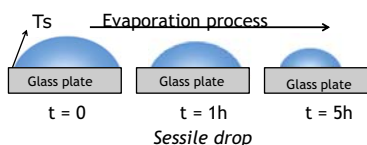
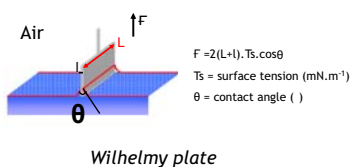


Peptidic Bond method

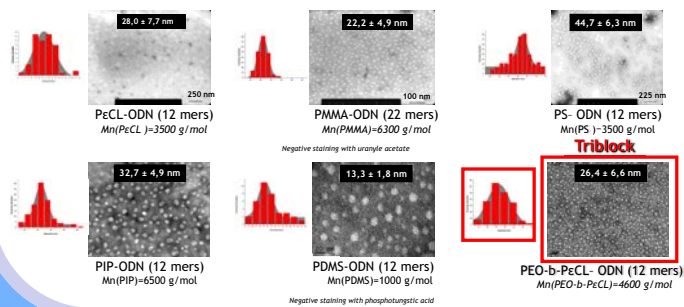


Physico-chemical characterization

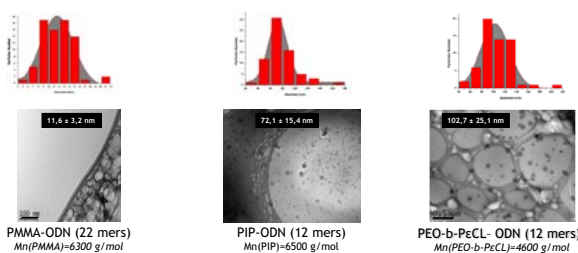
CAC determination



Transmission electronic microscopy

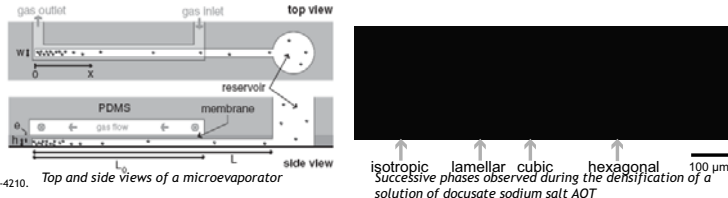
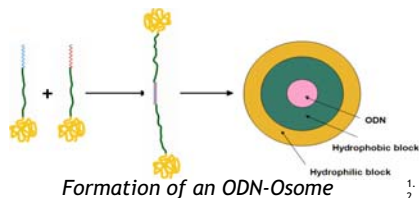


Cryotem



Outlooks

We plan to use the ability of ODN to hybridize to his complementary in order to synthesize ODN-Osome made of commercial amphiphilic diblock copolymers. We will also use microevaporation, a new microfluidic technology² which should allow us to construct the phase diagram of the copolymer mixture using a very limited amount of material. We also plan to carry out SAXS and SANS experiments to gain more insight into the structures obtained.



1. Herrmann et al., ACIE, 2006, 45, 4206-4210.
 2. Leng et al., Langmuir, 2007, 23, 2315.