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*Amphi IPREM - 10h*

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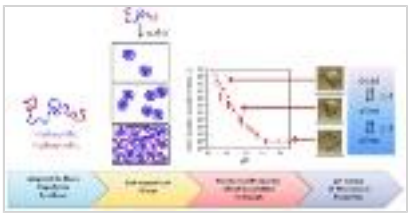

**Life, death and ressurection of zombie polymer hydrogels**

Amphiphilic block copolymers are macromolecules composed of at least one hydrophilic block chemically linked to one or several hydrophobic blocks. In water, these macromolecules self-assemble to form micelles composed of a hydrophobic core surrounded by a hydrated hydrophilic corona. The majority of amphiphilic block copolymers form “frozen” or dead micelles in aqueous solution. This means that there is no dynamic exchange of macromolecules between micelles because the energy necessary to extract a hydrophobic block from the core of micelles is too high. Consequently, the characteristics of the micelles are controlled kinetically and not thermodynamically.

In order to decrease this energy to overcome, we will show how the incorporation in a controlled manner of acrylic acid units (AA) within the hydrophobic block of poly(n-butyl acrylate) (PnBA) leads to dynamic or alive self-assemblies. We will mainly focus on hydrogels based on self-assembled triblock copolymers for which the hydrophobic nature of their associating blocks has been tempered through the incorporation of AA units. We will show how such a control allows:

* The control of the rheological properties of the hydrogels from viscous to gel-like in a reversible manner through the adjustment of the pH of the solutions. The dynamics can be indeed killed and further resurrected through pH cycles,
* The hybridization of block copolymers with different chemical structure which allows the formation of self-assemblies with controlled characteristics just by blending two different block copolymers with the proper ratio,
* The control of the degradation profile of the hydrogels.

We will conclude by showing that our approach can be considered to be universal since it can be applied to various types of chemistry and polymeric structures.