Interfacial properties of self-assembled copolymers

The proposed project aims at determining interfacial properties of original copolymers able to self-assemble and at evaluating their ability to stabilize emulsions. It belongs to the MACAOS project funded by ANR and coordinated by Christophe Chassenieux. The post-doctorate, hired for a period of 12 months from the 1st of October, will be located at Centre de Recherche Paul Pascal (CRPP) with some stays at the Institut des Molécules et Matériaux du Mans (IMMM).

Copolymers, able to dynamically self-assemble, are synthetized and provided by the MACAOS partners. We will study the interfacial properties of these copolymers that is to say their adsorption kinetics, the 2D viscoelasticity they confer to the interface…as a function of the copolymer state : molecular or self-assembled. In the first case, a surfactant-like behavior is expected while in the second case one can predict a particle-like behavior. Then, emulsions will be formulated and the link between interfacial behavior at model interfaces and at the emulsion drop surface will be established. The transition between one state to the other will be triggered by an external applied field as for example the polymer ionization.

Methods: pendant drop tensiometry, Langmuir trough compression experiments, determination of two-dimensional viscoelasticity by oscillating drop method, various mixers for emulsion preparation, optical and electronic microscopy rheology.

The candidate should be awarded by a PhD in the field of soft matter with preferentially a skill in rheology.

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