CROSS-OVER IN THE DYNAMICS OF POLYMER CONFINED BETWEEN TWO LIQUIDS OF DIFFERENT VISCOSITY

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The study of structural and dynamical properties of polymers at liquid/liquid interfaces is crucial to understand technological and biological systems. Polymers are indeed confined at liquid interfaces in many industrial processes, such as liquid/liquid extractions, solvent displacement methods, or emulsifications, and also in biological applications, such as drug nanocarriers. Depending on the relative solubility of the polymer chains, they can dissolve in one of the two solvents or reside at the interface. In the latter case the polymers adsorbed at the interface minimize the interfacial free energy of the system, behaving as active molecules [1]. By performing molecular dynamics simulations, we characterized the dynamics of polymer chains with different molecular weights, entrapped at the interface between two immiscible liquids of different viscosity (Figure 1). We showed that increasing the viscosity of one of the two liquids the dynamic behaviour of the chain changes from a Zimm-like dynamics typical of dilute polymer solutions, to a Rouse-like dynamics where hydrodynamic interactions are screened [2].

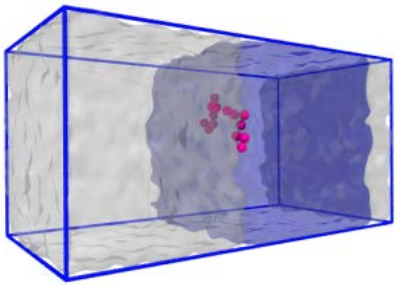

Figure 1 - Schematic representation of a polymer chain at the interface between two immiscible liquids of different viscosity.

References

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2. G. Giunta and P. Carbone, *Interface Focus*, 9(3), 20180074. (2019).

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