

SoftImpacts project

Description of research: This project will be focused on studying the interaction between soft objects and the electrified liquid-liquid interfaces (eLLI). The targeted soft objects are simply the particles that will be derived from the self-assembling chemical entities and suspended droplets (oil-in-water or water-in-oil). The term interaction, from our point of view, defines a situation when soft objects will hit, collide, fuse, adsorb, or maybe even bounce at/to/from the soft junction (LLI). Finally, we arrive to the third term – eLLI. Visually, this system can be very much compared to the mixture between olive oil and water. In practice, olive oil is exchanged with an organic solvent meeting particular physicochemical requirements, and both solvents (organic and aqueous) are enriched with the salts that dissociates into charged ions (thanks to ions the LLI can be electrified). Whenever the soft object will interact (think – collide) with the eLLI we are expecting to record ionic currents (ions crossing the eLLI) that can be probed with different electroanalytical techniques.

Reason for attempting a particular research topic: We want to satisfy the need to answer fundamental questions related to the bio-inspired interactions between soft interfaces. The scientific question we are asking is: To which extent electrochemistry can be used to follow interaction between soft interfaces? Our study is motivated by the fact, that such interactions are governing a number of biological and industrial processes. Example include cell waste removal via lysosomes, interaction between emulsion droplets or soft object based drug delivery platforms. This project aspires to deliver a new fundamental knowledge that can be used to further improve processes which are based on soft interfaces.

Results expected: We are expecting to develop a number of a new tools (model systems) that are dedicated to study the interaction between soft objects and soft interfaces. Such methodology together with created new knowledge can be than translated into better understand of systems relaying on soft junctions.