

Editorial



This special issue is devoted to polymers, colloids and interfaces. On first sight, polymers, colloids and interfaces might seem to be three unrelated topics somehow peripheral to chemistry. I would argue that this is not true. The rapidly increasing need for sustainable, high-performance materials and devices requires interdisciplinary research that is at the interface between chemistry, physics, biology, material science and engineering. Polymers, colloids and interfaces are located at exactly this interface. The synthesis of polymers involves organic chemistry and their further processing know-how in physical chemistry, physics, material science, engineering and, depending on the application, biology. There is a rapidly increasing number of techniques to process polymers with dimensions on the nanometer scale into colloids possessing well-defined compositions and dimensions in the 10s of nanometers up to 1 μm range. Colloids can be further processed into macroscopic materials, for example, by assembling them on flat interfaces to introduce colors to them, or on curved interfaces, including emulsions, to form stable 10–100 μm sized Pickering emulsions. In this sense, these three terms stand for three different length scales on which we can tune the structure and composition, and hence properties of materials. They all base on chemistry and unite different scientific disciplines, thereby offering exciting opportunities for the design and fabrication of the next generation of sustainable, functional materials. Hence, one could claim that polymers, colloids and interfaces might help to bring chemistry that happens at the sub-nanometer to nanometer length scale to the macroscale, thereby making the beauty and power of chemistry tangible to everybody. This issue is devoted to provide an opinionated overview over this highly interdisciplinary, vivid field within which I would argue Switzerland makes important contributions.

I am very grateful to the early- to mid-career scientists who wrote very nice, comprehensive perspectives on their vision on the fabrication of functional materials using polymers, colloids, and interfaces. This issue includes visions on the use of functionalized polymers as photoswitches to design the next-generation of smart, photo-responsive polymers, the use of block-copolymers and colloids to introduce colors to materials or to render them antimicrobial. It features the interdisciplinarity and breadth of this field and I hope, it stimulates thoughts on how to advance it to make a true contribution to the introduction of more sustainable materials, devices, and processes. The issue is divided into three sections.

The first section is devoted to polymers. **Calvino** offers her view on the future of photopolymerizations for the design of recyclable polymers. And **Dodero and Steiner** provide a comprehensive overview and an exciting perspective over the use of block-copolymers to introduce structural colors.

The second section is devoted to colloids. In this context, **Demirörs and coworkers** provide a very colorful overview over methods that enable the assembly of colloids on a large scale to fabricate structural colors whose appearance is independent of the viewing angle. **Lattuada and Dorbic** offer a comprehensive overview over the synthesis and assembly of non-spherical colloids. And **Salentinig and coworkers** share their opinion on a different type of colloids: viruses. They summarize how viruses can be characterized and assembled into superstructures.

The third section is devoted to interfaces. It illustrates their importance for soft objects such as microgels. **Vialetto** provides a comprehensive overview over the influence of interfaces on the morphology of soft hydrogel-based microparticles, so-called microgels, that are adsorbed at them.

I wish you all the best on the journey across the different length scales.

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Cover image: Porous hydrogel microparticles made from emulsion drop templates through salt-induced liquid-liquid phase separations. Image by Alexandra Thoma and Tianyu Yuan, Soft Materials Laboratory, EPFL.

The Editorial Board of CHIMIA expresses its thanks to Prof. Amstad, President of the Swiss Chemical Society Division of Polymers, Colloids & Interfaces, for guest-editing this very interesting issue that demonstrates the range and interdisciplinarity of this very active field of research that holds great importance for the future.