

Synthesis of polymeric particles with multiple lobes

Kata Dorbic, Marco Lattuada

Department of Chemistry, University of Fribourg, Chemin du Musée 9, Fribourg, Switzerland

kata.dorbic@unifr.ch

The formation of particles with multiple lobes has been in the focus of several investigations [1-3], because of their potential applications as colloidal molecules. Such particles can be used as a building blocks in the processes of self-assembly, or they can be used as carriers of different substances, because each lobe can be different from the others in the same entity. In the production of multi-lobed particles, it is important to develop protocols that are reproducible and robust, with good yield, and where it is easy to recover the particles at the end of the synthesis.

If one wants to form non-spherical particles, the interfacial tension that drives a particle to adopt a spherical shape must be overcome. Here will be shown how this can be achieved by using a method based on multiple swelling and polymerization steps, starting from simple polystyrene colloids. By combining hydrolyzed 3-(trimethoxysilyl)propyl methacrylate with styrene, with the possibility of introducing a crosslinker, we have been able to induce phase separation. This allowed us to create multi-lobed particles whose morphology changes with the quantity and ratio of monomers (Figure 1). In this work, we will show how the control of the hydrolysis of 3-(trimethoxysilyl)propyl methacrylate is playing a crucial role in defining the final shape of the particle.

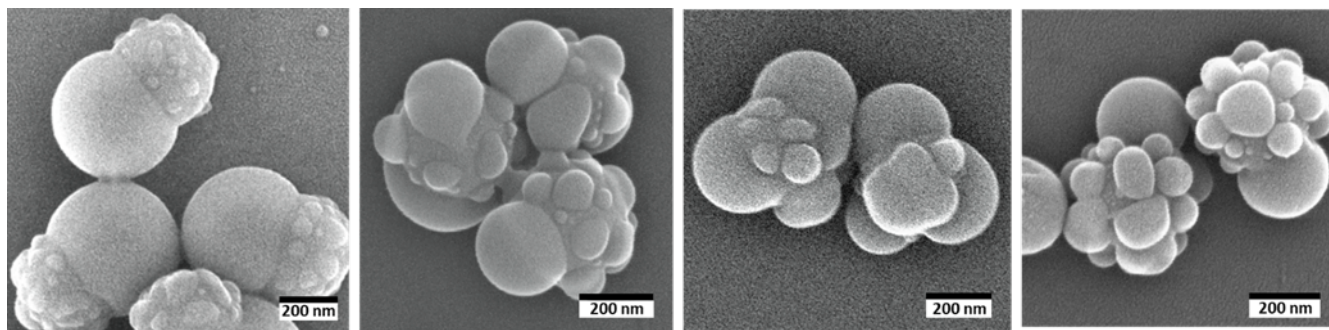


Figure 1. Changes in the morphology of particles by changing ratios between styrene and hydrolysed 3-(trimethoxysilyl)propyl methacrylate

References

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