Schmitt V

Stasse M and Héroguez V

CNRS University of Bordeaux, France

Elaboration of double emulsion based polymeric capsules for fragrance

We aim at encapsulating fragrances made of a variety of lipophilic species to slow down their diffusion. Our strategy is to develop capsules by polymerizing the water intermediate phase of an oil-in-water-in-oil double emulsion. In other terms, our system consists in a direct emulsion of fragrance (O1) in a water phase (W) containing monomer, initiator and crosslinker. To obtain the double emulsion, this direct emulsion, stabilized by a hydrophilic surfactant, is itself dispersed in an external lipophilic solvent used in perfumery (O2) and stabilized by a lipophilic surfactant. Polymerization of the intermediate water phase aim at obtaining a 3D network. This strategy exhibits the following advantages over other nowadays proposed capsules: polymerization only takes place in the water phase owing to the solubility of the monomer and the obtained 3D network is supposed to play the role of an effective barrier limiting the diffusion of the inner lipophilic species towards either the external solvent or air.

Such a strategy implies combining formulation for the elaboration of the double emulsion using two antagonistic surfactants, a hydrophilic and a lipophilic one and polymerization of the intermediate phase. Insertion of the polymerizable species in the double emulsion shall not destabilize it. Some monomers exhibiting interfacial affinity and interfering with the formulation of the double emulsion have to be avoided. By varying the nature of the monomers, the initiator to monomer ratio and the crossliknker to monomer ratio, capsules with high encapsulation efficiencies and with various mechanical properties have been obtained.

Speaker Biography

Schmitt V is a senior researcher. After a Ph-D in Strasbourg, she moved to Lund in Sweden for a post-doctoral position before getting hired at CNRS in Nancy with a permanent position. Since 1998, she is working at Centre de Recherche Paul Pascal in Bordeaux, France. Her research focuses on the elaboration and characterization of dispersed model systems like suspensions, emulsions and foams in view of addressing the link between structure and properties. She has a special interest on emulsions and foams stabilized by particles and on double emulsions. This presentation is part of a collaboration she continues with Héroguez V, a CNRS senior researcher too, specialized in the synthesis of nanoparticles (NPs) by Radical and Metathesis Polymerizations in dispersed media (suspension, dispersion, mini- microemulsions). She has high level expertise in Macromolecular Engineering. She has developed specific methods for producing polymeric NPs exhibiting controlled architecture, shape, and chemical composition. In particular, pH and thermosensitive NPs have been designed in order to allow release of active molecules with spatiotemporal control.

e: schmitt@crpp-bordeaux.cnrs.fr

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