

Advanced emulsion formulations for the preparation of encapsulating systems.



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Porous particles are employed in a wide range of applications as encapsulating and delivery systems. The use of multiple water-in-oil-in-water (W/O/W) emulsions is an interesting strategy for the preparation of such porous systems. Moreover, the characteristics of the emulsion-derived particles can be controlled through formulation studies and the type of the material used. Among all the materials described in the literature, silicones were chosen due to their interesting properties such as high stability, permeability to organic solvents or biocompatibility. In the present work, multiple W/O/W emulsions were prepared, using a mixture of silicone precursors as the oil phase, to serve as templates for the preparation of silicone porous particles. Various formulation parameters were varied to analyze their influence on the stability and structure of the emulsion. Furthermore, the choice of the emulsion preparation method is essential; hence emulsion templates were prepared by both the two-step emulsification method and a droplet-based microfluidic technique. Afterwards, porous particles were fabricated by simply crosslinking the intermediate oil phase through a thermal-induced reaction. Finally, some applications of the obtained silicone particles were also studied.