

The Ouzo effect as a powerful tool for encapsulation

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The nanoprecipitation of hydrophobic solutes (oils, solids, polymers, inorganic particles...) has been the object of numerous studies in the last 15 years, thanks to better understanding of the emulsification process (called 'Ouzo effect' by Vitale and Katz [1]). Particularly, the establishment of phase diagrams solute/water/solvent has allowed to circumscribe some zones where nanodispersions are obtained in the full volume. By coprecipitating two actives, the solute of interest in the solvent and a polymer in the water phase, nanocapsules are easily prepared, after concomitant crosslinking in the medium [2].

This talk proposes to summarize what are the main features of the Ouzo effect, and then to focus on encapsulation. We will particularly show the great variety of conditions, actives, (natural) polymers and (bio- and/or fluo-)markers that we can introduce in one pot to generate complex architectures (see Figure) [3-5]. I will finish by discussing the limitations of the process, e.g. the large dilution of final objects and the necessary removal of solvent, and the research currently done in our laboratory to push them.

[1] S. A. Vitale, J. L. Katz, *Langmuir* 19, 4105 (2003).

[2] X. Yan, X et al *Angew. Chem. Int. Ed.*, 53, 6910 (2014).

[3] X. Yan et al, *ACS Appl. Mater. Interf.*, 10, 25154 (2018)

[4] X. Yan et al, *Biomacromolecules*, 20, 3915 (2019).

[5] R. Ramos et al, *ACS Macro Lett.*, 10, 628 (2021).

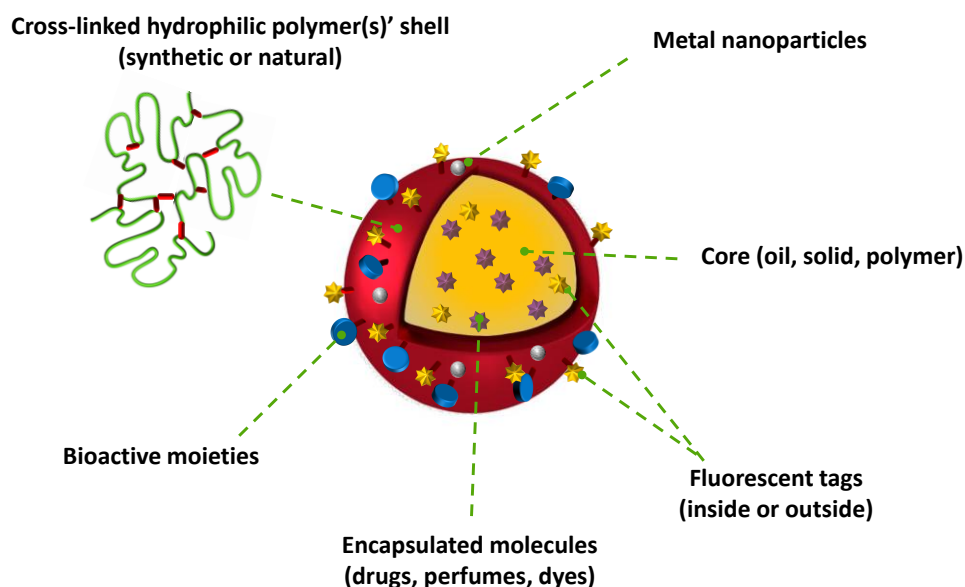


Figure : Variations around the structuration and functionalization of nanocapsules prepared by Ouzo effect.