

Elaboration and characterisation of aqueous colloidal suspensions of C₆₀ fullerene by Ouzo effect

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Since the end of last century, fullerene C₆₀ has been widely studied for its potential applications in biomedicine [1] and energy [2]. However, these applications are hampered by the difficulty to disperse C₆₀ in water. Typically, nanoprecipitation [3] or miniemulsion [4] processes are reported allowing to disperse only few ppm of fullerene in water. Stable dispersions at high concentration (on g/L scale) often require the use of a surfactant or chemical modification in order to obtain stable colloidal particles in the form of aggregated fullerene.

We propose to use Ouzo effect to produce C₆₀ nanoparticles at high concentration in water with a good control of their size without the help of an amphiphilic polymer or surfactant. The choice of a suitable organic solvent and its effect on C₆₀'s chemical structure will be discussed. The phase diagram of such a system will be presented. The characterisation of the structure of the C₆₀ nanoparticles was achieved by electron transmission microscopy and light scattering. Insight on their stability will be given using macroscopic observations and analytical centrifugation.

[1] Lyon, D.Y., et al. Environmental Science & Technology, 2006. **40**(14): p. 4360-4366.

[2] Andersen, T.R., et al. ACS Nano, 2011. **5**(5): p. 4188-4196.

[3] Deguchi, S., et al. Langmuir, 2001. **17**(19): p. 6013-6017.

[4] Andrievsky, G.V., et al. 1995(12): p. 1281-1282.

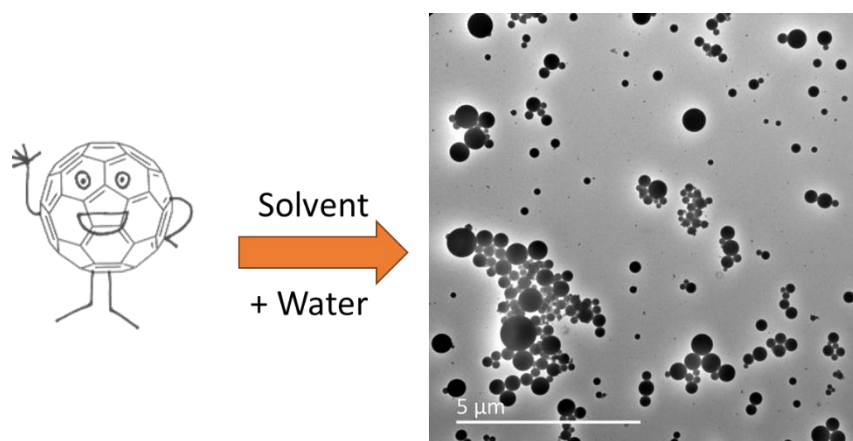


Figure 1 : TEM picture of Ouzo-obtained C₆₀ fullerene particles dried from water.