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NANOPARTICLES FOR DRUG DELIVERY VIA MINIEMULSION POLYMERIZATION OF BUTYL CYANOACRYLATE

E. Marie[a], M. Wu[a], E. Dellacherie[a], C. Frochot[b]

[a] *Laboratoire de Chimie Physique Macromoléculaire, Nancy-Université, CNRS, 1 rue Grandville, B.P. 20451, F-54001 Nancy, France (emmanuelle.marie@ensic.inpl-nancy.fr)*

[b] *Département de Chimie Physique des Réactions, Nancy-Université, CNRS, 1 rue Grandville, B.P. 20451, F-54001 Nancy, France*

Despite the high reactivity of the monomer, nanoparticles with a hydrophobic core based on poly(*n*-butyl cyanoacrylate) and a hydrophilic shell based on POE were synthesized in one step via miniemulsion polymerization. Particles size, surface coverage and hydrophilic layer thickness were controlled by the structure and the amount of the amphiphilic polymer in the aqueous phase, while the molar mass of the poly(*n*-butyl cyanoacrylate) depended on the pH of the continuous phase and the polymerization mechanism (anionic or radical).

The evolution of the molecular weight of the synthesized poly(*n*-butyl cyanoacrylate) was followed by Size Exclusion Chromatography as a function of time and pH. As expected, the degradation kinetics of poly(*n*-butyl cyanoacrylate) depended on the polymerization mechanism (anionic or radical). Finally, a model compound, pyrene, was successfully encapsulated in the synthesized nanoparticles. Its release was found to depend on the conditions of nanoparticles synthesis, especially on the polymerization mechanism.

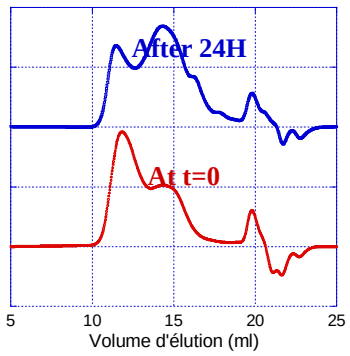

Figure 1 : Molecular weights of PBCA synthesized by anionic miniemulsion polymerization at pH=1, before and after degradation at pH=7.4 (for 24 hours)

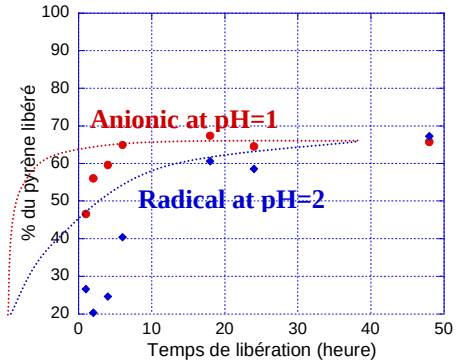

Figure 2 : Pyrene release in a 30% ethanol solution in aqueous buffer at pH=7.4; the nanoparticles were obtained by anionic (red curve) or radical (blue curve) miniemulsion polymerization