

Synthesis of Nanostructured Hybrid Particles via Miniemulsion Polymerization Suitable for Drug Delivery

Ibon Aranberri, Monika Goikoetxea, Abraham Chemtob, Jose M. Asua

Institute for Polymer Materials (POLYMAT) and Grupo de Ingeniería Química, Facultad de Químicas, The University of the Basque Country, Apdo 1072, 20080 Donostia-San Sebastian, Spain

Miniemulsion polymerization is a well suited technique to synthesize hybrid polymeric nanocomposites^{1,2}. In this work, two types of hybrid acrylic nanoparticles based on biodegradable and biocompatible polymers cellulose acetate butyrate and poly (ϵ -caprolactone) have been obtained via miniemulsion radical polymerization. In the first part, fundamental parameters controlling the emulsification of monomer-polymer nanodroplets prior to the polymerization step have been investigated in regard to colloidal stability and droplet size. Key process variables controlling the effectiveness of emulsification (organic phase/water interfacial tension, the viscosity of the organic phase, the equilibrium conformation of the polymer in the acrylic monomers and the surfactant concentration) were studied. The second part is devoted to miniemulsion polymerization of polymer nanodroplets.

Polymer microstructure was analyzed in terms of molecular weight and grafting. Finally, particle morphology was characterised by TEM.

References:

- [1] J.M Asua; *Progress in Polymer Science*, **2002**, 27, (7), 1283.
- [2] M. Antonietti, K. Landfester; *Progress in Polymer Science*, **2002**, 27, (4), 689.