

Preparation of nanoparticles from end-carboxylated poly(ϵ -caprolactone) oligomer

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Nanoparticles have potential applications, such as drug delivery system, coating industry and electronic applications. In this study, we prepared a biodegradable poly(ϵ -caprolactone) (PCL) nanoparticles. The PCL nanoparticles were prepared via microemulsification using end-carboxylated poly(ϵ -caprolactone) (X-PCL). X-PCL was prepared by reacting PCL-diol with succinic anhydride or trimellitic anhydride with pyridine as a catalyst. X-PCL is only soluble in some organic solvent such as dimethylformamide(DMF), tetrahydrofuran(THF) and their mixture. When the water was dropwisely add to the dilute polymer/organic-solvent solution under ultrasonication or reversely, we could observe the formation of stable colloids. The colloidal systems were characterized by using dynamic laser scattering (DLS). Field-emission scanning electron microscope (FE-SEM) and transmission electron microscope (TEM) were used to observe the shape and size of the colloidal nanoparticles after dialysis. Such formed colloidal nanoparticles had size distribution with an average diameter in the range of 50-100 nm. The variation of conductivity and surface tension of X-PCL solution during the emulsification process were also studied.