

Single-Step Fabrication of Monodisperse Hollow Polymeric Microspheres

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Hollow polymeric microspheres have attracted a great deal of interest because they have various potential in diagnostics, drug delivery, bioactive materials and so on. Some method including layer-by-layer (LBL) deposition, hard-template and emulsion methods have been developed to prepare hollow polymeric spheres, which require time consuming, multistep process.

Here we proposed facile route for fabrication of polymeric shell particles. Single emulsion droplets of polyethyleneglycoldiacrylate (PEGDA) were generated by using coaxial glass micro capillary chip. PEGDA droplets were rapidly encapsulated with oil flow containing surfactant and photo initiator. Photo initiator was diffused into emulsion droplets as time goes by. After few minute, PEGDA droplets were exposed by UV light and polymeric shell structure which have non-cured core region could be fabricated because of diffused photo initiator. Shell thickness could easily be controlled by varying diffusion time or amount of photo initiator. Fluorescence dye or inorganic colloidal particles such as silica or magnetic nanoparticles could be introduced in PEGDA for multifunction.