

Fabrication of monodisperse silica shell structured particle using silanol group functionalized polymer particle

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We present the simple method of fabricating silica shell structured particle. It can be synthesized by using simple 2-step fabrication method. First step is generation of polymeric particle template which is functionalized silanol group for silica grafting. And second step is development of silica nano-particle on the surface. In the first step, we generate polymeric micro droplet which is consisted of 3-trimethoxysilyl propyl methacrylate (TMSPM) as a monomer, crosslinking monomer, and photo initiator. And then, these droplet was photo-polymerized by exposing UV irradiation. Through facile microfluidic system, we obtained mono-dispersed size and maintained stable silanol group functionalized polymeric particle template. Subsequently, silica shell structure on surface of generated particles succeeded in stöber method using tetraethylorthosilicate (TEOS). Silica shell is made up silica nano-particle generated by 'grafting from' approach. We confirm nano-particles were formed from silanol group act as silica seed on the surface of polymer particle. Consequently, this method is possible to simply generate size adjustable monodisperse silica shell particle.