

Facile Synthesis of Monodisperse Spherical MCM-48 Mesoporous Silica Nanoparticles with Controlled Particle Size

김태완, Victor S.-Y. Lin¹, 정광은, 채호정, 김철웅, 정순용*
한국화학연구원; ¹Iowa State University
(syjeong@kRICT.re.kr*)

A rapid and facile synthesis route to the monodisperse spherical MCM-48 mesoporous silica nanoparticles (MSN) is developed based on the modified Stöber method. The phase domain of MCM-48 MSNs can be extended by controlling the synthesis conditions. The formation of monodispersed spherical MCM-48 MSNs is obtained using triblock copolymer Pluronic F127 as a particle size designer. The average particle size of MSN can be controlled from 70 to 500 nm. The MCM-48 MSNs thus obtained are demonstrated as a good hard template for preparation of other mesoporous nanoparticles such as mesoporous metal oxides. The present discovery of the extended synthesis conditions and the binary surfactant system in the MCM-48 synthesis offers to reproducible and facile synthesis of the monodisperse spherical MCM-48 mesoporous silica nanoparticles with precise structural control, providing vast prospects for future applications of ultra-fine mesostructured nanoparticle materials.