Preparation and surface modification of highly monodisperse silica particles

임채호[1,2], 심재원[1,2], 김신현[1,2], 이수연[1,2], 양승만[1,2,*]
[1]한국과학기술원 생명화학공학과; [2]광자유체집적소자연구단
(smyang@kaist.ac.kr*)

The demand for monodisperse silica particles with various sizes is constantly increasing in optical and biological industries due to their wide range of applications such as colloidal photonic crystals, light diffusers and biological probes. Stöber method, which is typical sol-gel process, employs ammonia anhydrous as a hydrolysis catalyst in order to synthesize colloidal silica particles. Our preparation method of silica particles is analogous to Stöber method, but basic amino acid, L-arginine has been used in place of ammonia anhydrous and reaction was taken in oil/water two phase system at high temperatures. The size range of silica particles through this method was from 20 nm to 80 nm. Furthermore, these monodisperse silica particles could be successfully used as seeds in the conventional Stöber method of regrowth for size range from 150 nm to 2 μm. In addition, we could change the surface property of silica particles from hydrophilic to hydrophobic after the treatment using silane coupling agents.