

Influence of surfactants on silica particle growth in sol-gel process to produce mono-dispersed large-size particles

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In the present study, anionic surfactants were added to promote the particle growth process in the seed growth technique, which is adopted for large monodispersed spherical silica particles in the sol-gel process. As a result of SEM analysis, it is noted that the silica particles are grown by agglomeration of secondary particles into the seed particles. Thus, the particle size (1.0-1.1 μm) was promoted by surfactants (sodium dedoxyl sulfate, N-lauroylsarcosin sodium salt, sodium cholate and dodecylbenzenesulfonic acid sodium salt) because the surface of negative charged silica particles is neutralized by metallic cation dissociated from the surfactant in solution and thus the repulsive force between silica seed and secondary particles is reduced. Also, the size monodispersity of silica particles was improved. In addition, the particles size was more increased when more surfactants used for the synthesis. In conclusion, degree of particle growth promotion depended on the chemical structure and the concentration of surfactant.