Synthesis of Micro-sized Monodispersed Spherical Silica

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Due to its light scattering function with low index of refraction, silica is used in optical devices. The spherical silica of about 1um size is used to improve the optical effect of the light guide panel of LCD, anti-glare film, etc. The common method of manufacturing spherical silica is sol-gel method, however, this method is not suitable for producing spherical silica larger than 1um in diameter. In this study, the influence of the raw materials of spherical silica including alcohol, TEOS, water and ammonia and the parameters of synthesizing process including the stirring and holding time on the size of silica particles was investigated. The particle size could be enlarged by increasing the concentration of TEOS which is the precursor, ammonia which is the catalyst, and PEG which is an additive, and using alcohol with high carbon number. The volume of water, stirring speed and hold time in hydration reaction also influenced particle size, and it was judged that there is optimum values of these parameters to obtain the largest particle size. Monodispersed silica with average particle diameter of 1.5um could be produced by controlling the raw materials and parameters of the process.