Synthesis of Silica Hollow Spheres Using Various Sized Polymer Core

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Silica hollow sphere has been considered as important material in wide field such as coating materials, toners, pigments, LCD board spacer. Fabrication methods are mainly nozzle-reactor system, emulsion, and sacrificial core. Nozzle-reactor system is difficult to prepare hollow sphere with nano-size and emulsion is not easy to control particle size. However, sacrificial core method can synthesize easily monodispersed nanohollow particle because of using highly dispersed sphere polymer core. In this study, the polymer particle size and wall thickness of the silica hollow sphere were controlled by using initiator/Si source amounts, catalyst concentration, reaction time and temperature and characterized by SEM, TEM, FT-IR, BET surface analysis. The polymer showed sphere and the sizes are in the range of 200-400 nm. The sphere size quickly increases up to 2 hrs(200 nm) of reaction time and then slowly increases to 72 hrs(300 nm). Reaction temperature is not sensitive to the sizes. Silica hollow spheres with 240-500 nm are possible to control the sphere size and wall thickness.