Morphology Transition of Nanostructured Hollow Silica

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Hollow silica have been investigated for potential candidates of supports for catalyst, carriers for drug delivery, and capsules for nanoparticles or biomaterials. Here, hollow silica particles were synthesized via sol-gel reaction using ionic block copolymer (poly(styrene-block-4-vinylpyridine)(PS-b-P4VP)) and silica precursor (TEOS). Morphology of hollow silica which has tubules and spheres can be controlled by adjusting the degree of quaternization. As changing the number of ionic groups and the interaction between ionic P4VP and counterion, the aggregation among micelle-silica hybrid compounds can be controlled, and it determined the morphology of hollow silica such as tubules and spheres. This hollow structure could be monitored using transmission electron microscopy(TEM) and Field emission-scanning electron microscopy(FE-SEM) method.