

Preparation of Highly Monodispersed Hybrid Silica Spheres Using a One-Step Sol-Gel Reaction in Aqueous Solution

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The successful one-step preparation method of monodisperse hybrid silica particles was studied using organosilane chemicals in aqueous solution. In general, almost all of the hybrid silica materials were made by a complex method where organic materials were coated on the surface of silica substrate via chemical reaction. However, our novel method can be applied to prepare colloidal hybrid particles without using substrate material. This method has three advantages: (i) this simple method gives the opportunity to prepare hybrid particles with high monodispersity through the self-hydrolysis of various organosilane monomers in aqueous solution, (ii) this efficient method can be applied to load lots of organic functional groups on the surface of silica particles through a one-step preparation method using only organosilane, and (iii) this effective method can be used to control the particle size of the product by changing the experimental conditions such as the concentration of the precursor or the reaction temperature.