

Synthesis and characterization of functionalized silica nanospheres

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The synthesis of inorganic nanostructures containing cavities of monodisperse diameter distribution has been receiving increased attention in the past decade. Such structures find applications in e.g. catalysis, adsorption and drug delivery [1,2]. A possible synthesis route is the template assisted core-shell synthesis. Since the size and shape of the cavities is determined by the core, it is important to use a template of adequate shape, size distribution and stability.

We synthesized hollow silica spheres around polystyrene spheres [3, 4, 5, 6]. Fig. 1. depicts a typical TEM image of the silica shells after the polystyrene template was removed by oxidation. The surface of the spheres was then modified by adding various functional groups [7,8,9].

Here we present the comprehensive characterization of the functionalized hollow silica spheres based on scanning electron microscopy, transmission electron microscopy, N₂ adsorption, FT-IR spectroscopy and Raman spectroscopy.

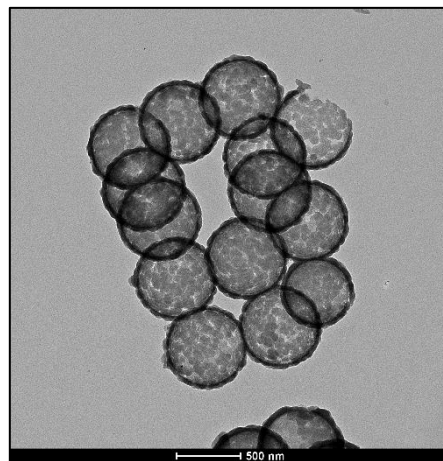


Fig.1. Characteristic TEM image of hollow silica shells

Keywords: core-shell structure, PS/SiO₂ nanoparticles, functionalization

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