

Synthesis and characterization of hollow silica microspheres functionalized by magnetic particles using W/O emulsion method

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Hollow silica particles functionalized by magnetic particles (HSFMs) are prepared without templates using the W/O emulsion system, including magnetic nanoparticles synthesized by the redox reaction of Fe salts. Since the removal process like etching step is not required, our system is a simple and easy method to obtain the functionalized shell and composite hollow materials. It is verified by XRD, EDS and VSM measurements that the structure and magnetic property of the magnetic particles are not changed in quality, before and after the synthesis of hollow silica particles. HSFMs or HSFMs modified with nucleophilic functional groups containing amine, sulfur, and phosphorous can be employed in various fields such as composite materials and biotechnology. Moreover, this method can be extended to the synthesis of hollow silica particles functionalized by other metal oxide materials as well as iron oxide.