

Facile synthesis of hollow mesoporous zinc silicate nanoparticles via a dual surfactant system

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We report a facile method for synthesizing hollow mesoporous zinc silicate nanoparticles. By reacting tetraethoxysilane, zinc acetate, cetyltrimethylammonium chloride, and a tri-block copolymer (F127) in water at 80 °C for 3 h and calcining the resulting product, nanoparticles with a core-double shell structure were obtained. Various characterization techniques showed that the as-synthesized nanoparticles have a hollow core, mesoporous zinc silicate inner shell, and mesoporous silica outer shell. By dissolving the zinc oxide phase in the inner shell with a citrate buffer, hollow mesoporous silica nanoparticles were obtained. This method provides a simple and inexpensive route for synthesizing hollow nanoparticles with a core-double shell structure in a single step because the steps for core formation and layer-by-layer shell growth are not required