

One-pot and Template-Free Synthesis of Monodisperse Porous/Hollow Metal Oxide Nanoparticles

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Porous/hollow nanostructures are of great interest in many current and emerging areas of technology. Herein, we synthesized Fe_3O_4 and TiO_2 nanoparticles with porous/hollow structure through a one-pot solvothermal process and without template. Time-dependent experiments suggested that the formation mechanism comprised several different steps including the generation of spherical particles by gathering of many tiny grains and the development of hollow structure based on the chemical conversion simultaneously coupled with the Ostwald ripening process within these spherical assemblies. We supposed that the chemical conversion might cause the non-uniformities of tiny grains and the empty spaces within the spherical assemblies and thus enhanced the outward migration and relocation of the core grains toward the outer layer, resulting in the formation and expansion of the porous/hollow structure.