

عنوان مقاله:

DEPOSITION OF TiO₂ NANOPARTICLES ON MONODISPERSED SILICA SPHERES BY HETEROCOAGULATION METHOD

محل انتشار:

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خلاصه مقاله:

Nowadays micro and nano spheres of ceramic materials were progressively synthesized for different applications such as pigments, fillers, catalysts, photographic materials, medicines, etc. In the present work, monodispersed silica spheres were coated with TiO₂ nanoparticles using colloidal titania sol via a simple electrostatic attraction strategy. Monodispersed silica spheres with diameters ranging from 500-700 nm were prepared by the Stöber method and colloidal titania sol was obtained by a hydrolysis-condensation reaction of tetra isopropyl orthotitanate (Ti(OC₃H₇)₄) in acidic media. SiO₂ spheres were coated with TiO₂ nanoparticles in the different weight ratios of TiO₂/SiO₂. The asprepared products were characterized by dynamic light scattering (DLS), scanning electron microscopy (SEM), X-ray diffraction (XRD), and Fourier transform infrared spectroscopy (FT-IR). The results of DLS showed that particle size distribution of TiO₂ sol was in the 12-38 nm range. It was found that uniform coating of TiO₂ could be deposited on the surface of silica spheres by adjusting the pH of TiO₂ sol in the 1.6 range. SEM images showed perfectly smooth surfaces of the silica spheres; but when TiO₂ nanoparticles were deposited on the surface of silica spheres, a loose Corresponding author. Tel:+982177240540-550 (2871); Fax:+982177240480and rough shell was made. Also FT-IR results confirmed the existence of Ti-O-Si chemical bonding at the interface between TiO₂ nanoparticles and silica sphere surfaces.

کلمات کلیدی:

TiO₂, Nanoparticle; Silica Sphere; Heterocoagulation; Sol-Gel

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