

Preparation and Characterization of Spherical Silica-coated Ceria Nanoparticles by Sol-Gel Method

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Monodispersed spherical silica-coated ceria nanoparticles were prepared through a sol-gel process using tetraethylorthosilicate (TEOS) and ceria fine particles. In this process, ceria fine particles were also prepared from cerium nitrate. The mean size of ceria particles was 300nm. Silica nanoparticles with narrow particle size distribution were prepared by controlled hydrolysis of TEOS solution. The silica sols were obtained by peptization, the process of redispersing a coagulated colloid, and were coated on ceria particles by the control of the weight ratio of silica/ceria and the pH of the mixture in aqueous solution. The morphologies of particles were characterized with scanning electron microscopy(SEM), transmission electron microscopy(TEM) and atomic force microscopy(AFM). The coating thickness of silica particles obtained by using this method was controlled in the range of 30 - 70nm.