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Thin Film Technology and it's Novelties in Material Science

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CHAPTER 21

DIFFERENT DIELECTRIC PROPERTIES OF SYNTHESIZED MESOPOROUS MOLECULAR SIEVES USING ULTRASONIC TREATMENT

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Abstract:

Sphere-shaped particles of mesoporous silica SBA-16 with cubic Im3m formation were synthesized at lower pH using Pluronic F127 as template and Rice Husk Ash as silica source. The diameter of the sphere shaped particles can be controlled in the range of 0.15–8 μm by varying circular. It is suggested that this morphology transition is due to a change in hydrolysis and condensation rate of the silica source and as a result the assembly of F127 micelles will differ. The SBA-16 samples were characterized using powder X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM) and Nitrogen adsorption techniques.

Keywords: SBA-16; circular particles; Synthesis temperature; RHA; Pluronic F127

Introduction:

Sphere-shaped particles of mesoporous silica SBA-16 with cubic Im3m structure were synthesize at low pH using Pluronic F127 as template and RHA as silica source. The diameter of the spherical particles can be controlled in the range of 0.15–8 μm by varying. The synthesis of mesoporous resources by a liquid-crystal template method was reported (Beck *et al.*, 1992, Kresge *et al.*, 1992). The properties of these materials make them gorgeous for adsorption, catalysis, separation, chemical sensing, optical coating, drug delivery and electronic applications. For practical purposes, the overall morphology of a mesoporous material is a necessary requirement in combination with their internal structure. SBA-16 is a mesoporous material with 3D cubic pore arrangement corresponding to Im3m space group (Boissiere *et al.*, 2001). In this body-centred-cubic structure each mesoporous is connected with its eight nearest neighbours to form a multidirectional system of mesoporous network (Sakamoto *et al.*, 2000), Due to its large cage, high surface area and high thermal stability. (Hudson *et al.*, 2008), this material appears to be one of the best candidates for catalytic support and packing materials for separation. Using F127 as a surfactant is the common way of synthesizing SBA-16(Zhao *et al.*, 1998, Van der Voort *et al.*, 2002). However, there are also reports on alternative surfactants such as F108 (Kipkemboi *et al.*, 2001), a blend of P123 and F127.

Micro porous sieves are widely used as solid acid catalysts, (Shaodian Shen *et al.*, 2007)but their applications are intrinsically limited by drawback of zeolite is that the small size of the channels (less than 0.18 nm) and cavities (<1. 5 nm) imposes diffusion limitations on reactions that can cause high back pressure on flow systems. The size of the zeolite micro pores (< 2 nm), mesoporous (2-50nm) and macro pores (> 50 nm) permit faster migration of guest molecules in the host frameworks. Since fast mass transfer of the reactant and products to and from the active sites is required for catalysts (Kresge *et al.*, 19[illegible] concept of infusing mesoporous into zeolite