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SYNTHESIS OF AMINO-FUNCTIONALIZED MONODISPERSED POROUS SILICA MICROSPHERES

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Abstract: The properties of porous silicon (PSi) make this material very useful. In this work, amine-functionalized Monodispersed porous silica microspheres (MPSM) has been synthesized successfully by tetraethoxysilane (TEOS) in a mixed solution of ethanol-water-dodecylamine, finally calcined and then functionalized with triethylenetetramine (TETA). The products were characterized in terms of chemical structure and morphology with Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM).It was found that MPSM has a highly porous morphology and very large specific surface area.

Keywords: Monodispersed Porous silica, amine- functionalized, Nanotechnology

1. INTRODUCTION

Nanotechnology is an emerging field that covers a wide range of technologies which are presently under development in nanoscale. Nanotechnology and nanoparticles (NPs) which are defined as less than 100 nm in length in at least one dimension, is a relatively recent research field that is expanding and diversifying rapidly. It plays a major role in the development of innovative methods to produce new products, to substitute existing production equipment and to reformulate new materials and chemicals with improved performance resulting in less consumption of energy and materials and reduced harm to the environment as well as environmental. Moreover materials and systems that often exhibit novel and significantly changing physical, chemical and biological properties due to their size and structure [1].

Silica is one of this materials. The development of porous silica materials by researchers of Mobil Corporation in 1992 stimulated explosive research on the preparation of porous materials through template approaches [2].That was due to the fact that the porous materials had their potential applications as versatile catalyst, catalyst supports, separation media, and hosts for clusters and nanowires, environmental remediation, catalysis and biomedicine, adsorption, biosensors and as a therapeutic material. Moreover silicon nanospheres has attracted extensive attention in the fields of biosensors and biological imaging because of their excellent biocompatibility, their superior electronic, optical, and mechanical properties, and their abundant sources [3].

It is considered a strong candidate material for their easy synthesis, high surface areas, welledfined surface properties, tunable pore diameters and low cytotoxicity. The sensitivity of porous silica depends on the morphological characteristics of its pores, i.e., diameter and uniformity, surface regularity, as well as layer thickness [4].