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论文

原位还原法制备SBA-15介孔分子筛负载纳米银颗粒

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摘要:

利用一种温和的还原剂六亚甲基四胺(HMT)通过一步合成的方法制备了介孔Ag/SBA-15分子筛, 采用粉末X射线衍射(XRD)、透射电镜(TEM)和氮气吸附/脱附等手段对样品进行了表征. 样品的比表面积为525 m²/g, 平均孔径为5.4 nm. 用XPS、广角XRD和高分辨TEM等手段证实样品中的银为金属态的纳米颗粒. 研究表明, 以六亚甲基四胺为还原剂通过原位还原的方法能使银纳米颗粒较好地分散到介孔材料的孔道中.

关键词: Ag/SBA-15; 六亚甲基四胺; 银纳米颗粒

In situ Formation of Silver Nanoparticles Hosted in Mesoporous SBA-15

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Abstract:

Mesoporous silicas SBA-15 with Ag nanoparticles in the channel was synthesized by one-step method with a mild reducing reagent(hexamethylenetetramine). Samples characterization were performed by the XRD, TEM, adsorption/desorption of nitrogen. The surface areas of Ag/SBA-15 is 525 m²/g and the average pore diameter is 5.4 nm. Presence of nanoparticles of silver in mesoporous SBA-15 were confirmed by X-ray photoelectron spectroscopy(XPS), high angle X-ray diffraction(XRD) and transmission electron microscopy(TEM) confirmed the diameter of the metal nanoparticles. The content of the silver in the Ag/SBA-15 was detected by ICP-AES. The silver nanoparticles were dispersed uniformly by the *in situ* auto-reduction reaction with hexamethylenetetramine(HMT) as reducing reagent, and diameter of nanoparticles is found to be about 8.0 nm which is coincident with the channel diameter of SBA-15.

Keywords: Ag/SBA-15; Hexamethylenetetramin; Ag nanoparticle

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