无机材料学报 2006 21 (5): 1268-1272 ISSN: 1000-324X CN: 31-1363/TQ

Pt/介孔TiO_2-SiO_2的制备、表征及光催化性能研究

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收稿日期 2005-9-25 修回日期 2006-1-3 网络版发布日期 接受日期

摘要 以正硅酸乙酯、钛酸异丙酯为前驱体, 尿素为沉淀剂, 改进的均匀沉淀法制备了TiO_2-SiO_2介孔复合材料, 用XRD、FTIR、氮气吸附-脱附、XPS等对材料进行了表征. 结果表明: Ti/Si摩尔比为0.5的介孔复合材料平均孔径为3.2nm, 比表面积达到609m^2/g. 用光还原法在材料表面沉积适量的贵金属Pt, 大大提高了材料的光催化活性.

关键词 Pt/TiO2-SiO2 均匀沉淀法 介孔材料 光催化

分类号 0643

Preparation, Characterization and Photocatalytic Activity of Mesoporous TiO_2-SiO_2 Composite Doped with Platinum

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Abstract Titania-silica mesoporous materials were synthesized by the improved homogeneous precipitation method with tetraethyl silicate and titanium isopropoxide as precursors and CTAB as the structure-directing agent. The materials were characterized by XRD, FT-IR, XPS, nitrogen sorption and so on. The mesoporous composite with Ti/Si molar ratio of 1/2 shows a narrow distributing pore diameter and large special surface area of 609m^2/g. Compared with pure nano-TiO_2 particles at the same titania loading, the composite exhibits higher photocatalytic activity in the degradation of methyl orange. The photocatalytic activity is greatly improved by doping platinum with an ppropriate loading.

Key words Pt/TiO2-SiO2 homogeneous precipitation method mesoporous material photocatalysis

DOI:

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