化学学报 2007 65 (14): 1289—1293 ISSN: 0567-7351 CN: 31-1320/06

研究通讯

有机改性TiO_2光催化剂的制备及可见光催化性能

姜东[1,2], 徐耀*[,3], 侯博[3], 吴东[1], 孙予罕*[,1]

([1]中国科学院山西煤炭化学研究所煤转化国家重点实验室 太原 030001)
([2]中国科学院研究生院 北京 100049)
([3]中国科学院山西煤炭化学研究所炭材料重点实验室 太原 030001)

收稿日期 2006-12-15 修回日期 2007-4-10 网络版发布日期 2007-7-24 接受日期 2007-6-3

摘要 以染料黄叱精(Chrysoidine G)和TiO_2 (Degussa P25)为原料, 利用甲苯二异氰酸酯为桥连体, 成功合成了一种有机改性的TiO_2光催化剂. 采用XRD, TEM, FT-IR, UV-Vis对所得催化剂进行了表征, 以亚甲基蓝降解为探针反应, 考察其可见光催化性能. 结果表明: 甲苯二异氰酸酯在黄叱精和TiO_2之间形成了稳定的化学键, 从而实现了对TiO_2的表面有机改性; 改性后的TiO_2在可见光区(400～550 nm)有明显的吸收; 与未改性TiO_2相比, 有机改性的TiO_2催化剂在可见光照射下表现出了很好的光催化性能.

关键词 TiO_2 有机改性 可见光催化 制备

分类号

Synthesis of Organically Hybridized TiO_2 Photocatalyst and Its Photocatalytic Activity under Visible Light Irradiation

JIANG Dong[1,2], XU Yao*[,3], HOU Bo[3], WU Dong[1], SUN Yu-Han*[,1]

([1] *State Key Laboratory of Coal Conversion, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan 030001*)
([2] *Graduate School of the Chinese Academy of Sciences, Beijing 100049*)
([3] *Key Laboratory of Carbon Material, Institute of Coal Chemistry, Chinese Academy of Sciences, Taiyuan 030001*)

Abstract An organically hybridized TiO_2 photocatalyst was successfully synthesized using a dye chrysoidine G, tolylene-2,4-diisocyanate and Degussa P25 as starting materials. Tolylene-2,4-diisocyanate was used as a connecter, and one —NCO reacted with Ti—OH and the other with the dye. The as-prepared catalyst was characterized by XRD, TEM, IR and UV-visible and its photocatalytic activity was evaluated by the degradation of methylene blue under visible light. The results showed that stable chemical bonds were formed through the above-mentioned reaction and an organically hybridized photocatalyst was prepared. The obtained catalyst showed an obvious absorption in visible region (400～550 nm). Compared with unmodified TiO_2, the organically hydridized TiO_2 exhibited largely enhanced activity for photocatalytic degradation of methylene blue under visible light irradiation.

Key words TiO_2 organically hybridized visible photocatalysis preparation

DOI:

通讯作者 徐耀 xuyao@sxicc.ac.cn