

REACTION KINETICS, CATALYSIS AND ...

TiO₂/SiO₂气凝胶的非超临界干燥法制备及其对吡啶降解的光催化活性

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摘要 TiO₂/SiO₂气凝胶具有不同摩尔比 of SiO₂/TiO₂ were prepared via non-supercritical method using tetraethyl titanate and silica sols as raw materials. The samples were characterized by TEM, SEM, BET, IR, XRD and so on. The results indicate that the BET surface area of TiO₂/SiO₂ aerogels calcined at 550°C which consisted of anatase structure of TiO₂ with narrow distribution pores of 5-25 nm is as high as 357.89 m²·g⁻¹.

1. For the photocatalytic degradation of pyridine, the catalytic activities of TiO₂/SiO₂ aerogels are much higher than that of TiO₂ powder. The photocatalytic activity of TiO₂/SiO₂ aerogels calcined at 800°C is the optimum. The higher the content of SiO₂, the higher the photocatalytic activity of TiO₂/SiO₂ aerogels. The cost for preparation of the aerogels is greatly reduced by using non-supercritical drying method, and the aerogels are hopefully applied in the treatment of industrial waste water such as coking effluent treatment.

关键词 TiO₂/SiO₂气凝胶, 非超临界干燥法, 制备, 吡啶, 降解, 光催化活性

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Preparation of TiO₂/SiO₂ Aerogels by Non-supercritical Drying Method and Their Photocatalytic Activity for Degradation of Pyridine

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Abstract TiO₂/SiO₂ aerogels with different molar ratio of SiO₂/TiO₂ were prepared via non-supercritical method using tetraethyl titanate and silica sols as raw materials. The samples were characterized by TEM, SEM, BET, IR, XRD and so on. The results indicate that the BET surface area of TiO₂/SiO₂ aerogels calcined at 550°C which consisted of anatase structure of TiO₂ with narrow distribution pores of 5-25 nm is as high as 357.89 m²·g⁻¹. 1. For the photocatalytic degradation of pyridine, the catalytic activities of TiO₂/SiO₂ aerogels are much higher than that of TiO₂ powder. The photocatalytic activity of TiO₂/SiO₂ aerogels calcined at 800°C is the optimum. The higher the content of SiO₂, the higher the photocatalytic activity of TiO₂/SiO₂ aerogels. The cost for preparation of the aerogels is greatly reduced by using non-supercritical drying method, and the aerogels are hopefully applied in the treatment of industrial waste water such as coking effluent treatment.

Key words TiO₂/SiO₂ aerogels, photocatalytic pyridine degradation

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