

## 常压下Ag-TiO<sub>2</sub>纳米管制备及光催化反应动力学研究

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摘要:

摘要 首次在常压下, 以试剂TiO<sub>2</sub>、NaOH和AgNO<sub>3</sub>为原料, 碱熔温度为700℃, 水热法制备了Ag-TiO<sub>2</sub>复合纳米管光催化剂。TEM和XRD用于纳米管组织与形貌表征。研究了纳米管制备以及用于模拟污染物甲基橙(MO)光催化降解的实验条件。结果表明, 原料是否碱熔, 水热温度高低和时间长短, 对光催化剂性能影响明显; 当MO溶液初始浓度Co为4mg/L、光催化降解反应持续4小时, 光催化降解率达到99%。降解反应的速率常数K与Co呈0.9966级的动力学关系。

关键词: 关键词 Ag-TiO<sub>2</sub>纳米管, 制备, 光催化, 降解, 动力学

## Synthesis of Ag-TiO<sub>2</sub> Nanotubes in Ambient Atmosphere and Kinetics of Photocatalytic Reaction

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**Abstract:**

Abstract Ag-TiO<sub>2</sub> composite nanotubes were synthesized for the first time using the hydrothermal crystallization with TiO<sub>2</sub>, NaOH and AgNO<sub>3</sub> at 700℃ under ambient atmosphere. The synthesized nanotubes were then characterized using TEM and XRD techniques. The experimental conditions for the nanotube synthesis and the photocatalytic degradation mechanism of methyl orange (MO) with the nanotubes as a photocatalyst were also examined. The results show that there is a distinct effect on nanotube's photocatalytic characteristics under different synthesizing conditions such as melting and hydrothermal crystallization temperature and time. The photocatalytic degradation rate ( $\eta$ ) reached about 99% when the reaction was kept for 4 h and the initial concentration of MO solution (Co) was 4mg / L. The relationship between the rate constant (K) of the degradation and Co conformed to an order of 0.9966 reaction.

**Keywords:** Keywords Ag-TiO<sub>2</sub> nanotubes, synthesis, photocatalysis, degradation, kinetics.

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