

### 论文摘要

中国有色金属学报

ZHONGGUO YOUSEJINSHUXUEBAO XUEBAO

第17卷 第9期 (总第102期) 2007年9月

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文章编号: 1004-0609(2007)09-1555-06

## N掺杂TiO<sub>2</sub>光催化剂的制备与表征

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**摘要:**以饱和尿素溶液水解沉淀工艺制备水合TiO<sub>2</sub>, 将水合TiO<sub>2</sub>在400~700 °C的空气气氛下煅烧2 h, 制得淡黄色的N掺杂TiO<sub>2</sub>光催化剂。对样品的煅烧过程进行分析, 采用XRD, TEM, BET及UV-Vis等对其物相、粒径、比表面积、掺氮量、吸光性能及可见光催化性能等进行测试和表征。结果表明: 掺氮元素主要以形成配合物分子形式均匀分布在煅烧前驱体中, 在TiO<sub>2</sub>从无定形转变为锐钛矿型的过程中, 掺氮元素以Ti—N化学键的形式进入到TiO<sub>2</sub>晶格中; 该N掺杂TiO<sub>2</sub>光催化剂样品的粒径为10-30 nm, 比表面积为30-70 m<sup>2</sup>/g, 掺氮量约3%, 能吸收波长400 nm以上的可见光; 样品在波长主峰420 nm的荧光灯激发下, 反应3 h后对2,4-二氯苯酚的光催化降解率超过40%。

**关键字:** TiO<sub>2</sub>; 光催化剂; N掺杂; 可见光

## Preparation and characterization of N-doped TiO<sub>2</sub> photocatalyst

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**Abstract:** Under 400–700 °C and ambient atmosphere, N-doped TiO<sub>2</sub> photocatalyst was prepared by calcining hydrated titanium dioxide which was obtained by using saturate urea solutions as precipitant. The obtained yellow samples were characterized by XRD, TEM and UV-Vis, the calcine process was analyzed, and their photocatalytic activities under visible light were also evaluated. The results indicate that the presence of nitrogen element in the precursor is in the form of complex formation, and nitrogen is doped into TiO<sub>2</sub> lattice in the form of Ti—N bond when the crystalline structure of TiO<sub>2</sub> changes from amorphous to anatase. The samples grain sizes, specific surface area and nitrogen doping contents are 10–30 nm, 30–70 m<sup>2</sup>/g and 3%, respectively, and can absorb visible light with wavelength above 400 nm. Photocatalytic activities results show that over 40% 2,4-dichlorophenol can be degraded under visible light irradiation after 3 h reaction.

**Key words:** TiO<sub>2</sub>; photocatalyst; nitrogen doping; visible light

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