

### 论文摘要

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## 制备方法对 $\text{LaFeO}_3$ 可见光光催化活性的影响

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**摘 要:** 采用4种方法制备 $\text{LaFeO}_3$ 催化剂, 探讨制备方法对 $\text{LaFeO}_3$ 催化剂结构和性能的影响。用XRD、UV-Vis DRS、PL和SEM等手段对样品进行表征。以罗丹明B为目标降解物, 考察催化剂的可见光光催化活性。研究表明: 这4种方法均能制备单一的钙钛矿型 $\text{LaFeO}_3$ 催化剂, 其中, 共沉淀法制备的催化剂具有最大的晶粒尺寸, 最小的比表面积, 仅为 $0.4 \text{ m}^2/\text{g}$ , 显示出最强的光催化活性; 在可见光照射下反应140 min, 罗丹明B的脱色率达到53.6%。柠檬酸络合法制备的催化剂的比表面积最大, 为 $8.1 \text{ m}^2/\text{g}$ , 但其脱色率仅为9.0%。由此可推断, 小的颗粒和高的比表面积并不是总有利于催化剂的光催化活性, 大的晶粒和规整的表面形貌等对催化活性也具有决定性的影响。

**关键字:**  $\text{LaFeO}_3$ ; 可见光; 罗丹明B; 共沉淀法

## Effects of preparation methods on photocatalytic activity of $\text{LaFeO}_3$ under visible light irradiation

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**Abstract:**  $\text{LaFeO}_3$  catalysts were prepared by four kinds of methods to explore the effects of preparation methods on structure and performance of  $\text{LaFeO}_3$  catalyst. The samples were characterized by X-ray diffraction, UV-visible diffuse reflectance spectrum, photoluminescence spectrum, scanning electron microscopy and  $\text{N}_2$ -adsorption. The photocatalytic activities of different catalysts were investigated by utilizing rhodamine B as degradation agent under visible light irradiation. The results show that the sample prepared by coprecipitation method exhibits the highest activity and has the largest crystallite size, and after reaction for 140 min, 53.6% of rhodamine B is decolorized; while for catalyst prepared by the citric acid complexation, the decoloration ratio is only 9.0%, though the latter has a higher surface area and smaller crystallite size than the former. The results suggest that smaller crystallite size and higher surface area are not always favorable to photo

catalytic activity of a catalyst, other factors, such as large crystallite size and regular morphology, also play a crucial role.

**Key words:** LaFeO<sub>3</sub>; visible light; rhodamine B; coprecipitation method

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