

研究论文

## 不同形貌TiO<sub>2</sub>的水热合成及对苯酚的降解研究

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**摘要** 采用水热合成法, 通过对溶液的pH值、反应物配比、陈化温度及陈化时间等条件的控制, 合成出不同晶型及形貌的TiO<sub>2</sub>纳米粒子. 结果表明, 溶液的pH=11, *n*(钛酸丁酯):*n*(三乙醇胺)=1:2, 陈化温度为150 °C, 陈化时间为48 h时, 能得到较规则的、长径比约为4:1的棒状TiO<sub>2</sub>. 当溶液pH<10时, 得到球形的TiO<sub>2</sub>纳米粒子; 陈化时间为24 h时, 得到纺锤形TiO<sub>2</sub>纳米晶. 以上合成的纳米粒子均为锐钛矿型, 但当溶液的pH>12时, 则得到板钛矿型TiO<sub>2</sub>粒子. 以苯酚为降解模型, 考察了不同形貌TiO<sub>2</sub>的光催化活性.

**关键词** [二氧化钛](#) [水热合成](#) [纳米粒子](#) [锐钛矿](#) [板钛矿](#) [苯酚降解](#)

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## Studies on Hydrothermal Synthesis of Titania with Different Morphologies and Degradation of Phenol

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**Abstract** Different crystal and crystalline type titania nanoparticles were prepared by using the hydrothermal method and controlling the pH values of solution, ratios of the reactants, temperature and time of hydrothermal reaction. The experimental results show clearly that uniform rod-like titania particles in an average aspect ratio of 4:1 could be obtained under the condition of the pH=11, *n*(TBOT):*n*(TEA)=1:2, hydrothermal treatment at 150 °C for 48 h. When the pH of the solution was less than 10, spherical titania nanoparticles could be obtained; but when the time was changed to 24 h, spindle titania particles could be obtained. The nanoparticles prepared above are all anatase, but when the pH more than 12, the particles turn to brookite. Phenol in polluted water was used as the degeneration model and the photocatalytic activity of titania with different morphologies was tested in this article.

**Key words** [TiO<sub>2</sub>](#) [Hydrothermal synthesis](#) [Nanoparticle](#) [Anatase](#) [Brookite](#) [Phenol degradation](#)

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