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### TiO<sub>2</sub>纤维光催化降解X-3B影响因素研究

#### Study on the influencing factors of photocatalytic degradation of X-3B aqueous solution by TiO<sub>2</sub> fibers

关键词: [TiO<sub>2</sub>纤维](#) [光催化](#) [X-3B](#)

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摘要: 采用溶胶-凝胶法及水蒸汽活化热处理工艺制备了15%(质量分数)SiO<sub>2</sub>掺杂的TiO<sub>2</sub>纤维,并利用SEM、XRD和HRTEM对其结构进行了表征.同时,以活性艳红X-3B染料水溶液为降解对象,研究了热处理温度、溶液pH值、紫外光源、溶液浓度等因素对TiO<sub>2</sub>纤维光催化活性的影响.结果表明,所制得的TiO<sub>2</sub>纤维为锐钛矿相,直径约为5~10 μm;其最佳热处理温度为700 °C,且在强酸(pH=2)或强碱(pH=14)条件下均表现出良好的光催化活性,并对不同浓度的X-3B溶液都有良好的降解效果,同时TiO<sub>2</sub>纤维也具有较好的可重复使用性.

**Abstract:** TiO<sub>2</sub> fibers doped with 15% SiO<sub>2</sub> were prepared by using sol-gel method followed by heat-treatment under steam atmosphere. The structures of the as-prepared TiO<sub>2</sub> fibers were characterized by SEM, XRD and HRTEM. Photocatalytic activities of the TiO<sub>2</sub> fibers were investigated by decomposing the active brilliant red X-3B dye aqueous solution. The effects of heat-treatment temperature, pH value, UV light source, and the X-3B solution concentration on the photocatalytic activities of TiO<sub>2</sub> fiber were investigated. The results showed that the fibers were anatase TiO<sub>2</sub> with diameters in the range of 5~10 μm. Optimal heat-treatment temperature for preparing TiO<sub>2</sub> fibers was 700 °C. The TiO<sub>2</sub> fibers exhibited high photocatalytic efficiency on the degradation of X-3B solutions of different concentrations in condition of strong acid (pH=2) and strong alkaline (pH=14). In addition, the fibers showed good reusability.

**Key words:** [TiO<sub>2</sub> fibers](#) [photocatalysis](#) [X-3B](#)

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