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活性炭负载铁催化过硫酸盐降解酸性大红3R

### Degradation of acid red 3R by persulfate with Fe-loaded activated carbon as catalyst

关键词: [过硫酸钠](#) [活性炭](#) [铁](#) [酸性大红3R](#) [非均相催化](#)

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摘要: 采用浸渍-高温煅烧法制备负载型的Fe/活性炭催化剂,利用电镜扫描(SEM)、X射线衍射(XRD)对催化剂进行表征.并以酸性大红3R为目标污染物,用此催化剂研究了过硫酸盐在非均相催化体系的氧化性能.考察了Fe负载量、过硫酸钠用量、催化剂用量、初始污染物浓度等因素对酸性大红3R降解的影响,并对催化剂重复使用性能进行测试.结果表明,Fe负载量为6%时,催化降解效果最好;当 $\text{Na}_2\text{S}_2\text{O}_8$ 浓度为 $3.0 \text{ g} \cdot \text{L}^{-1}$ ,催化剂用量 $1.5 \text{ g} \cdot \text{L}^{-1}$ ,降解3 h时,酸性大红3R去除率达80%以上;催化剂可重复使用5次以上.同时还采用紫外可见、气相色谱-质谱分析其降解的历程.

**Abstract:** The Fe-loaded activated carbon catalyst was prepared through impregnation-high temperature calcination and further characterized by scanning electron microscope (SEM) and X-ray diffraction (XRD). Acid red 3R was chosen as a model pollutant and oxidation performance of acid red 3R by persulfate was investigated in heterogeneous system with the Fe-loaded activated carbon as the catalyst. Factors affecting degradation of acid red 3R were studied, such as Fe loading content, sodium persulfate and catalyst dosage, and initial concentration. The recycling ability of the catalyst was also tested. The results showed that optimal degradation effect could be reached when the Fe-loading content was up to 6%. The removal rate of acid red 3R could reach more than 80% after 3 h when the concentration of  $\text{Na}_2\text{S}_2\text{O}_8$  and catalyst were up to  $3.0 \text{ g} \cdot \text{L}^{-1}$  and  $1.5 \text{ g} \cdot \text{L}^{-1}$ , respectively. The catalyst could be used repeatedly for more than five times. The degradation process was also analyzed through UV-vis spectrophotometry and gas chromatography-mass spectrometry.

**Key words:** [sodium persulfate](#) [activated carbon](#) [iron](#) [acid red 3R](#) [heterogeneous catalysis](#)

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