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对苯二酚强化多相类-Fenton过程降解活性艳红MX-5B的效能与机理

The efficiency and mechanisms of the enhancement of hydroquinone on the degradation of reactive red MX-5B by heterogeneous Fenton-like reaction

关键词: [Si-FeOOH](#) [对苯二酚](#) [活性艳红](#) [溶铁量](#)

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摘要: 用碱沉淀法制备的硅羟基氧化铁(Si-FeOOH)作多相类-Fenton反应的催化剂,探讨了室温条件下投加还原剂对苯二酚(HQ)对其催化 H_2O_2 降解活性艳红MX-5B的影响,同时考察了pH、 H_2O_2 浓度、催化剂Si-FeOOH投量及活性艳红浓度对活性艳红MX-5B脱色率的影响,并从溶铁量方面初步探讨了Si-FeOOH/ H_2O_2 /HQ体系降解活性艳红MX-5B的机理.结果表明,对苯二酚强化以Si-FeOOH为催化剂的多相类-Fenton反应降解活性艳红的效果显著.在pH=3,活性艳红初始浓度为 $10\text{ mg}\cdot\text{L}^{-1}$,对苯二酚浓度为 $0.55\text{ mg}\cdot\text{L}^{-1}$,Si-FeOOH投量为 $100\text{ mg}\cdot\text{L}^{-1}$, H_2O_2 浓度为 $51\text{ mg}\cdot\text{L}^{-1}$ 的反应条件下,活性艳红MX-5B的脱色率达94.69%.研究还发现,活性艳红脱色率与反应体系里的铁离子浓度关系密切,表明多相类-Fenton反应中除了催化剂表面吸附催化作用外,也可能存在类似均相类-Fenton的溶液催化作用.

Abstract: In this study a Si-FeOOH heterogeneous catalyst for the Fenton-like reaction was prepared by sodium hydroxide precipitation. At room temperature, the influence of hydroquinone on the degradation of reactive red MX-5B by Fenton-like was investigated. This paper also studied the influencing factors of Fenton-like reaction on the decolorizing rate of reactive red MX-5B, such as pH, the dosages of H_2O_2 , Si-FeOOH and reactive red MX-5B. The mechanisms of the degradation of reactive red MX-5B by Si-FeOOH/ H_2O_2 /hydroquinone system were also discussed. Experimental results showed that the effect of the degradation of reactive red by Si-FeOOH heterogeneous Fenton-like reaction under the addition of hydroquinone was remarkable. The optimal conditions were the initial concentration of reactive red MX-5B $10\text{ mg}\cdot\text{L}^{-1}$, Hydroquinone dosage $0.55\text{ mg}\cdot\text{L}^{-1}$, catalyst dosage $100\text{ mg}\cdot\text{L}^{-1}$, and H_2O_2 dosage $51\text{ mg}\cdot\text{L}^{-1}$ at pH of 3. Under these conditions, the removal of reactive red MX-5B could reach 94.69%. In addition, the decolorizing rate of the reactive red MX-5B was correlated with the iron ions concentration in the reaction system. This result indicated that in the heterogeneous Fenton-like reaction, apart from the surface adsorbed catalysis, there may exist a homogeneous catalysis effect similar to homogeneous Fenton-like reaction in the solution.

Key words: [Si-FeOOH](#) [hydroquinone](#) [reactive red](#) [dissolved iron](#)

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