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Fe-MCM-41催化氧化2,4-二氯苯氧乙酸

Catalytic degradation of 2,4-dichloro-phenoxyacetic acid by self-synthesized Fe-MCM-41

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中文摘要:

采用水热法合成了Fe-MCM-41中孔分子筛,紫外、红外及XRD表征显示铁离子已进入中孔分子筛骨架。以H_2O_2为氧化剂形成类Fenton试剂,实验结果表明,在催化剂加入量为1 g/L、H_2O_2体积分数为6%、pH为4、反应时间为10 h、反应温度为35℃的条件下,处理质量浓度为50 mg/L的2,4-D废水的降解率达94.95%。宏观动力学研究显示,该反应近似为一级反应,反应速率常数、表观活化能分别为0.21667 min^{-1}和26.65 kJ /mol。

英文摘要:

The mesoporous molecular sieves Fe-MCM-41 were synthesized via a hydrothermal method,and characterized by X-ray powder diffraction, FTIR and DRS-UV-Vis. The characterization data show that Fe^{3+} got into the framework of MCM-41. Catalytic degradation of 2,4-dichloro-phenoxyacetic acid wastewater was investigated by using Fe-MCM-41 catalysts and hydrogen peroxide as Fenton-like reagent.The results indicate that the degradation rate of 2,4-dichloro-phenoxyacetic acid (50 mg/L) reached 94.95% in the presence of Fe-MCM-41 (1 g/L) and hydrogen peroxide (6%) at pH of 4 after 10 hours under normal temperature and pressure.Kinetic studies of the catalytic reaction show that the degradation rate of 2,4-dichloro-phenoxyacetic acid nearly followed the first-order reaction, the reaction constant and activity energy respectively are 0.21667 min^{-1} and 26.65 kJ/mol at 35℃.