煤矸石改性的应用

摘　要

随着工业的发展，废水和固体废物给人们的生活带来诸多不便。为了解决这两大污染，本实验采用煤矸石对其改性，制备一种新型高效吸附剂来治理废水。

通过单因素实验，考察粒径、焙烧温度、焙烧时间、混合比例对吸附剂吸附性能的影响，并得到最佳改性条件：在煤矸石目数 200 目、焙烧温度 800℃、焙烧时间 90min、煤矸石石灰石混合比 2:3、氯化铝添加量 10%时制备出最佳条件复合材料吸附剂。此条件下吸附亚甲基蓝溶液吸附率可达 92%。

利用最佳条件下制备出的吸附剂，对亚甲基蓝溶液进行吸附。测亚甲基蓝的初始浓度、投加量、反应时间、反应温度对吸附率的影响。测得吸附 50ml 的 100mg/L 的亚甲基蓝，在投加 0.5g，震荡吸附一小时，在 40℃下吸附的条件下，吸附率最好，能达到 95.7%。

通过一级动力学和二级动力学分析得到，在二级动力学的 R^2 大于一级动力学的 R^2，所以本反应为化学吸附。

关键词：煤矸石；吸附剂；亚甲基蓝

Abstract

With the development of industry, waste water and solid waste bring a lot of inconvenience to people's life. In order to solve these two major pollution, this experiment uses coal gangue to modify it and prepare a new type of high-efficiency adsorbent to treat wastewater.

Through single factor experiment, the effects of particle size, calcination temperature, calcination time and mixing ratio on the adsorption performance of adsorbent were investigated. According to the experimental data, the best conditions were obtained: when the particle size of coal gangue was 200 mesh, the mixing ratio with limestone was 2:3, 10% aluminum chloride was added, and heated at 800 ℃ for 90 minutes. It is the best technological condition for the preparation of adsorbent.

Using the adsorbent prepared under the optimum conditions, the methylene blue solution was adsorbed. The effects of initial concentration, dosage, reaction time and temperature of methylene blue on the adsorption rate were measured. Under the condition of adding 0.5g, shaking adsorption for one hour, and adsorption at 40 ℃, the adsorption rate is the best, which can reach 95.7%.

Through the analysis of first-order kinetics and second-order kinetics, it is found that R2 in the second-order kinetics is greater than R2 in the first-order kinetics, so this reaction is a chemical adsorption.

Key words: Coal gangue; Adsorbent. Methylene blue

目　录