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研究报告

宋祎楚,冀晓东,柯瑶瑶,戴显庆,彭绍好.粉煤灰合成沸石对Cr³⁺的去除能力及影响因素研究[J].环境科学学报,2015,35(12):3847-3854粉煤灰合成沸石对Cr³⁺的去除能力及影响因素研究The ability and influencing factors of Cr³⁺ removal using synthetic zeolite from fly ash关键词: [粉煤灰合成沸石](#) [Cr³⁺](#) [吸附](#)基金项目: [北京林业大学科技创新计划团队项目\(No.TD2011-01\)](#)

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摘要: 研究了粉煤灰合成沸石对废水中Cr³⁺的去除能力,分析了接触时间、pH、沸石投加量、Cr³⁺初始浓度、温度等因素对Cr³⁺过程吸附的影响.试验结果表明,合成沸石的主要成分为一种无名沸石.合成沸石对Cr³⁺具有较快的吸附速度,吸附过程符合二级反应动力学.在pH 2.0~12.0范围内,合成沸石对Cr³⁺都具有较高的去除效率,Cr³⁺去除率随着沸石投加量的增加而增加,随着Cr³⁺初始浓度的升高而降低.Langmuir等温线模型对吸附数据具有更好的非线性拟合效果,所得最大吸附量为111.7 mg·g⁻¹.热力学研究表明吸附过程为吸热反应.与原沸石相比,利用NaCl再生后的沸石的Cr³⁺去除率下降11.42%~14.10%,但仍可循环利用.上述实验结果表明本文合成的沸石具有较好的除Cr³⁺的应用潜力.

Abstract: This paper studied the capacity of synthesized zeolite from fly ash for Cr³⁺ removal in wastewater, and analyzed the influence of contact time, pH, zeolite dosage, initial concentration of Cr³⁺, temperature on the Cr³⁺ adsorption process by batch experiments. The results showed that the main component of the synthesized zeolite is an unnamed zeolite. The uptake of Cr³⁺ on the synthesized zeolite was relatively fast, and the process followed pseudo-second-order model. Within the range of pH 2.0~12.0, the synthesized zeolite had high Cr³⁺ removal efficiency. The Cr³⁺ removal efficiency improved with the increase of zeolite dosage and decrease with the initial Cr³⁺ concentration. The Langmuir model can better characterize the adsorption equilibrium data, and the maximum adsorption capacity was 111.655 mg·g⁻¹. The adsorption process was also found to be endothermic reaction. Compared to the synthesized zeolite, the Cr³⁺ removal efficiency of zeolite regenerated using NaCl decreased by 11.42%~14.1%, but the regenerated zeolite could still be repeatedly used for Cr³⁺ removal. These results showed that the synthesized zeolite had a strong potential for Cr³⁺ removal.

Key words: [synthesized zeolite from fly ash](#) [Cr³⁺](#) [adsorption](#)

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