

化学

稻壳对铀吸附性能的研究

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收稿日期 修回日期 网络版发布日期:

摘要 采用稻壳粉末作为吸附剂, 进行了模拟含铀废水中U(VI)吸附实验的研究, 考察了稻壳的粒度、溶液的pH、初始浓度、吸附时间、温度及稻壳用量等因素对铀吸附去除率的影响, 分析了吸附过程的反应动力学和等温吸附规律, 并用扫描电镜、红外光谱及能谱图分析了吸附机理。结果表明: 稻壳粉末对铀的吸附平衡时间为4 h, 且吸附剂粒度越小、温度越高、投加量越大、溶液pH=5左右时越有利于铀的去除; 稻壳对U(VI)的吸附动力学行为可用准二级吸附速率方程来描述, 相关系数 $R^2=1$; 吸附过程符合Freundlich等温吸附方程, 相关系数 $R^2=0.9954$; 稻壳吸附U(VI)使表面形态发生变化, 与U(VI)相互作用的基团主要是羟基、羧基、P—O和Si—O。综合看来, 稻壳对U(VI)的吸附既存在物理吸附, 又存在化学吸附, 为混合吸附过程。

关键词 [稻壳](#) [U\(VI\)](#) [吸附性能](#) [机理](#)

分类号

Adsorptive Property of Rice Husk for Uranium

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Abstract The adsorption experiments were researched by using the rice husk powder as the adsorbent to remove the U(VI) from aqueous solution. The affecting factors on the U(VI) removal rate such as rice husk particle size, pH, initial concentration, adsorption time, temperature and dosage of adsorbent were evaluated, kinetics and adsorption isotherm law were analyzed, and mechanisms for U(VI) removal were discussed by SEM, FT-IR and energy spectrum analysis. The results show that U(VI) removal rate increases with the decrease of the size of adsorbent, and with the increase of adsorbent dosage and temperature. The process of adsorption can be described by an equation of pseudo 2nd-order mode, and the relation coefficient is 1. The process of adsorption also fits to Freundlich isotherm ($R^2=0.9954$). The adsorption of uranium on rice husk changes the surface form of rice husk. Hydroxyl, carboxylic, P—O and Si—O are the main functional groups in the reaction with U(VI). The adsorption mechanism is mixture adsorption, including the physical and chemical adsorption.

Key words [rice](#) [husk](#) [U\(VI\)](#) [adsorptive](#) [property](#) [mechanism](#)

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