

分离工程

金属离子改性活性炭对二氯甲烷脱附活化能的影响

潘红艳, 李忠, 夏启斌, 奚红霞, 李晶, 钱宇

华南理工大学传热强化与过程节能教育部重点实验室, 化工与能源学院

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摘要

主要研究了金属离子改性活性炭对二氯甲烷脱附活化能的影响。通过浸渍法分别将6种不同金属离子负载在活性炭表面, 采用ASAP 2010M测定该系列改性活性炭的孔径分布和比表面积, 利用程序升温脱附技术测定了二氯甲烷在系列改性活性炭上的脱附活化能, 应用软硬酸碱理论分析和讨论了活性炭表面负载不同金属离子对二氯甲烷脱附活化能的影响。结果表明, 二氯甲烷在Al(III)/SY-6AC、Li(I)/SY-6AC、Mg(II)/SY-6AC、Fe(III)/SY-6AC和Ca(II)/SY-6AC的脱附活化能高于其在原始活性炭上的脱附活化能, 而它在Ag(I)/SY-6AC的脱附活化能低于在原始活性炭上的脱附活化能。根据软硬酸碱理论分类, 二氯甲烷属硬碱, 当活性炭表面分别负载了硬酸类金属离子Al³⁺、Li⁺、Mg²⁺、Fe³⁺和Ca²⁺, 则增大了表面局部硬酸度, 提高了对二氯甲烷的吸附能力; Ag⁺属软酸, 当活性炭表面负载了Ag⁺, 则降低了活性炭表面局部硬酸度, 从而降低了对二氯甲烷的吸附能力。

关键词

[活性炭](#) [二氯甲烷](#) [金属离子](#) [脱附活化能](#)

分类号

Effect of metal ions loaded onto activated carbons on desorption activation energy of dichloromethane

PAN Hongyan, LI Zhong, XIA Qibin, XI Hongxia, LI Jing, QIAN Yu

Abstract

This work involves the investigation of the effects of different metal ions loaded on activated carbon (AC) on the activation energy for desorption of dichloromethane. Texture parameters of the modified activated carbons were measured with Micromeritics ASAP 2010M. TPD experiment was conducted to measure the activation energy for dichloromethane desorption. The variation of the desorption activation energy of dichloromethane on activated carbons was discussed with the help of the hard soft acid base (HSAB) principle. The results showed that the desorption activation energy of dichloromethane on Al(III)/SY-6AC, Li(I)/SY-6AC, Mg(II)/SY-6AC, Fe(III)/SY-6AC and Ca(II)/SY-6AC was larger than that on the original AC, however, the activation energy for dichloromethane desorption from Ag(I)/SY-6AC was lower than that on the original AC. In comparison with the original activated carbon, the loading of Al³⁺, Li⁺, Mg²⁺, Fe³⁺ or Ca²⁺ enhanced the interaction between dichloromethane and the surfaces of modification activated carbons because Al³⁺, Li⁺, Mg²⁺, Fe³⁺ or Ca²⁺ are hard acid and dichloromethane is a hard base, and the loading of Ag⁺ weakened the interaction between dichloromethane and the Ag(I)/AC surfaces because Ag⁺ is a soft acid.

Key words

[activated carbon](#) [dichloromethane](#) [metal ions](#) [desorption activation energy](#)

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