

### 论文摘要

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## 不同温度下HNO<sub>3</sub>改性对活性炭吸附银的影响

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**摘要:** 使用浓HNO<sub>3</sub>分别在常温和沸腾状态下对活性炭进行改性, 用FTIR和N<sub>2</sub>吸附法对活性炭进行表面分析, 使用AAS, SEM和XRD研究银在活性炭表面的吸附和分布特征。研究表明: 活性炭经常温浓HNO<sub>3</sub>改性后, 比表面积和孔容都明显提高, 而经沸腾浓HNO<sub>3</sub>改性后, 比表面积和孔容却明显减小, 但2种改性方式都使活性炭表面产生更多的含氧基团, 为[Ag(NH<sub>3</sub>)<sub>2</sub>]<sup>+</sup>的吸附还原提供更多的活性点, 从而使活性炭表面银颗粒更加密集; 常温浓HNO<sub>3</sub>改性极大地促进了[Ag(NH<sub>3</sub>)<sub>2</sub>]<sup>+</sup>的吸附还原, 当银离子初始质量浓度为600 mg/L时, 活性炭对银的吸附量是原炭的5倍多; 而活性炭沸腾浓HNO<sub>3</sub>改性使银的吸附量略有下降, 但银颗粒却更加细小而密集, 有利于活性炭表面纳米银颗粒的形成。

**关键字:** 活性炭; 银; 浓HNO<sub>3</sub>; 改性; 吸附

## Effect of modification of activated carbon with HNO<sub>3</sub> at different temperatures on silver adsorption

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**Abstract:** Activated carbon (AC) was modified by concentrated nitric acid at room temperature and under boiling condition. The AC was characterized by FTIR and N<sub>2</sub> adsorption technique. The adsorption and distribution of silver on AC were investigated by AAS, SEM, XRD for the preparation of AC supported with silver (AC/Ag). The results show that the surface area, micropore and mesopore volumes of carbon modified at room temperature increase, but those of carbon modified under boiling condition decrease greatly. The surface groups of AC modified at room temperature and under boiling

condition (especially C—O, C=O) increase greatly, which makes silver granule on activated carbon become dense. The modification at room temperature increases the silver ion adsorption and reduction by more than 5 times when the concentration of silver ion is 600 mg/L. The modification under boiling condition makes silver granule become small and dense very much, and avails to the formation of silver nanoparticles on surface of activated carbon.

**Key words:** activated carbon; silver; concentrated nitric acid; modification; adsorption

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