

阙付有,曾抗美,李旭东.ACF吸附法处理苯酚泄漏造成的河流突发污染事故模拟研究[J].环境科学学报,2008,(12):2554-2561

### ACF吸附法处理苯酚泄漏造成的河流突发污染事故模拟研究

#### Removal of phenol from a river by adsorption onto activated carbon fiber (ACF)

**关键词:** [河流](#) [突发污染事故](#) [应急处理](#) [活性炭纤维](#) [苯酚](#) [吸附](#)

**基金项目:** [国家高技术研究发展计划\(863\)\(No.2007AA06A409\)](#); [四川省科技支撑项目\(No.07SG005-001\)](#)

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**摘要:** 环境突发污染事故给人民生活、经济发展和生态环境造成重大影响,研究污染物泄漏造成的河流污染的应急处理方法十分必要.实验以苯酚为研究对象,选用吸附容量大、密度与水接近的活性炭纤维(ACF)为吸附剂,在自制的河流模型中,研究了ACF对苯酚进行吸附的过程,考察了吸附剂投加量、苯酚浓度、吸附剂比表面积、吸附剂投加方式、水流速度与水质等对吸附速率与吸附效果的影响.实验结果表明,ACF能以较快的速率吸附苯酚;ACF投加量是影响吸附速率最重要的因素,当ACF投加质量之比为1:2:4时,吸附速率常数之比近似为1:2:4;苯酚浓度对吸附速率的影响显著,苯酚浓度较低时吸附速率较高,苯酚初始浓度为 $7\text{mg}\cdot\text{L}^{-1}$ 时,经过86min的吸附,苯酚浓度可以达到地表水V类水中挥发酚的限值要求( $0.1\text{mg}\cdot\text{L}^{-1}$ );在吸附11min左右追加适量的ACF,能够明显提高吸附速率;河水流速和水质对吸附速率影响不大;在实际河水中,ACF对苯酚的吸附过程与在模拟河水中相似,吸附效果显著.

**Abstract:** Unexpected environmental pollution accidents pose significant impacts to human life, economic development and the ecological environment. The study of emergency control of accidental pollutant discharge into rivers is extremely necessary. In the experiments, phenol was selected as a representative pollutant and activated carbon fiber (ACF) was selected as the adsorbent because it has a strong adsorption capacity and a similar density to water. In the constructed river model, the effects of ACF dosage, phenol concentration, ACF surface area, method of ACF addition, water flow rate and water quality on the adsorption were investigated. The experimental results showed that ACF adsorbed phenol quickly and effectively. The ACF dosage was the most important factor that affected the adsorption ratio. When the ACF dosage ratio was 1:2:4, the constants of adsorption rate was approximately 1:2:4. The effect of phenol concentrations on the adsorption rate was notable. Faster adsorption rates were achieved at low phenol concentrations. The phenol concentration reached the Category V limit for volatile phenol in surface water ( $0.1\text{mg}\cdot\text{L}^{-1}$ ) after 86 minutes of adsorption from an initial phenol concentration of  $7\text{mg}\cdot\text{L}^{-1}$ . After 11 minutes of adsorption, certain amount of ACF was added and the adsorption rate improved significantly. River flow rate and water quality have little effect on the adsorption rate. The adsorption results obtained in actual river water were comparable with those in simulated river water.

**Key words:** [river pollution accidents](#) [emergency control](#) [ACF](#) [phenol](#) [adsorption](#)

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