

研究论文

## 活性炭纤维固相微萃取-气相色谱法测定海水中的硝基苯类和环酮类化合物

麻寒娜, 朱梦雅, 王亚林\*, 孙同华, 贾金平

上海交通大学环境科学与工程学院, 上海 200240

收稿日期 2008-9-3 修回日期 2008-11-3 网络版发布日期 2009-6-1 接受日期 2008-12-1

**摘要** 建立了自制活性炭纤维固相微萃取与气相色谱联用测定海水中6种硝基苯类和环酮类化合物的分析方法。优化的萃取条件为: 样品中加NaCl至饱和, 在1500 r/min速率搅拌下, 于60 °C水浴中顶空萃取30 min, 于280 °C下解吸2 min。方法的线性范围为0.01~400 µg/L, 检出限为1.4~3.2 ng/L, 相对标准偏差(RSD, n6)为1.4%~7.8%。海水样品中硝基苯类和环酮类化合物的加标回收率和RSD分别为86.3%~101.8%和3.7%~7.8%。应用所建立的方法对东海近岸表层水样进行测定, 其中硝基苯、1,3-二硝基苯、2,6-二硝基甲苯的质量浓度分别为0.756, 0.944, 0.890 µg/L。实验结果表明, 该方法简便、高效、无需有机溶剂, 适合于海洋水体中硝基苯类和环酮类化合物的分析。

**关键词** [活性炭纤维](#) [固相微萃取](#) [气相色谱法](#) [硝基苯类化合物](#) [环酮类化合物](#) [海水](#)

## Determination of nitroaromatics and cyclo ketones in sea water by gas chromatography coupled with activated carbon fiber solid-phase micro-extraction

MA Hanna, ZHU Mengya, WANG Yalin\*, SUN Tonghua, JIA Jinping

College of Environmental Science and Engineering, Shanghai Jiao Tong University, Shanghai 200240, China

### Abstract

A gas chromatography (GC) coupled with solid-phase micro-extraction using a special activated carbon fiber (ACF) was developed for the analysis of 6 nitroaromatics and cyclic ketones, nitrobenzene (NB), 1,3-dinitrobenzene (1,3-DNB), 2,4-dinitrotoluene (2,4-DNT), 2,6-dinitrotoluene (2,6-DNT), isophorone, 1,4-naphthaquinone (1,4-NPQ), in sea water samples. The sample was extracted for 30 min under saturation of NaCl at 1500 r/min and 60 °C in head space. The desorption was performance at 280 °C for 2 min. The linear ranges were from 0.01 to 400 µg/L. The limits of detection (LODs) were 1.4~3.2 ng/L. This method has been successfully applied to the determination of nitroaromatics and cyclic ketones in the sea water samples obtained from East China Sea. The concentrations of nitrobenzene, 1,3-dinitrobenzene and 2,6-dinitrotoluene in the sea water sample were 0.756, 0.944, 0.890 µg/L, respectively. The recoveries were 86.3%~101.8% with the relative standard deviations (RSDs) of 3.7%~7.8%. The method is suitable for analyzing nitroaromatics and cyclic ketones at low concentration levels in sea water samples.

**Key words** [activated carbon fiber \(ACF\)](#) [solid-phase micro-extraction](#) [gas chromatography \(GC\)](#) [nitroaromatics](#) [cyclic ketones](#) [sea water](#)

DOI:

通讯作者 王亚林 [ylwf@sjtu.edu.cn](mailto:ylwf@sjtu.edu.cn)

### 扩展功能

#### 本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(827KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

#### 服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)

#### 相关信息

- ▶ [本刊中 包含“活性炭纤维”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [麻寒娜](#)
- [朱梦雅](#)
- [王亚林](#)
- [孙同华](#)
- [贾金平](#)