

气相色谱-质谱法测定水中痕量的四乙基铅

杨丽莉1*, 王美飞1, 李娟2, 胡恩宇1

1. 南京市环境监测中心站, 江苏 南京 210013; 2. 江苏省环境监测中心, 江苏 南京 210024

Determination of tetraethyllead in water by gas chromatography-mass spectrometry

YANG Lili1*, WANG Meifei1, LI Juan2, HU Enyu1

1. Nanjing Environment Monitoring Center, Nanjing 210013, China; 2. Jiangsu Environment Monitoring Center, Nanjing 210024, China

摘要

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摘要 建立了气相色谱-质谱(GC-MS)测定水中痕量四乙基铅的分析方法。用正己烷萃取水样中的四乙基铅,萃取液浓缩后加入同位素内标萘-d8,采用GC-MS选择离子方式(SIM)进行检测,在200 mL水样中四乙基铅的检出限可达0.04 µg/L;添加回收率为92.2%~103%,准确度好;平行5次测定的相对标准差为4.4%~13.3%。结果表明:方法简便、快速、准确、实用,可用于水中痕量四乙基铅的测定。

关键词: 气相色谱-质谱法 四乙基铅 水

Abstract: A new method for the determination of tetraethyllead (TEL) in water by gas chromatography-mass spectrometry (GC-MS) has been developed. The TEL in water samples (200 mL) was extracted with hexane (50 mL) by adding 20 g NaCl, then the extracted solution was concentrated into 1.0 mL and the internal standard (naphthalene-d8) solution was added to every concentrated solution. The pretreated samples were analyzed by GC-MS. An amount of 1.0 µL solution was injected onto an HP-5ms capillary column (30 m×0.25 mm×0.25 µm) and determined by GC-MS in selected ion monitoring (SIM). The selected monitoring ions were m/z 136, 236, 237, 294 and 295. The m/z 295 was selected as quantitative ion for TEL and m/z 136 for the internal standard. The method had good linearity over the tested concentration range of 0.02–0.40 mg/L (r=0.9998) for TEL. The analytical performance characteristics of the proposed procedure were as follows: the detection limit for TEL in 200 mL water sample was 0.04 µg/L. The average recoveries and the relative standard deviations of TEL were 92.2%–103% and less than 13.3%, respectively. The method is rapid, convenient and accurate for the determination of water samples.

Keywords: gas chromatography-mass spectrometry (GC-MS) tetraethyllead water

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Corresponding Authors: 杨丽莉,研究员,主要从事环境中有机污染物分析监测研究. Tel: (025)83336937, E-mail: yllj@126.com.

Email: yllj@126.com

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