

“质谱技术与环境应用”专栏

# 大气中强致癌物3-硝基苯并蒽酮GC/MS检测方法的建立

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**摘要** 持久性有机污染物(POPs) 3-硝基苯并蒽酮(3-NBA)是一种极强的直接致突变和致癌物,多种动物试验以及人体细胞试验证明其具有极强的致突变能力。环境中的3-NBA主要来源于机动车尾气和大气光氧化反应,其在大气中浓度远低于多环芳烃。利用高效液相色谱(HPLC)法,分离、富集目标组分,再结合气相色谱质谱(GC/MS)技术,可建立大气中3-硝基苯并蒽酮的检测方法,仪器检测限为13.7 pg,方法检测限为1.9 pg·m<sup>-3</sup>。方法回收率为88.52%,目标化合物回收率为78.2%。该方法重现性好、测定精度高,可用于实验室常规分析。

**关键词** [持久性有机污染物\(POPs\)](#) [3-硝基苯并蒽酮](#) [气相色谱-质谱\(GC/MS\)](#)

分类号

## Development of Analytical Method for 3-Nitrobenzanthrone, A Potential Carcinogen in Atmosphere by GC/MS

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**Abstract** 3-Nitrobenzanthrone, a persistent organic pollutants (POPs), is an extremely potential mutagen and susceptible carcinogen as proved by the tests using both animal and human cells. The major sources of 3-nitrobenzanthrone are believed to be vehicle exhaust from diesel engines, as well as photooxidation reaction in the atmosphere. Its atmospheric concentration is far below polycyclic aromatic hydrocarbons. This paper reported an analytical method that was established by using high pressure liquid chromatography (HPLC) to separate and enrich the target fraction and consequently measured with gas chromatography-mass spectrometry (GC/MS). The instrument detection limit (IDL) is 13.7 pg, and the method detection limit(MDL) is 1.86 pg·m<sup>-3</sup>. The method recoveries for the deuterated surrogate, 1-nitropyrene-d9, and 3-nitrobenzanthrone are 88.5% and 78.2%, respectively. The method features good accuracy, precision and reproducibility, and could be used for regular measurements of 3-nitrobenzanthrone.

**Key words** [persistent organic pollutants\(POPs\)](#) [3-nitrobenzanthrone](#) [gas chromatography-mass spectrometry\(GC/MS\)](#)

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