

研究论文

非水胶束电动色谱分离邻苯二甲酸酯类化合物

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摘要 非水胶束电动色谱 (NAMEKC) 兼具非水毛细管电泳的优点和胶束电动色谱的分离机制, 尤其适于对强疏水性化合物进行分离分析。在以甲酰胺为非水溶剂的电泳介质中, 采用十二烷基硫酸钠 (SDS) 形成胶束相, 开展NAMEKC方法的研究。通过添加水溶液、调节水溶液酸度、添加有机溶剂、改变SDS浓度等操作条件的考察, 在15 min 内实现了3种美国环保局优先监测的污染物——邻苯二甲酸二甲酯、邻苯二甲酸二乙酯、邻苯二甲酸二丁酯的分离。分离度最小者为1.5, 检测限优于3.04 mmol/L (以信噪比为3计)。3种典型的强疏水性物质的成功分离, 显示出NAMEKC方法在分离疏水性物质方面的优势, 扩展了NAMEKC在电中性有机物分析中的应用。

关键词 [非水毛细管电泳](#) [胶束电动力色谱](#) [邻苯二甲酸酯](#) [甲酰胺](#)

分类号

Separation of Phthalates in Non-Aqueous Micelle Using Capillary Electrokinetic Chromatography

Abstract

On the basis of non-aqueous capillary electrophoresis (NACE) and micellar electrokinetic chromatography (MEKC), a novel technique, non-aqueous micellar electrokinetic chromatography (NAMEKC), has been established. NAMEKC has the advantages of NACE and uses the separation mechanism of MEKC, showing special advantages for separation of hydrophobic compounds. Separation of three of the priority pollutants by U.S. Environmental Protection Agency (EPA), i.e. dimethyl phthalate (DMP), diethyl phthalate (DEP), and dibutyl phthalate (DBP), were realized in 15 min. Important factors on separation, such as the amount of water added in the electrophoretic running buffer, the acidity of water phase, the organic additive, and the concentration of sodium dodecyl sulfate (SDS), were investigated. The proportion of water in the electrophoretic running buffer could affect the current and the stability of SDS micelle. Organic additives and the acidity of water phase showed no effect on increasing resolution. The concentration of SDS was a dominant factor, affecting the partition of analytes in micelle. DMP, DEP, and DBP were separated in a short time under the optimized operation conditions using 20 mmol/L NaH₂PO₄ and 120 mmol/L SDS in formamide/water (9/1, v/v). The application of NAMEKC leads to successful separation of the three typical hydrophobic compounds, which provides a novel means to separate and analyze hydrophobic compounds.

Key words [Non-aqueous capillary electrophoresis](#) [Micellar electrokinetic Chromatography](#) [phthalate](#) [formamide](#)

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