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离子色谱法同时测定离子液体中的三氟乙酸根、氟硼酸根及卤素离子

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Simultaneous determination of trifluoroacetate, tetrafluorobo ionic liquid by ion chromatography

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摘要 采用离子色谱-直接电导检测法同时测定了离子液体中的三氟乙酸根(CF3COO~)、氟硼酸根(BF4~)及卤素离子(F~、Cl~、B用Shim-pack IC-A3阴离子交换色谱柱,分别选用邻苯二甲酸氢钾、邻苯二甲酸+三(羟甲基)氨基甲烷、对羟基苯甲酸+三(羟甲基)氨酸为淋洗液,考察了淋洗液种类和浓度、乙腈浓度、色谱柱温度对分离测定三氟乙酸根、氟硼酸根及卤素离子的影响。确定的最佳色1.2 mmol/L邻苯二甲酸氢钾为淋洗液,柱温45 ℃,流速1.0 mL/min。在此条件下,可同时分离上述5种阴离子,且色谱峰形对称。所测出限(以信噪比为3计)为0.01～0.50 mg/L,保留时间和峰面积的相对标准偏差(n=5)分别不大于0.2%和1.2%。将方法应用于测定的三氟乙酸根、氟硼酸根及卤素离子,加标回收率为98.0%～103.2%。该方法简单、准确、可靠,具有较好的实用性。

关键词： 离子色谱 三氟乙酸根 氟硼酸根 卤素离子 离子液体

Abstract： A method was developed for the simultaneous determination of trifluoroacetate, tetrafluoroborate ions (F~, Cl~, Br~) by ion chromatography with direct conductivity detection. The chromatographic separation performed on a Shim-pack IC-A3 anion-exchange column with potassium biphthalate, phthalic acid+tris(hydrox aminomethane, and p-hydroxybenzoic acid+tris(hydroxymethyl)-aminomethane+boric acid as eluent, separate effects of the nature of eluent, eluent concentration, acetonitrile concentration and column temperature on th separation and the retention factors of the anions were investigated. The optimized chromatographic conditic determination of the anions were as follows: 1.2 mmol/L potassium biphthalate as eluent, a column temperat and a flow rate of 1.0 mL/min. Under the optimal conditions, the anions were baseline separated. Moreover, t symmetries of peaks were better. The limits of detection (S/N=3) for the anions were in the range of 0.01~0.5 The relative standard deviations (RSDs) of the chromatographic retention time and peak area for the anions w more than 0.2% and 1.2% (n=5), respectively. The method has been applied to the determination of trifluoro tetrafluoroborate and halide ions in ionic liquids. The spiked recoveries of the anions were from 98.0% to 103. method is simple, accurate and reliable, and has better practicability.

Keywords： ion chromatography trifluoroacetate tetrafluoroborate halide ions ionic liquid

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