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两种高热稳定性端羟基单阳离子型咪唑离子液体毛细管气相色谱固定相的性能评价

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Evaluation of two hydroxyl-terminated monocationic ionic liquid stationary phases with high thermal stability for capillary gas chromatography

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摘要 参考文献 相关文章

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摘要 采用静态法将合成的端羟基单阳离子咪唑离子液体1-(6-羟己基)-3-丁基咪唑二(三氟甲基)磺酰亚胺盐(HHBIM-NTf$_2$)和1-(8-羟辛基)-3-丁基咪唑二(三氟甲基)磺酰亚胺盐(HOBIM-NTf$_2$)作为固定相制备离子液体毛细管气相色谱柱。采用Grob试剂、混合醇样品和芳香族异构体混合物对固定相色谱选择性进行了考察,Grob试剂和混合醇组分产生的尖锐、对称的色谱峰形及异构体混合物组分达到基线分离的结果均表明端羟基离子液体固定相具有良好的色谱选择性。HHBIM-NTf$_2$柱和HOBIM-NTf$_2$柱经250 ℃老化8 h后对异构体混合物的分离能力没有明显下降,而HHBIM-NTf$_2$柱经300 ℃老化后仍有理想的异构体选择性,表明端羟基离子液体固定相具有理想的热稳定性。本结果为进一步改善单阳离子型咪唑离子液体固定相的色谱性能提供了有效途径。

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Abstract： Novel hydroxyl-terminated ionic liquids of 1-(6-hydroxyhexyl)-3-butyl imidazolium bis(trifluoromethyl) sulfonylimide (HHBIM-NTf$_2$) and 1-(8-hydroxyoctyl)-3-butyl imidazolium bis(trifluoromethyl)sulfonylimide (HOBIM-NTf$_2$) were synthesized as stationary phases for capillary gas chromatography (GC). Besides, 1-octyl-3-butyl imidazolium bis (trifluoromethyl)sulfonylimide (OBIM-NTf$_2$) was used as the reference. Selectivities and thermal stabilities of HHBIM-NTf$_2$, HOBIM-NTf$_2$ and OBIM-NTf$_2$ were evaluated by means of the separation of Grob test mixture and positional isomers after the columns were conditioned up to 160 ℃, 250 ℃ and 300 ℃, respectively. As a result, baseline separations of Grob test mixture and alcohol mixture and better peak shapes were observed with HHBIM-NTf$_2$ and HOBIM-NTf$_2$. Importantly, baseline separation of dimethoxybenzene isomers was also achieved with HHBIM-NTf$_2$ and HOBIM-NTf$_2$. Satisfactory selectivity of HHBIM-NTf$_2$ still remained even after conditioned at 300 ℃ for 8 h. The results for thermal stability showed that as GC stationary phases, HHBIM-NTf$_2$ and HOBIM-NTf$_2$ were stable at least up to 300 ℃ and 250 ℃, respectively. The hydroxyl-terminated monocationic ionic liquids possess excellent selectivity and thermal stability and are alternative candidates for GC stationary phases.

Keywords： font-family: "Times New Roman","serif" mso-bidi-font-size: 12.0pt mso-font-kerning: 1.0pt mso-ansi-language: EN-US mso-fareast-language: ZH-CN mso-bidi-language: AR-SA capillary gas chromatography')" href="#">mso-fareast-font-family: 宋体">capillary gas chromatography hydroxyl-terminated ionic liquids stationary phase

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