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Surface-bonded amide-functionalized imidazolium ionic liquid as stationary phase for hydrophilic interaction liquid chromatography

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Highlights

- A novel imidazolium-embedded amide stationary phase was prepared for HILIC.
- The prepared column possessed anion-exchange/HILIC mixed-mode retention mechanism.
- The stationary phase exhibited superior HILIC separation performance.

Abstract

The amide group modified silica materials are popular stationary phases for hydrophilic interaction liquid chromatography (HILIC). **Meanwhile**, surface-confined imidazolium ionic liquids (ILs) have been proved to be useful HILIC stationary phases and possess many unique properties. **In this study**, the synthesis of an amide-functionalized imidazolium IL **was conducted** which was then bonded onto silica surface to obtain a novel imidazolium-embedded amide stationary phase for HILIC. The combination of the amide group and imidazolium IL moiety might bring some advantages in selectivity or retention and **therefore extended its** applications. After characterizing the prepared IL and the resulting modified silica materials, the chromatographic performance and separation selectivity of the packed column were evaluated and compared with a commercial amide column. Then, the retention behavior was investigated through observing the retention factors at different chromatographic conditions using a wide range of compounds. Exceptionally, the prepared amide IL column exhibited superior separation performance towards **complex samples such as flavonoids mixture, soybean flavonoids and human urine**. All the results indicated that **the novel amide IL column** possessed an

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