

Effect of 1-alkyl-3-methyl-imidazolium tetrafluoroborate as mobile phase additives in RP-LC on the adsorption behaviors of some basic, acidic, and zwitterion compounds

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In order to study the potential application of ionic liquids as mobile phase additives in liquid chromatography for separation, some compounds with simple functional groups of amine or carboxylic acid such as benzoic acid, benzylamine, 4-amino-benzoic acid, L-phenylalanine, and L-tryptophan were used as analytes in reversed phase liquid chromatography using 1-alkyl-3-methylimidazolium tetrafluoroborate ([Rmim]BF₄) ionic liquids as mobile phase additives. The effective mechanism of ionic liquids on the adsorption behaviors of solutes was studied. The results showed that both ionic liquid cation and anion also joined in the retention mechanism of solutes. The dynamic ion exchange mechanism is dominant when the carbon chain length of ionic liquid cation increases. In addition, the presence of ionic liquids in mobile phase also enhanced the adsorption capacity of benzylamine in the C18 column.