



Retention of Polar Compounds without Ion-Pairing Reagents

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Reverse phase HPLC, the technique of choice to solve multiple separation problems, has its acknowledged limitations. One of them is lack of retention of highly polar compounds on conventional stationary phases. Traditionally, mobile phase additives, such as ion-pairing reagents, have been successfully employed for separation of these compounds. Practical limitations of ion-pairing chromatography include artifacts when using gradient elution, incompatibility with MS, ELSD, preparative chromatography, and more complex mobile phase preparations.

Organic compounds can be quantified with their inorganic counter ions on the same column at the same time. Also, inorganic cations and anions can be run together without an ion-chromatography system and without ion suppressors. Unlike with reversed-phase columns, selectivity can be altered not only by varying organic modifier concentration, but also by changing acid modifier type and concentration. These tools open a new realm of choices to alter selectivity and elution order of analytes.

Having oppositely charged analytes and stationary phase allows to increase retention of polar compounds (Figure 4). Having the same charge of analytes and stationary phase produces ion-exclusion phenomena that can be used to tune the separation of ionic compounds. These interactions result in symmetrical peaks even for very basic compounds.

Compounds of very different polarity can be analyzed in isocratic conditions with MS and in preparative LC compatible conditions.

Primesep[®] mixed-mode stationary phases (Figure 1) are suitable for separations of polar and non-polar compounds (Figure 2, 3) at both analytical and preparative scales in isocratic and gradient modes. These stationary phases allow for a great degree of flexibility in the separation of a broad range of analytes on one stationary phase platform utilizing simple mobile phases that are compatible with multiple detection modes.

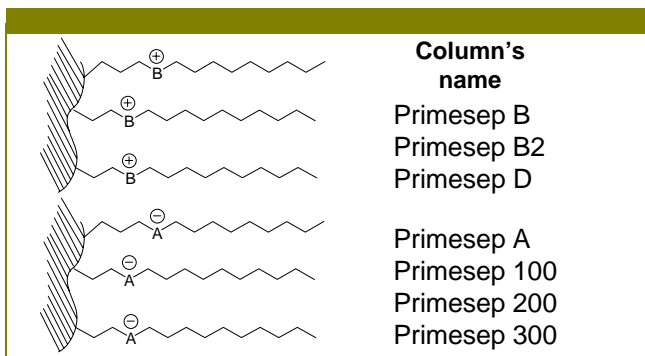
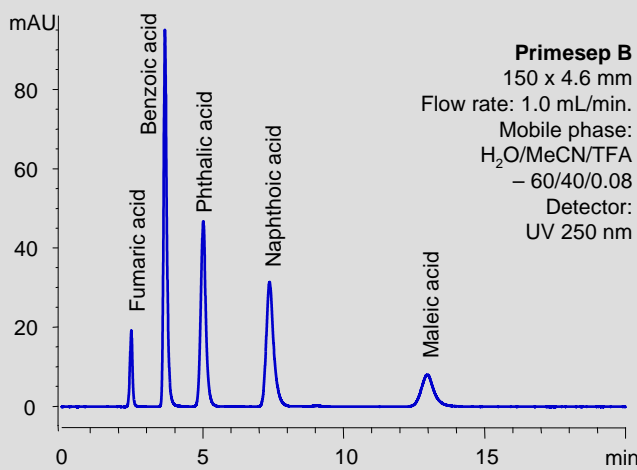
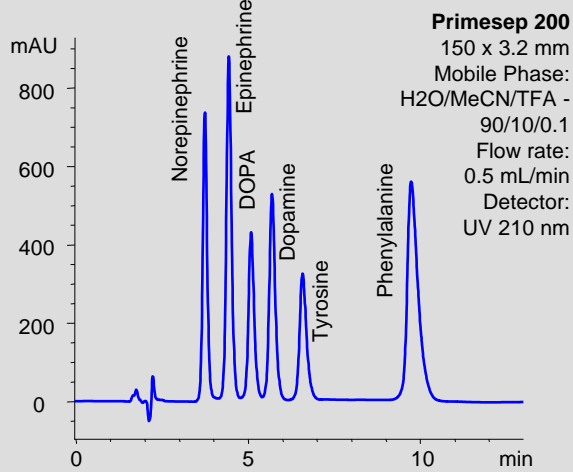


Figure 1: Simplified structure of stationary phase ligand attached to silica support

Hydrophobic and polar, weak and strong organic acids analyzed at isocratic conditions



Ionized amines separated by ion-exchange and reverse phase mechanism



Highly polar and non polar compounds are analyzed in a complex mixture with isocratic method

