

A NOVEL APPROACH OF METHOD DEVELOPMENT IN SHAPE SELECTIVITY FOR POLYCYCLIC AROMATIC HYDROCARBONS BY ENHANCED FLUIDITY REVERSED PHASE LIQUID CHROMATOGRAPHY

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The separation of shape isomers is a challenging problem in chromatography. To a first approximation, the nature of the mobile phase should not have a great effect on shape selectivity. There is no intrinsic order in the mobile phase, as it is a bulk fluid. However, mobile phase variables such as composition and temperature can have an effect on the conformation of the stationary phase. It is thought that stationary phase chains change their conformation in response to the surrounding mobile phase ^[1]. This change in the order of the alkyl ligands changes the shape selectivity of the system. Shape selectivity trends with hydro-organic mobile phases seem to correlate with these theories: it has been shown ^[2] that mobile phases with a higher organic content (and thus more fully extended and ordered stationary phase ligands) have better shape selectivity than mobile phases that are water rich.

In the framework of green chromatography, different percentages of supercritical CO₂ were added to acetonitrile-water, methanol-water and ethanol-water based mobile phases to investigate the shape selectivity effects induced by the use of the this new ternary mobile phase when using C18 and Naphtylethyl based stationary phase (π NAP). A mixture of 16 priority PAH pollutants was used to investigate these effects. Next to interesting changes in selectivity improvements in analysis time and shifting Van Deemter curves could be measured in this way demonstrating the potential of this new green variant of HPLC.

References

[1] D.E. Martire, R.E. Boehm, J. Phys. Chem., 1983, 87, 1045-1062.

[2] L.C. Sander, S.A. Wise, J. Chromatogr., 1993, 656, 335-351.

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