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VENDOR SEMINAR:

Exploiting Alternative Selectivity to C18 Stationary Phases in HPLC

Exploiting alternative selectivity to C18 stationary phases in HPLC

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C18 remains the most widely used stationary phase in high-performance liquid chromatography (HPLC).

Numerous advancements and modifications have been made to both stationary phases and the underlying silica support particles over the years. Notable commercial introductions include hybrid particles, types of bonding (monomeric vs. polymeric), improved carbon loading and degree of endcapping. These modifications can offer improved retention of moderately polar analytes, decreased tailing of basic analytes, and permit use of higher pH mobile phases. The introduction of polar modified C18 stationary phases (or aqueous C18) containing polar side chains, embedded polar groups or polar endcapping has further improved the retention and peak shape of moderately polar compounds. However, challenges still remain in obtaining adequate retention and/or peak shape of more polar compounds, especially for small basic compounds that are used with low pH mobile phases that are typically used in LC-MS analysis.

Although alternative sorbent chemistry, and selectivity, are regularly exploited in solid-phase extraction (e.g. polystyrene-divinylbenzene) the same cannot be said for HPLC. However, HPLC columns that contain alternative functional groups are commercially available and can be readily used to address some of the difficulties that chemists often experience with standard alkyl phases. Examples of such functional groups include phenyl, polyaromatic and pentafluorophenylpropyl (PFPP) stationary phases. Theses HPLC columns exhibit alternative/orthogonal selectivity to C18 phases and can be used for compounds that are hard to resolve or that are unretained on C18 columns, particularly aromatic compounds. These phases can retain analytes through π- π and hydrophobic (dispersive) interactions, while the PFPP phase also exhibits dipole-dipole and H-bonding capability and can strongly retain basic, halogenated and nitrogen-containing compounds. Furthermore, due to its polar and non-polar character, the PFPP phase can exhibit dual-mode retention behavior (reversed phase and HILIC-type retention of basic compounds).

This presentation will discuss the use of aromatic HPLC columns and how they can be an optimal choice for use with conventional LC-MS solvents and mobile phase additives for the analysis of a wide range of compounds, including pesticides, veterinary drugs, mycotoxins and environmental contaminants.