Optimizing Separation of Polar and Non-Polar Analytes Using Cogent TYPE-C Silica™ Columns - Tech Information

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Overview

Achieving reliable chromatographic separation of both polar and non-polar compounds within a single analytical run can be challenging using traditional reversed-phase or HILIC techniques alone. Cogent TYPE-C Silica™ columns, including the Cogent Diamond Hydride™, offer a unique solution: their retention behavior can be tuned between Reversed Phase (RP) and Aqueous Normal Phase (ANP) by simply adjusting mobile-phase composition for many compounds.

These silica hydride stationary phases enable highly versatile method development, allowing analysts to fine-tune interactions for analytes across a broad polarity range. This dual-mode capability delivers efficient solutions for impurity profiling, multi-component assays, and complex matrix analysis.

Key Technical Advantages

1. Dual-Mode Retention Control (RP ↔ ANP)

The Cogent TYPE-C Silica™ chemistry allows seamless shifting between reversed-phase and aqueous normal-phase type of retention simply by modifying the organic/aqueous ratio of the mobile phase.

This capability reduces the need for multiple columns or orthogonal methods when developing workflows involving structurally diverse analytes.

2. ANP Retention of Hydrophobic Compounds

A unique characteristic of Cogent Diamond Hydride™ is its ability to retain some hydrophobic analytes by the ANP mechanism, an effect linked to functional groups such as amines or carboxylic acids present on the analyte structure.

This behavior expands the method development space and can provide improved selectivity compared with traditional stationary phases.

3. Enhanced Flexibility in Method Development

Because retention is influenced by the water content and mobile-phase strength, analysts can rapidly adjust selectivity and resolution without resorting to more complex changes such as temperature shifts or column switching.

4. Ideal for Mixed-Mode Applications

These columns support simultaneous RP-like hydrophobic interactions and ANP-type partitioning/adsorption, making them valuable for:

- Stability-indicating assays
- Small polar metabolite profiling
- Ionizable compound separations
- Multi-analyte impurity or degradant workflows

Recommended Applications

- Pharmaceutical impurity profiling where both hydrophilic and lipophilic impurities must be captured in a single run.
- Metabolomics or bioanalytical assays requiring retention of highly polar intermediates without sacrificing resolution for non-polar endpoints.
- Environmental monitoring involving a broad polarity range of contaminants.

Summary: *Cogent TYPE-C Silica™ and Cogent Diamond Hydride™ columns provide a powerful and flexible platform for analysts seeking a unified solution to mixed-polarity separations. Their ability to operate simultaneously in RP and ANP modes, combined with tunable selectivity, makes them ideal for advanced chromatographic method development.*

Click HERE for Cogent Diamond Hydride™ ordering information.

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