

## Ammonium Fluoride Affect On Chromatography Using Cogent TYPE-C HPLC Columns - Tech Information

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### How Ammonium Fluoride Affects Chromatography on Cogent TYPE-C™ HPLC Columns

Ammonium fluoride ( $\text{NH}_4\text{F}$ ) has become increasingly popular as a mobile-phase additive in LC–MS, especially in Aqueous Normal Phase (ANP) workflows.

When paired with Cogent TYPE-C™ silica hydride columns, ammonium fluoride offers multiple chromatographic and MS-related benefits—while also requiring careful handling due to its corrosive and potentially column-damaging nature.

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### Key Benefits of Ammonium Fluoride on TYPE-C™ Columns

#### 1. Acts as an Effective Buffer (pH Control)

Ammonium fluoride can stabilize mobile-phase pH, an important variable in ANP and LC-MS workflows where ionization efficiency and retention are pH-dependent.

#### 2. Improves Peak Shapes

Users often observe sharper, more symmetrical peaks, especially for polar and ionizable analytes. This improvement enhances quantitative performance and helps resolve compounds that otherwise show tailing or broadening.

#### 3. Enhances MS Sensitivity

Ammonium fluoride is known to boost MS response for certain analyte classes—an advantage documented both in practice and in peer-reviewed research.

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*For further reading, the KB article cites the foundational publication: Pesek & Matyska, “Ammonium fluoride as a mobile phase additive in aqueous normal phase chromatography,” J. Chrom. A 1401 (2015) 69–74.*

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### Durability Considerations for Cogent TYPE-C™ Columns

TYPE-C™ silica hydride particles are more resistant to acidic and corrosive conditions than traditional silica or Type-B columns, which contributes to their longer lifetimes when ammonium fluoride is used.

#### However:

- Concentrations above ~1 mM may cause irreversible column damage

Despite their improved stability, Cogent TYPE-C™ columns may still experience reduced lifetime when ammonium fluoride levels exceed safe limits.

- Some degree of lifetime reduction is still expected

Even though they last longer than conventional silica columns under NH<sub>4</sub>F exposure, TYPE-C™ columns are not immune to fluoride-driven degradation.

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## Safety & Handling Requirements

### 1. Avoid Glass—Use Teflon Bottles

- Ammonium fluoride is corrosive to glass, risking contamination, particle formation, and deterioration of your mobile-phase container.
- Always store and prepare NH<sub>4</sub>F solutions in Teflon (PTFE) containers.

### 2. Keep Concentration at or Below ~1 mM

- Exceeding this limit increases the likelihood of column damage, selectivity drift, and back-pressure changes.

### 3. Rinse and Switch Additives Carefully

Before switching to a non-fluoride mobile phase or to another additive (e.g., formic acid), always run:

- A volatile wash (ACN / water)
- Sufficient equilibration volume

This prevents cross-reactivity and protects the stationary phase.

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## When to Choose Ammonium Fluoride

Ammonium fluoride is especially valuable when:

- You need enhanced MS sensitivity for target analytes
- You require improved peak shapes for polar compounds in ANP mode
- You want buffering at low ionic strength suitable for LC–MS

When used correctly and at safe concentrations, ammonium fluoride can significantly elevate overall chromatographic performance.

