Will phosphates precipitate in an HPLC column - PRIMER

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If you're working with HPLC and considering using phosphate buffers, it's important to understand how they behave inside your column—especially when it comes to precipitation, which can damage your system.

Phosphoric acid itself is safe to use in HPLC systems. It’s a fully soluble acid and will not precipitate inside the column. So if you're using phosphoric acid to adjust pH or as part of your mobile phase, you're in the clear.

However, sodium phosphate (and other phosphate salts like potassium phosphate) is a different story. These salts are commonly used as buffers, but they can precipitate under certain conditions, especially when mixed with organic solvents like acetonitrile or methanol. This precipitation can clog your column, increase back pressure, and even damage your HPLC system.
Important tip:

Never use sodium phosphate buffers as a storage solvent for your HPLC columns. Even if they seem fine during use, they can crystallize when the system is turned off or when the solvent composition changes.

Beginner Best Practices:

- Stick to volatile buffers (like ammonium acetate or formate) when possible, especially if you're using mass spectrometry.
- Always flush your column with water or a compatible solvent before switching to high-organic mobile phases.
- Check your buffer solubility in your mobile phase mixture before use.
- Store your columns in manufacturer-recommended solvents—usually a mix of water and organic solvent, without salts.
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