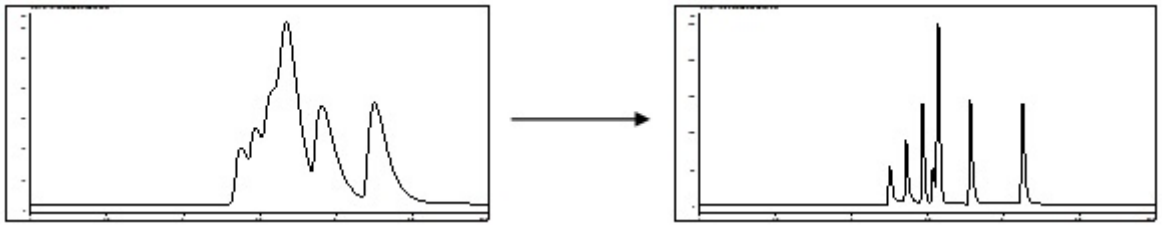
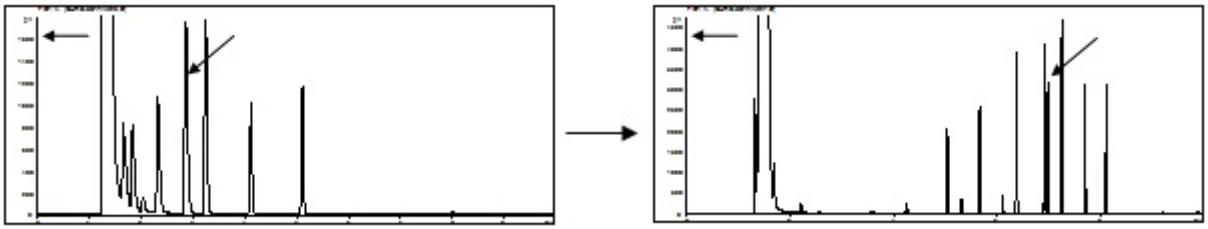


Peak widths decreased by adding a split ratio



Example of analyte focusing by lowering the initial oven temperature

Depending on method conditions, early eluting compounds are apt to have poor peak shapes. Some analytes may not fully focus onto the column well because the initial temperature may be too high.

Polarity mismatch can also occur if a solvent doesn't dissolve well in the phase. The solvent 'pools' on the column phase and is pushed down the column by the carrier gas. Some compounds travel with the solvent pools and may lead to tailing or split peaks.

Below are some steps that can be implemented to help minimize any distortions to early eluting peaks in gas chromatography.

Use a split injection

Using a split injection limits the amount of solvent that gets onto the column and reduces

how much analyte dissolves in pooled solvent. The split injection also reduces peak widths because the higher flow through the inlet moves compounds from the inlet to the column faster. This will improve the peak shape considerably. The downside is that the split will sacrifice sensitivity. If you have sensitivity to spare or a more concentrated sample, this may be an option.

Decrease the injection volume

This also reduces the amount of solvent that is introduced onto the column. It also reduces the amount of analytes and therefore will also sacrifice sensitivity.

Lower the initial oven temperature

This will force analytes to condense more into the phase and limits analyte migration during injection. This is known as analyte focusing. The downside of this is slightly longer cycle times because cooling to a lower temperature may take longer.

Use a pressure pulsed injection

This will increase the flow onto the column, but only temporarily. Using a pressure pulsed injection helps focus the analytes and results in a narrower peak shape. Usually a pulsed injection will be about 10-15psi above the normal pressure for the duration of the injection. Afterward, the pressure and flow return to normal. Early eluting compounds can elute even earlier and a solvent delay may need to be reduced if using a MS detector.

Use a guard column

When used with volatiles, this is sometimes called a solvent gap. It can help to separate the analytes from the solvent and reduces the solvent pool effect. In some instances, it can also

extend column lifetime because the guard can be trimmed or replaced when contaminated by dirty samples which would otherwise sacrifice the performance of the column.

Increase the column film thickness

Using a thicker film will better dissolve both volatile analytes and result in longer retention for early eluting peaks. Doing so will also dissolve greater amounts of solvent and help minimize distortion due to solvent mismatch.

Related resources:

- Two Ways to Attain Sharper Peak Shape and Higher Sensitivity in GC
- Gas Chromatography Troubleshooting Guide
- GC Accessories: Product Overview Guide
- Split Injections in Gas Chromatography: How to Reduce Inlet Discrimination by Using a Liner with Glass Wool