

Gas Chromatography Troubleshooting Part 2

– Baseline & Response Issues

By Shimadzu UK

In today's high-pressure environments, it is important to be able to quickly and accurately troubleshoot any issues that may arise with analytical instrumentation. In part 1 of this article, Shimadzu UK discussed the probable causes of issues with peak shape and how to resolve them. We reviewed effective troubleshooting for abnormal peak shapes in gas chromatography (GC), namely no peaks, fronting or tailing peaks, split peaks, broad peaks, and ghost peaks. In this second part we will continue to build on these skills by looking at solutions for high or unstable baselines, variability in retention time and changes in response.

This troubleshooting knowledge will allow you to pinpoint the cause of an issue, rectify it while minimising downtime, allowing you to get your system back up and running and producing results again.

As with all troubleshooting investigation, a step-wise approach is the best, changing only one variable at a time to allow a more focused systematic process. This will not only help you identify the root cause of the problem but will also allow you to prevent errors from recurring.

Following a methodical process, starting with confirming the reproducibility of an error, and slowly narrowing down the tests to isolate different parts of the instrument to pinpoint where the issue is occurring will allow you to investigate the root cause of the issue.

The advice outlined in this article is very general, and can apply to most gas chromatographic systems, not just Shimadzu models, however processes might vary slightly from system to system, so it is always wise to check guidelines supplied by your provider.

Common issues and solutions

High Baseline

A high baseline can cause issues with integration and sensitivity of target analytes especially those which elute towards the end of the run.

1. Column

a) A high baseline could be a result of improper conditioning of the column. This may be resolved by increasing the conditioning time or temperature.

2. Contamination

a) Over time, contamination from sample matrix can build up on the column, especially at the front end. This can be removed by trimming the column and/or heating the column to its maximum temperature.

b) Impurities in the gases can be a source of contamination. Many systems have in line filters, these can become saturated over time

GC Troubleshooting Guide



Noisy
Baseline



Poor
Resolution



Retention
Time
Variability

 SHIMADZU

and should be regularly replaced.

d) Contamination from continued use or dirty samples can build up in the injector and detector. These should be cleaned when signs of contamination appear or as part of a routine maintenance regime.

3. Leaks

a) A leak in the system can cause oxidation of the stationary phase which will be seen as column bleed. Check for oxygen leaks across the entire system and replace seals and/or filters as necessary.

b) If the baseline issues persist once the leaks have been fixed, it is possible that the stationary phase has degraded too far, the column will then need to be replaced.

Unstable Baseline

An unstable baseline, such as spiking, excessive noise and drift, can result in poor integration and a loss of sensitivity.

1. Carrier gas leak or contamination

a) Leaks in the flow path of the carrier gas can introduce

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Dean Rood



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LC GC, 1988

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