

# 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

# Gas Chromatography Baseline Troubleshooting

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Chromatographic Systems John Q. Walker, 2012-12-02 Chromatographic Systems Maintenance and Troubleshooting Second Edition provides a clear and concise guide for chromatographic maintenance This book covers troubleshooting and repair procedures that can be utilized by both experienced and inexperienced chemists and technicians to reduce instrument down time This edition is divided into two parts Part I focuses on liquid chromatography which consists of an introductory chapter on principles techniques and utility followed by specific chapters devoted to the individual systems comprising the total liquid chromatographic makeup Gas chromatography is emphasized in Part II introducing the basic theory and analyzing the systematic progression through possible malfunctions in various parts of the gas chromatograph This publication is a good source for chromatographers scientists chemists and technicians interested in the maintenance and troubleshooting of chromatographic systems

*Food Authenticity and Traceability* M Lees, 2003-10-22 The ability to trace and authenticate a food product is of major concern to the food industry This important topic is reviewed extensively in this authoritative text on current and emerging techniques Part one deals with analytical techniques applied to food authentication There are chapters on both established and developing technologies as well as discussions of chemometrics and data handling Part two relates these methodologies to particular food and beverage products such as meat dairy products cereals and wine In part three traceability is reviewed in detail looking at the development of efficient traceability systems and their application in practice to such areas as animal feed and fish processing Food Authenticity and Traceability is an essential reference for all those concerned with food safety and quality Outlines methods and issues in food authentication and traceability Deals with analytical techniques applied to food authentication with chapters on established

and developing technologies chemometrics and data handling Explores how techniques are applied in particular sectors and reviews recent developments in traceability systems for differing food products

**The Troubleshooting and Maintenance Guide for Gas Chromatographers** Dean Rood,2007-09-24 This fourth edition of the classic guide for every user of gas chromatographic instrumentation is now updated to include such new topics as fast GC using narrow short columns electronic pressure control and basic aspects of quantitative gas chromatography The author shares his many years of experience in technical support for gas chromatography users addressing the most common problems questions and misconceptions in capillary gas chromatography He structures and presents the material in a concise and practical manner suitable even for the most inexperienced user without any detailed knowledge of chemistry or chromatography For lab technicians in chemistry analytical food medicinal and environmental chemists pharmacutists

Basic Gas Chromatography Harold Monroe McNair,Ernest J. Bonelli,1969 LC GC ,1988 **Annual Book of ASTM Standards** American Society for Testing and Materials,1986 A compilation of all ASTM standards issued each year **Annual Book of ASTM Standards** ASTM International,American Society for Testing and Materials,2003 **Headspace Gas Chromatographic Measurement and Applications of Limiting Activity Coefficients** Jung Hag Park,1988 **A Practical Guide to the Care, Maintenance, and Troubleshooting of Capillary Gas Chromatographic Systems** Dean Rood,1991 **Gas Chromatography** Ian A. Fowlis,1995-06-14 This volume has been revised and updated to include new chapters on high resolution gas chromatography GC GC detectors and the classification of GC Self assessment questions are used throughout the text to ensure a full understanding of unfamiliar concepts Modern Practice of Gas Chromatography Robert Lee Grob,1977 As in previous editions contributing authors have been chosen for their expertise and active participation in their respective areas Modern Practice of Gas Chromatography Fourth Edition presents a well rounded and comprehensive overview of the current state of this important technology providing a practical reference that will greatly appeal to both experienced chromatographers and novices

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## **Table of Contents Gas Chromatography Baseline Troubleshooting**

1. Understanding the eBook Gas Chromatography Baseline Troubleshooting
  - The Rise of Digital Reading Gas Chromatography Baseline Troubleshooting
  - Advantages of eBooks Over Traditional Books
2. Identifying Gas Chromatography Baseline Troubleshooting
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Gas Chromatography Baseline Troubleshooting
  - User-Friendly Interface
4. Exploring eBook Recommendations from Gas Chromatography Baseline Troubleshooting
  - Personalized Recommendations
  - Gas Chromatography Baseline Troubleshooting User Reviews and Ratings
  - Gas Chromatography Baseline Troubleshooting and Bestseller Lists
5. Accessing Gas Chromatography Baseline Troubleshooting Free and Paid eBooks
  - Gas Chromatography Baseline Troubleshooting Public Domain eBooks
  - Gas Chromatography Baseline Troubleshooting eBook Subscription Services

- Gas Chromatography Baseline Troubleshooting Budget-Friendly Options
- 6. Navigating Gas Chromatography Baseline Troubleshooting eBook Formats
  - ePub, PDF, MOBI, and More
  - Gas Chromatography Baseline Troubleshooting Compatibility with Devices
  - Gas Chromatography Baseline Troubleshooting Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Gas Chromatography Baseline Troubleshooting
  - Highlighting and Note-Taking Gas Chromatography Baseline Troubleshooting
  - Interactive Elements Gas Chromatography Baseline Troubleshooting
- 8. Staying Engaged with Gas Chromatography Baseline Troubleshooting
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Gas Chromatography Baseline Troubleshooting
- 9. Balancing eBooks and Physical Books Gas Chromatography Baseline Troubleshooting
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Gas Chromatography Baseline Troubleshooting
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Gas Chromatography Baseline Troubleshooting
  - Setting Reading Goals Gas Chromatography Baseline Troubleshooting
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Gas Chromatography Baseline Troubleshooting
  - Fact-Checking eBook Content of Gas Chromatography Baseline Troubleshooting
  - Distinguishing Credible Sources
- 13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
- 14. Embracing eBook Trends

- Integration of Multimedia Elements
- Interactive and Gamified eBooks

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