

# Preface

“It is not enough to know something, one must also use it; it is not enough to want something, one must also do it.”

(“Es ist nicht genug zu wissen, man muss es auch anwenden; es ist nicht genug zu wollen, man muss es auch tun”)

Johann Wolfgang von Goethe

About 45 years ago, Werner Engewald, formally trained as organic chemist, started out to work in the field of gas chromatography, which was a young, but already aspiring technique back in those days. Three years later he taught the first class on GC and continued to teach course on GC and later capillary GC until today. Ever since, gas chromatography has matured into a widely distributed and extremely powerful analytical technique that can be found in most analytical laboratories. It is characterized by the high separation efficiency of capillary columns, sophisticated instrumentation including powerful detectors, automation, fairly short analysis times, as well as high precision and reproducibility in quantitative analysis. The application of GC significantly enhanced or even enabled our knowledge on the composition of complex samples, such as petroleum oil, flavor and fragrances, foodstuff, and environmental or biological samples. The combination of gas chromatography with mass spectrometry is unrivaled for the analysis of volatile compounds.

Over the years, the interests, operating experiences, and tasks of the participants of the GC courses have changed. Owing to the ever-increasing time and cost pressure, simple operation, automation, high sample throughput, fast analyses, and high precision and reproducibility are more and more in the focus of attention. Then again, the demand for fast and cost-effective trace and ultra-trace analysis of organic compounds in complex matrices and the simultaneous analysis of as many analytes as possible is increasing. All the while, GC is often viewed as a service technique that does not require extensive training. The convenient and easy setup of modern instrumentation allows also the untrained user to generate seemingly appropriate data, but problems and questions will arise in case of malfunctions

and unexpected or erratic results. To cite the late Walt Jennings, a renowned pioneer of gas chromatography: “You don’t need to be an expert to use GC, but the more you know, the better your results will be.”

It has always been the credo of Werner’s courses to teach GC and GC theory with the practical application in mind. Based on his longstanding experiences together with Katja Dettmer-Wilde the idea for a GC book was born. Our intention was to discuss the theory as short and simple possible, but emphasizing the practical implications for the user in the laboratory. We hope that we succeeded in presenting it in a comprehensible, easy-to-read fashion without oversimplification. For a deeper insight the interested reader is referred to the compendium of GC textbooks compiled in the Appendix. Furthermore, we intended to present a comprehensive overview on instrumental and methodical aspects of GC and its different application areas. Our initial idea was picked up and further developed by Peter Enders, senior executive editor chemistry with Springer-Verlag, and after his retirement by Dr. Steffen Pauly, executive editor chemistry with Springer-Verlag. We soon realized that we cannot master this endeavor by ourselves and secured the help of renowned experts from various fields of chromatography that contributed chapters to the book. More than 30 authors from different countries participated in our book project. We like to use this opportunity to thank our colleagues for all their great work and their patience with us when the project did not progress at the anticipated pace. We could not make this book happen without their help. We also appreciate the excellent support by our editors with Springer, Peter Enders, Dr. Steffen Pauly, and Ms. Beate Siek.

Most of all, we are deeply grateful to our families. They encouraged and supported us all the way without complaints about yet another day and evening spent at the computer.

A book can certainly not address all topics and answer all open questions, but we hope it will find an audience, provides support, and communicates the power and beauty of this technique.

Katja Dettmer-Wilde  
Werner Engewald

Practical Gas Chromatography

A Comprehensive Reference

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