

Provides a comprehensive description of mass spectrometry basics, applications, and perspectives

Edited by
Smoluch
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Wiley Series on Mass Spectrometry

Dominic M. Desiderio, Joseph A. Loo, Series Editors

Mass spectrometry is a modern analytical technique, allowing for fast and ultrasensitive detection and identification of chemical species. It can serve for analysis of narcotics, counterfeit medicines, components of explosives, but also in clinical chemistry, forensic research and anti-doping analysis, for identification of clinically relevant molecules as biomarkers of various diseases. This book describes everything readers need to know about mass spectrometry—from the instrumentation to the theory and applications. It looks at all aspects of mass spectrometry, including inorganic, organic, forensic, and biological MS (paying special attention to various methodologies and data interpretation). It also contains a list of key terms for easier and faster understanding of the material by newcomers to the subject and test questions to assist lecturers.

Knowing how crucial it is for young researchers to fully understand both the power of mass spectrometry and the importance of other complementary methodologies, *Mass Spectrometry: An Applied Approach* teaches that it should be used in conjunction with other techniques such as NMR, pharmacological tests, structural identification, molecular biology, in order to reveal the true function(s) of the identified molecule.

- Provides a description of mass spectrometry basics, applications and perspectives of the technique
- Oriented to a broad audience with limited or basic knowledge in mass spectrometry instrumentation, theory, and its applications in order to enhance their competence in this field
- Covers all aspects of mass spectrometry, including inorganic, organic, forensic, and biological MS with special attention to application of various methodologies and data interpretation
- Includes a list of key terms, and test questions, for easier and faster understanding of the material

Mass Spectrometry: An Applied Approach is highly recommended for advanced students, young scientists, and anyone involved in a field that utilizes the technique.

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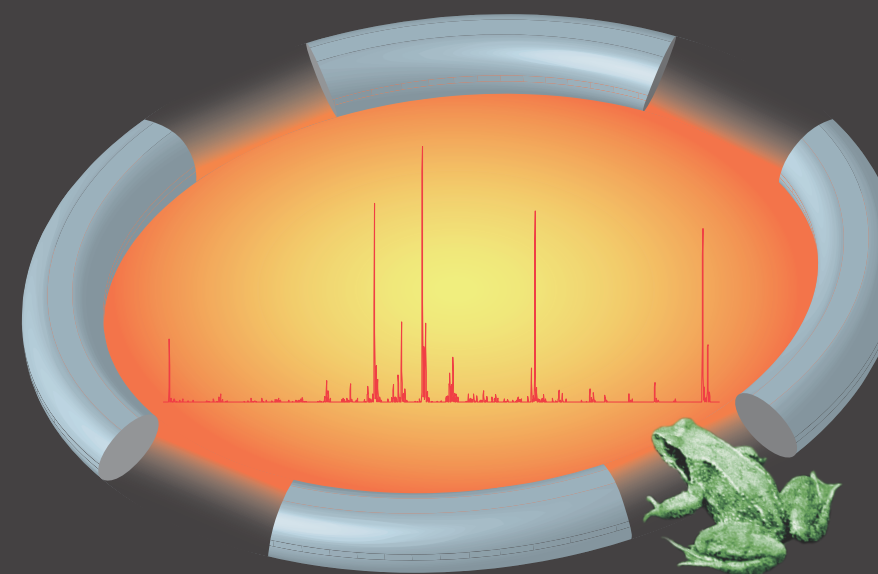
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An Applied Approach

Edited by

*Marek Smoluch, Giuseppe Grasso, Piotr Suder,
and Jerzy Silberring*

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Preface

Rapid development of genomics, proteomics, combinatorial chemistry, and medical/toxicological diagnostics triggered the rapid development of various mass spectrometry techniques to fulfill requirements of many disciplines, such as biomedical sciences, toxicology, forensic research, and pharmacology. Mass spectrometry (MS) is a unique method that not only allows mass measurement but also provides detailed identification of molecules and traces the fate of compounds in vivo and in vitro. Among others, mass spectrometry may, at least partially, identify amino acid sequence of peptides and proteins, assign sites of posttranslational modifications, identify bacterial strains, and verify structures of organic compounds. The latter is particularly useful for detection of novel drugs of abuse, explosives, etc. A yet another challenge is rapid selection of combinatorial libraries, containing vast number of elements, and a novel place of mass spectrometry in nanomedicine, being a combination of diagnostics and therapy (theranostics).

MS has been proven as an efficient tool to analyze complex biological mixtures by applying hyphenated techniques, such as GC/MS, LC/MS, CE/MS, and TLC/MS, where mass spectrometer acts as a sensitive and highly specific detector. Such approaches may find their applications in, e.g. genomics, functional proteomics to reveal the role of entire pathways in biological systems (systems biology). Another interesting capability of MS is identification of the low molecular mass compounds that are not coded by genes. This aspect is a basis of metabolomics and remains, together with proteomics, a complementary way to study functions of the genes (transcriptomics).

Our goal was to offer you a book, which is written in an understandable language, avoiding complex equations and advanced physics, bearing in mind that the most important aspect for the readers are practical aspects, potential applications, and selection of proper methodologies to solve their analytical and scientific problems.