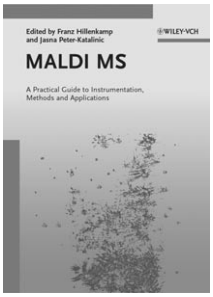
Critical Mass Spectrometry

MALDI MS: A Practical Guide to Instrumentation, Methods, and Applications

Edited by *Franz Hillenkamp* and *Jasna Peter-Katalinić*.

Wiley-VCH, Weinheim 2007. xvi + 345 pp., hardcover € 99.00.—ISBN 978-3-527-31440-9



Since the invention of matrix-assisted laser desorption/ionisation (MALDI) mass spectrometry 20 years ago this method has emerged, apart from electrospray, as one of the most important techniques for the identification and structure analysis of biological macromolecules such as proteins, peptides, and lipids. It has been developed for obtaining both accurate mass determination and primary sequence information. Desorption and subsequent mass measurement of macromolecules without significant fragmentation is a result of the soft ionization technique. Over the past decade this specific MS method has also been successfully applied to the characterization of synthetic polymers. MALDI MS provides absolute and accurate molecular masses for polymers with narrow polydispersity, information on repeat units, mass of end groups, molecular weight distribution, and structural information on the degree of polymerization and copolymerization. Latest results concern liquid chromatographic–MALDI MS coupling techniques.

A number of papers on MALDI MS have been published in recent years. This book gives a comprehensive overview of the methodological and instrumental enhancements of the technique along with different applications predominantly in the field of biosciences. The details of the MALDI process including analyte incorporation, the ablation/desorption process, and ionization are illustrated in a very clear and concise way. Various preparation techniques are presented. The second chapter describes the MALDI MS instrumentation. Many clear graphics illustrate the different operating modes and explain the equipment involved. The variety of lasers used for MALDI MS are also displayed. One section is dedicated to the fragmentation of molecular ions in the MALDI process and the tandem MS technique; another section deals with mass analyzers.

This book is the first monograph with a detailed description of mass spectrometers (FTMS, quadrupole ion trap, quadrupole time-of-flight (ToF), quadrupole FT, orbitrap), including future directions of the field. The first part is a very useful summary of the state of the art for beginners and advanced users. The chapters that follow contain many details of key applications concerning proteomics, biomarkers, nucleic acids, glycans, lipids, and polymers. The content is clearly structured, and specific aspects for each substance class are elaborated, for instance, sample preparation. Problems and limitations are critically discussed, such as the limitations of accuracy due to mass resolution.

The ninth and final chapter is dedicated to the special topic of small-molecule desorption/ionization mass analysis. MALDI was developed for large molecules, and small-molecule characterization has been "suppressed" until recently, not least because of competition by the ESI MS technique. The reasons for this, as discussed in the book, were low resolution of first-generation linear ToF instruments, matrix ion interference, and detector saturation in the low mass range. However, novel sample preparation approaches, new instrumentation, and optimization of the type of matrix are now available to overcome these shortcomings. Thus the potential of MALDI MS can be used for mixtures of both high- and low-molecular-weight compounds such as proteins and glucose, respectively. The book, including its extensive lists of references, is a practical and valuable guide for researchers at academic institutions and companies working in the field of bioanalytics.

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Functional Informatics in Drug Discovery

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In recent years, "informatics" terms have become popular to describe research and development areas that integrate computational and experimental efforts in the greater life science arena. Of course, bioinformatics, medical informatics, and chemoinformatics have already become established fields. Other terms that are now in use include research informatics, molecular informatics, life science informatics, and drug discovery informatics. Many but not all of these terms have originated from drug discovery environments, and the boundaries between areas one attempts to cover are often rather fluid.

A new book, edited by Sergey Ilyin, adds yet another variant to the current spectrum of informatics terms: "functional informatics", also with a clear link to drug discovery. The editor positions this book as an "in-depth analysis of emerging trends and future opportunities in [technology] integration and interfacing

