

# Preface

This book presents fundamentals of one of the well-recognized mass spectrometry techniques, matrix-assisted laser desorption ionization time of flight mass spectrometry (MALDI-ToF-MS). The book describes the basic principles of this interesting analytical technique, the history of the invention as well as the mechanism of the ionization and mass determination. The book offers strategies on how to analyze MALDI spectra, how to find the exact matched structure with the resultant mass values of the spectra and how to determine end-groups for each polymer chain. In particular, this book explains how MALDI analysis can be essential in some of the key areas of research such as bio-diagnosis, tissue engineering, and drug delivery. The current book not only helps to understand the principles of these major areas of research but also provides examples of different copolymer systems which were designed for these respective applications. In order to simplify MALDI analysis, monomers in each chapter are shown in different colors thus they can be easily identified in the structure of the molecules. The book initially presents MALDI analysis of a copolymer chains with a linear structure including two monomers. This copolymer system was developed for the purpose of virus detection as one of the subcategories of bio-diagnostic applications. Subsequently, a more complex system consists of linear copolymer chains including three monomers is described in the following chapter. This copolymer system was designed for the tissue engineering applications. Eventually, a more complex copolymer system with branched molecular structures is explained that has the application in drug delivery systems. As you progress with the book, it guides you through the interpretation of data obtained from this complicated technique (MALDI-ToF-MS) in the most simplified manner. Moreover, each chapter describes how MALDI analysis can be essential to gain a better understanding of the mentioned copolymer systems and their applicability in bio-diagnosis, tissue engineering, and drug delivery domains.

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