1. Record Nr. UNINA9910298303503321

Titolo	Surface Analysis and Techniques in Biology / / edited by Vincent S. Smentkowski
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	3-319-01360-2
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (333 p.)
Disciplina	570 570.28 570.72 610
Soggetti	Molecular biology Systems biology Biology—Technique Molecular Medicine Systems Biology Biological Techniques
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references at the end of each chapters and index.
Nota di contenuto	""2.3 Characterization of Biomolecules""""2.3.1 Proteins and Peptides""; ""2.3.2 Other Biomolecules: Lipids, Mucins, Enzymes, and DNA""; ""2.4 Cell, Bacteria, and Tissue Analysis""; ""2.4.1 Hard Tissue""; ""2.5 Biointerface Engineering""; ""2.5.1 The Future of XPS""; ""2.6 Conclusions""; ""References""; ""Chapter 3: Biomolecular Analysis by Time-of-Flight Secondary Ion Mass Spectrometry (ToF-SIMS)""; ""3.1 Introduction""; ""3.2 Principle of the Ionization Process""; ""3.2.1 Formation of Secondary Ions""; ""3.2.1.1 Collision Cascade (Monoatomic Bombardment)"" ""3.2.1.2 Effect of Cluster Primary Ions (Polyatomic Bombardment)""""" 3.3 Instrumentation""; ""3.3.1 Primary Ion Guns""; ""3.3.1.1 Primary Ion Sources""; ""3.3.1.1.1 Liquid Metal Ion Source (LMIS)""; ""3.3.1.1.2 Electron Impact Ion Source""; ""3.3.1.2 Separation and Pulsing of

Primary Ions""; ""3.3.1.3 Focusing of Primary Ions""; ""3.3.2 Secondary Ion Separation and Detection: Time-of-Flight Analyzer""; ""3.3.3 Charge Compensation""; ""3.3.4 Technology of Sputtering (Depth Profiling)""; ""3.4 Operational Modes""; ""3.4.1 Overview""; ""3.4.2 Spectrometry""; ""3.4.3 Imaging""
""3.4.3.1 Langmuira€?Blodgett Films/Self-Assembled Monolayers""""" 3.4.3.2 Tissue Sections""; ""3.4.3.3 Single-Cell Analysis""; ""3.4.3.4 Other Imaging Applications""; ""3.4.4 Depth Profiling""; ""3.4.5 3D Microarea Analysis""; ""3.5 Improvement of Data Quality""; ""3.5.1 Enhancement of Secondary Ionization Probability""; ""3.5.2 Statistical Evaluation""; ""3.6 Specifications of TOF-SIMS""; ""3.7 Perspectives""; ""3.8 Acknowledgment""; ""References""; ""Chapter 4: Cluster Secondary Ion Mass Spectrometry""; ""4.1 Introduction""; ""4.2 Physics of Cluster SIMS""; ""4.3 Properties of Cluster SIMS""
""4.3.1 Enhanced Yields""""""4.3.2 Reduced Physical Damage""; ""4.3.3 Molecular Depth Profiling""; ""4.3.4 Implications to SIMS Imaging""; ""4.3.5 Comparison of Different Strategies""; ""4.4 Applications of Cluster SIMS""; ""4.4.1 Biological Tissue""; ""4.4.2 Biological Single Cells""; ""4.5 Future Directions of Cluster SIMS""; ""4.6 Summary""; ""References""; ""Chapter 5: Biological Tissue Imaging at Different Levels: MALDI and SIMS Imaging Combined""; ""5.1 Introduction""; ""5.2 Imaging Mass Spectrometry Modes""; ""5.2.1 Imaging Modes""; ""5.2.2 Microprobe Mode""; ""5.2.3 Microscope Mode""
""5.3 MALDI and SIMS: Two Sources of Ionization""

Sommario/riassunto

The outer layer of bulk solid or liquid samples is referred to as the surface of the sample/material. At the surface, the composition, microstructure, phase, chemical bonding, electronic states, and/or texture is often different than that of the bulk material. The outer surface is where many material interactions/reactions take place. This is especially true biomaterials which may be fabricated into bio-devices and in turn implanted into tissues and organs. Surfaces of biomaterials (synthetic or modified natural materials) are of critical importance since the surface is typically the only part of the biomaterial/bio-device that comes in contact with the biological system. Analytical techniques are required to characterize the surface of biomaterials and quantify their impact in real-world biological systems. Surface analysis of biological materials started in the 1960’s and the number of researchers working in this area have increased very rapidly since then, a number of advances have been made to standard surface analytical instrumentation, and a number of new instruments have been introduced. We felt the time was right for a book which summarized the main surface analysis techniques that are being used to study biological specimens/systems. The compilation of chapters in this book will help the biological research community realize the benefits that surface analysis provides. We look forward to seeing a larger number of biologists and medical specialists using the techniques discussed in this book. It is of importance to note that new analysis instruments are continuously being developed and introduced to the scientific community – we look forward to seeing what the future has in store. We are also excited to see next generation medical devices, which will benefit from surface analysis, and which will help our society. About the Editor Vincent S. Smentkowski is a Senior Scientist in the Nanostructures and Surfaces Laboratory at General Electric Global Research (GEGR) where he performs surface analysis to support research programs at GEGR, GE businesses, and strategic partners. Currently, his research is focused on the applications of ToF-SIMS analysis, emphasizing how multivariate statistical analysis tools facilitate data reduction. Vin holds 6 U.S. patents, more than 85

publications in referred journals, greater than 100 GEGR internal manuscripts, has co-authored 3 book chapters, and has presented numerous contributed and invited talks. Vin is a Fellow of the American Vacuum Society. .