

1. Record Nr.	UNINA9910827678303321
Titolo	Cluster secondary ion mass spectrometry : principles and applications / / edited by Christine M. Mahoney
Pubbl/distr/stampa	Hoboken, N.J., : John Wiley & Sons, Inc., 2013
ISBN	9781118589243 1118589246 9781118589335 1118589335 9781299475878 1299475876 9781118589250 1118589254
Edizione	[1st ed.]
Descrizione fisica	1 online resource (366 p.)
Collana	Wiley Series on Mass Spectrometry
Altri autori (Persone)	MahoneyChristine M
Disciplina	543/.65
Soggetti	Secondary ion mass spectrometry Mass spectrometry
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 and index.
Nota di contenuto	CLUSTER SECONDARY ION MASS SPECTROMETRY; CONTENTS; Contributors; About the Editor; 1 AN INTRODUCTION TO CLUSTER SECONDARY ION MASS SPECTROMETRY (CLUSTER SIMS); 1.1 Secondary Ion Mass Spectrometry in a Nutshell; 1.1.1 SIMS Imaging; 1.1.2 SIMS Depth Profiling; 1.2 Basic Cluster SIMS Theory; 1.3 Cluster SIMS: An Early History; 1.3.1 Nonlinear Sputter Yield Enhancements; 1.3.2 Molecular Depth Profiling; 1.4 Recent Developments; 1.5 About this Book; Acknowledgment; References; 2 CLUSTER SIMS OF ORGANIC MATERIALS: THEORETICAL INSIGHTS; 2.1 Introduction 2.2 Molecular Dynamics Simulations of Sputtering with Clusters2.2.1 The Cluster Effect; 2.2.2 Computer Simulations and the Molecular Dynamics ""Experiment""; 2.2.3 Light and Heavy Element Clusters, and the Importance of Mass Matching; 2.2.4 Structural Effects in Organic Materials; 2.2.4.1 Amorphous Molecular Solids and Polymers; 2.2.4.2 Organic Crystals; 2.2.4.3 Thin Organic Layers on Metal Substrates;

2.2.4.4 Hybrid Metal-Organic Samples; 2.2.5 Induced Chemistry; 2.2.6 Multiple Hits and Depth Profiling; 2.2.7 From Small Polyatomic Projectiles to Massive Clusters  
 2.2.7.1 Light-Element Clusters 2.2.7.2 Large Argon Clusters; 2.2.7.3 Massive Gold Clusters; 2.3 Other Models; 2.3.1 Analytical Models: From Linear Collision Cascades to Fluid Dynamics; 2.3.2 Recent Developments and Hybrid Approaches; 2.4 Conclusions; Acknowledgments; References; 3 ION SOURCES USED FOR SECONDARY ION MASS SPECTROMETRY; 3.1 Introduction; 3.2 Research Needs that have Influenced the Development of Primary Ion Sources for Sputtering; 3.3 Functional Aspects of Various Ion Sources; 3.3.1 Energy Spread in the Beam; 3.3.2 Point-Source Ionization; 3.3.3 Stable Emission 3.3.4 Ion Reactivity 3.3.5 Source Lifetime; 3.3.6 Penetration Depth and Surface Energy Spread of the Projectile; 3.4 Atomic Ion Sources; 3.4.1 Field Emission; 3.4.2 Radio Frequency (RF) Ionization; 3.4.3 Electron Impact; 3.4.4 Thermal Ionization; 3.4.5 DC-Glow Discharge; 3.4.6 Sputtering; 3.5 Molecular Ion Sources; 3.5.1 Field Emission; 3.5.2 Radio Frequency Discharge; 3.5.3 Electron Impact; 3.5.4 DC-Glow Discharge; 3.5.5 Sputtering; 3.6 Cluster Ion Sources; 3.6.1 Jets and Electron Impact (Massive Gas Clusters); 3.6.2 Field Emission; 3.7 Summary; References 4 SURFACE ANALYSIS OF ORGANIC MATERIALS WITH POLYATOMIC PRIMARY ION SOURCES 4.1 Introduction; 4.2 Cluster Sources in Static SIMS; 4.2.1 A Brief Introduction to Static SIMS; 4.2.2 Analysis beyond the Static Limit; 4.2.3 Increased Ion Yields; 4.2.4 Decreased Charging; 4.2.5 Surface Cleaning; 4.3 Experimental Considerations; 4.3.1 When to Employ Cluster Sources as Opposed to Atomic Sources; 4.3.2 Type of Cluster Source Used; 4.3.2.1 Liquid Metal Ion Gun (LMIG); 4.3.2.2 C + 60 for Mass Spectral Analysis and Imaging Applications; 4.3.2.3 The Gas Cluster Ion Beam (GCIB); 4.3.2.4 Au 4+ 400 4.3.2.5 Other Sources

## Sommario/riassunto

Explores the impact of the latest breakthroughs in cluster SIMS technology Cluster secondary ion mass spectrometry (SIMS) is a high spatial resolution imaging mass spectrometry technique, which can be used to characterize the three-dimensional chemical structure in complex organic and molecular systems. It works by using a cluster ion source to sputter desorb material from a solid sample surface. Prior to the advent of the cluster source, SIMS was severely limited in its ability to characterize soft samples as a result of damage from the atomic source. Molecular samples were es