

Secondary Ion Mass Spectroscopy of Solid Surfaces

V.T Cherepin

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**Dag Brune, Ragnar Hellborg, Harry J.
Whitlow, Ola Hunderi**



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Secondary Ion Mass Spectroscopy of Solid Surfaces Cherepin, 2020-04-28 This volume is devoted to the physics instrumentation and analytical methods of secondary ion mass spectroscopy SIMS in relation to solid surfaces It describes modern models of secondary ion formation and the factors influencing sensitivity of measurements and the range of applications All the main parts of SIMS instruments are discussed in detail Emphasising practical applications the book also considers the methods and analytical procedures for constitutional analysis of solids including metals semiconductors organic and biological samples Methods of depth profiling spatially multidimensional analysis and study of processes at the surface such as adsorption catalysis and oxidation are given along with the application of SIMS in combination with other methods of surface analysis

Secondary Ion Mass Spectroscopy of Solid Surfaces V. T. Cherepin, 2020-04-28 This volume is devoted to the physics instrumentation and analytical methods of secondary ion mass spectroscopy SIMS in relation to solid surfaces It describes modern models of secondary ion formation and the factors influencing sensitivity of measurements and the range of applications All the main parts of SIMS instruments are discussed in detail Emphasising practical applications the book also considers the methods and analytical procedures for constitutional analysis of solids including metals semiconductors organic and biological samples Methods of depth profiling spatially multidimensional analysis and study of processes at the surface such as adsorption catalysis and oxidation are given along with the application of SIMS in combination with other methods of surface analysis

Fundamentals of Industrial Catalytic Processes C. H. Bartholomew, Robert J. Farrauto, 2011-11-30 Catalysis is central to the chemical industry as it is directly or involved in the production of almost all useful chemical products In this book the authors present the definitive account of industrial catalytic processes Throughout Fundamentals of Industrial Catalytic Processes the information is illustrated with many case studies and problems This book is valuable to anyone wanting a clear account of industrial catalytic processes but is particularly useful to industrial and academic chemists and engineers and graduate working on catalysis This book also Covers fundamentals of catalytic processes including chemistry catalyst preparation properties and reaction engineering Addresses heterogeneous catalytic processes employed by industry Provides detailed data on existing catalysts and catalytic reactions process design and chemical engineering Covers catalysts used in fuel cells

Ion Spectroscopies for Surface Analysis Alvin W. Czanderna, David M. Hercules, 2012-12-06 Determining the elemental composition of surfaces is an essential measurement in characterizing solid surfaces At present many approaches may be applied for measuring the elemental and molecular composition of a surface Each method has particular strengths and limitations that often are directly connected to the physical processes involved Typically atoms and molecules on the surface and in the near surface region may be excited by photons electrons ions or neutrals and the detected particles are emitted ejected or scattered ions or electrons The purpose of this book is to bring together a discussion of the surface compositional analysis that depends on detecting scattered or

sputtered ions and the methods emphasized are those where instruments are commercially available for carrying out the analysis For each topic treated the physical principles instrumentation qualitative analysis artifacts quantitative analysis applications opportunities and limitations are discussed The first chapter provides an overview of the role of elemental composition in surface science compositional depth profiling stimulation by an electric field electrons neutrals or photons and detection of ions and then stimulation by ions and detection of ions electrons photons or neutrals Molecular Magnetic Materials on Solid Surfaces Matteo Mannini, 2009 This PhD thesis summarises a study of the nanostructuration of single molecule magnets and organic radicals on metallic surfaces carried out by the author in collaboration with a number of research groups in Italy France Germany and Israel A tailored approach was followed to graft individual molecules to the surface to characterise the morphology of the functionalised surfaces with standard scanning probe microscopy and to investigate their magnetic properties using X Ray circular dichroism The aim of this project was to develop the initial basis for the organisation and addressing of magnetic molecules with a view to the development of single molecule devices for data storage and molecular spintronic applications

Chemistry and Physics of Solid Surfaces V R. Vanselow, R. Howe, 2013-11-21 This volume contains review articles which were written by the invited speakers of the Sixth International Summer Institute in Surface Science ISSS held at the University of Wisconsin Milwaukee in August 1983 The objective of ISSS is to bring together a group of internationally recognized experts on various aspects of surface science to present tutorial review lectures over a period of one week Each speaker is asked in addition to write a review paper on his lecture topic The collected articles from previous Institutes have been published under the following titles Surface Science Recent Progress and Perspectives Crit Rev Solid State Sci 4 124 559 1974 Chemistry and Physics of Solid Surfaces Vol I 1976 Vol II 1979 Vol III 1982 CRC Press Boca Raton FL and Vol IV 1982 Springer Ser Chern Phys Vol 20 Springer Verlag Berlin Heidelberg New York 1982 No single collection of reviews or one week conference for that matter can possibly cover the entire field of modern surface science from heterogeneous catalysis through semiconductor surface physics to metallurgy It is intended however that the series Chemistry and Physics of Solid Surfaces as a whole should provide experts and students alike with a comprehensive set of reviews and literature references on as many aspects of the subject as possible particular emphasis being placed on the gas solid interface Each volume is introduced with a historical review of the development of one aspect of surface science by a distinguished participant in that development

Major Facilities at the Naval Research Laboratory, Washington, DC 20375-5000 Naval Research Laboratory (U.S.), 1988

Chemistry and Physics of Solid Surfaces VI Ralf Vanselow, Russell Howe, 2012-12-06 This volume contains review articles which were written by the invited speakers of the seventh International Summer Institute in Surface Science ISSS held at the University of Wisconsin Milwaukee in July 1985 The form of ISSS is a set of tutorial review lectures presented over a one week period by internationally recognized experts on various aspects of surface science Each speaker is asked in addition to write a review

article on his lecture topic No single volume in the series Chemistry and Physics of Solid Surfaces can possibly cover the entire field of modern surface science However the series as a whole is intended to provide experts and students alike with a comprehensive set of reviews and literature references particularly emphasizing the gas solid interface The collected articles from previous Summer Institutes have been published under the following titles Surface Science Recent Progress and Perspectives Crit Rev Solid State Sci 4 125 559 1974 Chemistry and Physics of Solid Surfaces Vols I II and III CRC Press Boca Raton FL 1976 1979 and 1982 Vols IV and V Springer Ser Chern Phys Vols 20 and 35 Springer Berlin Heidelberg 1982 and 1984 The field of catalysis which has provided the major impetus for the development of modern surface science lost two of its pioneers during 1984 and 1985 Professors G M Schwab 1899 1984 and P K Emmett 1900 1985

Characterization of Biomaterials Amit Bandyopadhyay, Susmita Bose, 2013-03-12 One of the key challenges current biomaterials researchers face is identifying which of the dizzying number of highly specialized characterization tools can be gainfully applied to different materials and biomedical devices Since this diverse marketplace of tools and techniques can be used for numerous applications choosing the proper characterization tool is highly important saving both time and resources Characterization of Biomaterials is a detailed and multidisciplinary discussion of the physical chemical mechanical surface in vitro and in vivo characterization tools and techniques of increasing importance to fundamental biomaterials research Characterization of Biomaterials will serve as a comprehensive resource for biomaterials researchers requiring detailed information on physical chemical mechanical surface and in vitro or in vivo characterization The book is designed for materials scientists bioengineers biologists clinicians and biomedical device researchers seeking input on planning on how to test their novel materials structures or biomedical devices to a specific application Chapters are developed considering the need for industrial researchers as well as academics Biomaterials researchers come from a wide variety of disciplines this book will help them to analyze their materials and devices taking advantage of the multiple experiences on offer Coverage encompasses a cross section of the physical sciences biological sciences engineering and applied sciences characterization community providing gainful and cross cutting insight into this highly multi disciplinary field Detailed coverage of important test protocols presents specific examples and standards for applied characterization

Electronic Materials Handbook, 1989-11-01 Volume 1 Packaging is an authoritative reference source of practical information for the design or process engineer who must make informed day to day decisions about the materials and processes of microelectronic packaging Its 117 articles offer the collective knowledge wisdom and judgement of 407 microelectronics packaging experts authors co authors and reviewers representing 192 companies universities laboratories and other organizations This is the inaugural volume of ASMAs all new Electronic Materials Handbook series designed to be the Metals Handbook of electronics technology In over 65 years of publishing the Metals Handbook ASM has developed a unique editorial method of compiling large technical reference books ASMAs access to leading materials technology experts enables to organize these books on an

industry consensus basis Behind every article Is an author who is a top expert in its specific subject area This multi author approach ensures the best most timely information throughout Individually selected panels of 5 and 6 peers review each article for technical accuracy generic point of view and completeness Volumes in the Electronic Materials Handbook series are multidisciplinary to reflect industry practice applied in integrating multiple technology disciplines necessary to any program in advanced electronics Volume 1 Packaging focusing on the middle level of the electronics technology size spectrum offers the greatest practical value to the largest and broadest group of users Future volumes in the series will address topics on larger integrated electronic assemblies and smaller semiconductor materials and devices size levels

Mass Spectrometry Imaging in Food Analysis Leo M.L. Nollet, 2020-04-29 Food contains various compounds and many technologies exist to analyze those molecules of interest However the analysis of the spatial distribution of those compounds using conventional technology such as liquid chromatography mass spectrometry or gas chromatography mass spectrometry is difficult Mass spectrometry imaging MSI is a mass spectrometry technique to visualize the spatial distribution of molecules as biomarkers metabolites peptides or proteins by their molecular masses Despite the fact that MSI has been generally considered a qualitative method the signal generated by this technique is proportional to the relative abundance of the analyte and so quantification is possible Mass Spectrometry Imaging in Food Analysis a volume in the Food Analysis and Properties Series explains how the novel use of matrix assisted laser desorption ionization mass spectrometry imaging MALDI MSI will be an ideal complementary approach MALDI MSI is a two dimensional MALDI MS technology that can detect compounds in a tissue section without extraction purification separation or labeling It can be used to visualize the spatial distribution of biomolecules in foods Features Explains the novel use of matrix assisted laser desorption ionization mass spectrometry imaging in food analysis Describes how MALDI MSI will be a useful technique for optical quality assurance Shows how MALDI MSI detects food contaminants and residues Covers the historical development of the technology While there are a multitude of books on mass spectrometry none focus on food applications and thus this book is ideally suited to food scientists food industry personnel engaged in product development research institutions and universities active in food analysis or chemical analysis Also available in the Food Analysis and Properties Series Food Aroma Evolution During Food Processing Cooking and Aging edited by Matteo Bordiga and Leo M L Nollet ISBN 9781138338241 Ambient Mass Spectroscopy Techniques in Food and the Environment edited by Leo M L Nollet and Basil K Munjanja ISBN 9781138505568 Hyperspectral Imaging Analysis and Applications for Food Quality edited by N C Basantia Leo M L Nollet and Mohammed Kamruzzaman ISBN 9781138630796 For a complete list of books in this series please visit our website at www.crcpress.com Food Analysis Properties book series CRCFOODANPRO

Characterization of Solid Materials and Heterogeneous Catalysts, 2 Volume Set Michel Che, Jacques C. Vedrine, 2012-05-14 This two volume book provides an overview of physical techniques used to characterize the structure of solid materials on the one hand and to investigate the

reactivity of their surface on the other Therefore this book is a must have for anyone working in fields related to surface reactivity Among the latter and because of its most important industrial impact catalysis has been used as the directing thread of the book After the preface and a general introduction to physical techniques by M Che and J C Vedrine two overviews on physical techniques are presented by G Ertl and Sir J M Thomas for investigating model catalysts and porous catalysts respectively The book is organized into four parts Molecular Local Spectroscopies Macroscopic Techniques Characterization of the Fluid Phase Gas and or Liquid and Advanced Characterization Each chapter focuses upon the following important themes overview of the technique most important parameters to interpret the experimental data practical details applications of the technique particularly during chemical processes with its advantages and disadvantages conclusions

Surface Characterization Dag Brune, Ragnar Hellborg, Harry J. Whitlow, Ola Hunderi, 2008-07-11 Surface Characterization provides an authoritative guide to the wide range of powerful techniques that are used to characterize the surfaces of materials Practical in approach it not only describes the major analytical techniques but emphasizes how they can be used to solve a multitude of chemical and physical problems A special feature of the book is that the various techniques are grouped according to the material property under investigation These parts are preceded by an overview comparing the capabilities of the characterization methods available Extensive data tables allow the reader to assess rapidly the strengths as well as the pitfalls inherent in each method Chapters on chemical composition optical and crystallographic properties microtopography surface processes tribological electrical and magnetic properties of surface films are featured In addition chapters specializing on applications within the life sciences on the microscopic scale and chemometrics are included Surface Characterization is addressed to both academic and industrial audiences Scientists and engineers working on the production and development of new materials will find it an invaluable reference source Physicist chemists chemical engineers material scientists and engineers from every area of materials research will benefit from the wealth of practical advice the book provides

New Trends and Potentialities of ToF-SIMS in Surface Studies Jacek Grams, 2007 This book presents the latest trends and applications of time of flight secondary ion mass spectrometry ToF SIMS It includes research and applications of the new primary ion guns It also describes new possibilities of mass spectrometers and instrumentation development

Catalog of National Bureau of Standards Publications, 1966-1976 United States. National Bureau of Standards, 1978

Surface Analysis John C. Vickerman, Ian S. Gilmore, 2011-08-10 This completely updated and revised second edition of Surface Analysis The Principal Techniques deals with the characterisation and understanding of the outer layers of substrates how they react look and function which are all of interest to surface scientists Within this comprehensive text experts in each analysis area introduce the theory and practice of the principal techniques that have shown themselves to be effective in both basic research and in applied surface analysis Examples of analysis are provided to facilitate the understanding of this topic and to show readers how they can overcome problems within this area of study

Catalog of

National Bureau of Standards Publications, 1966-1976 United States. National Bureau of Standards. Technical Information and Publications Division, Betty L. Burris, Rebecca J. Morehouse, 1978

Proceedings of the Symposium on Electron and Ion Beam Science and Technology Robert Bakish, 1976

Potential Energy Surfaces and Dynamics Calculations Donald Truhlar, 2013-11-11

The present volume is concerned with two of the central questions of chemical dynamics What do we know about the energies of interaction of atoms and molecules with each other and with solid surfaces How can such interaction energies be used to understand and make quantitative predictions about dynamical processes like scattering energy transfer and chemical reactions It is becoming clearly recognized that the computer is leading to rapid progress in answering these questions The computer allows probing dynamical mechanisms in fine detail and often allows us to answer questions that cannot be addressed with current experimental techniques As we enter the 1980 s not only are more powerful and faster computers being used but techniques and methods have been honed to a state where exciting and reliable data are being generated on a variety of systems at an unprecedented pace The present volume presents a collection of work that illustrates the capabilities and some of the successes of this kind of computer assisted research In a 1978 Chemical Society Report Frey and Walsh pointed out that it is extremely doubtful if a calculated energy of activation for any unimolecular decomposition can replace an experimental determination However they also recorded that they believed that some of the elaborate calculations being performed at present do suggest that we may be approaching a time when a choice between reaction mechanisms will be helped by such computational work

Ion Formation from Organic Solids A. Benninghoven, 2012-12-06

The Second International Conference on Ion Formation from Organic Solids IFOS II was held at the University of Münster Federal Republic of Germany from September 7 to 9 1982 The subject of the conference was the rapidly developing field of ion formation from volatile thermally labile organic compounds Rapid progress has been made in this field in the last few years mainly because of the discovery of unexpected new ionization processes such as sputtering and laser induced desorption The aim of the conference was twofold to acquire a basic understanding of these soft ionization processes on the one hand and to examine their present and future analytical applications on the other It sought to bring together scientists working in fundamental as well as applied research The participants represented such widely varied fields as pure and applied physics and chemistry biochemistry nuclear and solid state physics medicine and pharmacology These proceedings contain all of the papers presented at the conference Six review papers cover the fundamentals of different ionization processes The authors of these reviews were asked to give up to date surveys including characteristics of spectra the influence of excitation parameters tentative models for ion formation processes and assessments of their analytical applications These reviews are followed by 26 contributed papers dealing with more specialized aspects of the ionization processes and their analytical applications

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