

2nd Edition

An Introduction to **Surface Analysis** by **XPS** and **AES**

John F. Watts
John Wolstenholme



WILEY

An Introduction To Surface Analysis By Xps And Aes

Seong H. Kim



An Introduction To Surface Analysis By Xps And Aes:

An Introduction to Surface Analysis by XPS and AES John F. Watts, John Wolstenholme, 2019-08-15 Provides a concise yet comprehensive introduction to XPS and AES techniques in surface analysis This accessible second edition of the bestselling book *An Introduction to Surface Analysis by XPS and AES 2nd Edition* explores the basic principles and applications of X ray Photoelectron Spectroscopy XPS and Auger Electron Spectroscopy AES techniques It starts with an examination of the basic concepts of electron spectroscopy and electron spectrometer design followed by a qualitative and quantitative interpretation of the electron spectrum Chapters examine recent innovations in instrument design and key applications in metallurgy biomaterials and electronics Practical and concise it includes compositional depth profiling multi technique analysis and everything about samples including their handling preparation stability and more Topics discussed in more depth include peak fitting energy loss background analysis multi technique analysis and multi technique profiling The book finishes with chapters on applications of electron spectroscopy in materials science and the comparison of XPS and AES with other analytical techniques Extensively revised and updated with new material on NAPXPS twin anode monochromators gas cluster ion sources valence band spectra hydrogen detection and quantification Explores key spectroscopic techniques in surface analysis Provides descriptions of latest instruments and techniques Includes a detailed glossary of key surface analysis terms Features an extensive bibliography of key references and additional reading Uses a non theoretical style to appeal to industrial surface analysis sectors *An Introduction to Surface Analysis by XPS and AES 2nd Edition* is an excellent introductory text for undergraduates first year postgraduates and industrial users of XPS and AES

An Introduction to Surface Analysis by XPS and AES. ,2003 Extensively revised and updated with additional material included in existing chapters and new material on angle resolved XPS surface engineering and complimentary methods Includes an accessible introduction to the key spectroscopic techniques in surface analysis Provides descriptions of latest instruments and techniques Includes a detailed glossary of key surface analysis terms

An Introduction to Surface Analysis by Electron Spectroscopy John F. Watts, 1990 Surface analysis the examination of the outer few nanometers of a material is a routine undertaking in laboratories throughout the world and is of great importance in such areas as corrosion adhesion polymer surface treatment and microelectronics fabrication This handbook provides an introduction to the two most popular surface analysis techniques X ray photoelectron spectroscopy and Auger electron spectroscopy It explains the underlying physical principles discusses instrumentation and looks at the interpretation of resulting spectra Applications of the two techniques are considered and a critical comparison with other available methods is also included This fully illustrated guide will be a valuable introduction for students and researchers in physics engineering and materials science

Surface and Interface Analysis Seong H. Kim, 2025-03-05 Comprehensive textbook covering characterization techniques to understand the chemistry and structure of materials on surfaces and at interfaces *Surface and Interface Analysis* is a comprehensive

textbook resource that covers everything readers need to know about surface energy molecular speciation and optical and physical characterization techniques Assuming only basic knowledge of general chemistry electronic orbitals organic functional groups physics electromagnetic waves Maxwell equations physical chemistry Schrödinger equation harmonic oscillator and mathematics wave equations covariance matrix this textbook helps readers understand the underlying principles of the discussed characterization techniques and enables them to transform theoretical knowledge into applied skills through a Maieutic pedagogical approach Written by a highly qualified professor Surface and Interface Analysis includes information on Relationship between atomic and molecular orbitals and compositional analysis principles based on measurements of photoelectrons Auger electrons x rays and secondary ions emitted from the surface Governance of electromagnetic wave propagation in a dielectric medium and what can be learned from analyzing the electromagnetic wave reflected from the interface Surface metrology using light reflection non contact and scanning probe contact and analysis of mechanical properties through indentation Artifacts and misinterpretations that may be encountered during analysis Surface and Interface Analysis is an ideal textbook resource on the subject for graduate students in the fields of solid state physics optics materials science chemistry and engineering who want to learn and apply advanced materials characterization methods along with undergraduate students in advanced elective courses

Data Driven Guide to the Analysis of X-ray Photoelectron Spectra using RxpsG Giorgio Speranza, 2023-11-23 Key Features Simplifies the use of RxpsG how it works and its applications Demonstrates RxpsG using a reproduction of the graphical interface of RxpsG showing the steps needed to perform a specific task and the effect on the XPS spectra Accessible to readers without any prior experience using the RxpsG software

Surface Analysis by Electron Spectroscopy Graham C. Smith, 2013-11-21 This book is the fifth in a series of scientific textbooks designed to cover advances in selected research fields from a basic and general viewpoint The reader is taken carefully but rapidly through the introductory material in order that the significance of recent developments can be understood with only limited initial knowledge The inclusion in the Appendix of the abstracts of many of the more important papers in the field provides further assistance for the non specialist and acts as a springboard to supplementary reading for those who wish to consult the original literature Surface analysis has been the subject of numerous books and review articles and the fundamental scientific principles of the more popular techniques are now reasonably well established This book is concerned with the very powerful techniques of Auger electron and X ray photoelectron spectroscopy AES and XPS with an emphasis on how they may be performed as part of a modern analytical facility Since the development of AES and XPS in the late 1960s and early 1970s there have been great strides forward in the sensitivities and resolutions of the instrumentation Simultaneously these spectroscopies have undergone a veritable explosion both in their acceptance alongside more routine analytical techniques and in the range of problems and materials to which they are applied As a result many researchers in industry and in academia now come into contact with AES and XPS not as specialists but as users

Handbook of Applied Solid State Spectroscopy D.R. Vij, 2007-02-15 Solid State spectroscopy is a burgeoning field with applications in many branches of science including physics chemistry biosciences surface science and materials science Handbook of Applied Solid State Spectroscopy brings together in one volume information about various spectroscopic techniques that is currently scattered in the literature of these disciplines This concise yet comprehensive volume covers theory and applications of a broad range of spectroscopies including NMR NQR EPR ESR ENDOR scanning tunneling acoustic resonance FTIR auger electron emission x ray photoelectron emission luminescence and optical polarization and more Emphasis is placed on fundamentals and current methods and procedures together with the latest applications and developments in the field Auger- and X-Ray Photoelectron Spectroscopy in Materials Science Siegfried Hofmann, 2012-10-25 To anyone who is interested in surface chemical analysis of materials on the nanometer scale this book is prepared to give appropriate information Based on typical application examples in materials science a concise approach to all aspects of quantitative analysis of surfaces and thin films with AES and XPS is provided Starting from basic principles which are step by step developed into practically useful equations extensive guidance is given to graduate students as well as to experienced researchers Key chapters are those on quantitative surface analysis and on quantitative depth profiling including recent developments in topics such as surface excitation parameter and backscattering correction factor Basic relations are derived for emission and excitation angle dependencies in the analysis of bulk material and of fractional nano layer structures and for both smooth and rough surfaces It is shown how to optimize the analytical strategy signal to noise ratio certainty and detection limit Worked examples for quantification of alloys and of layer structures in practical cases e g contamination evaporation segregation and oxidation are used to critically review different approaches to quantification with respect to average matrix correction factors and matrix relative sensitivity factors State of the art issues in quantitative destructive and non destructive depth profiling are discussed with emphasis on sputter depth profiling and on angle resolved XPS and AES Taking into account preferential sputtering and electron backscattering corrections an introduction to the mixing roughness information depth MRI model and its extensions is presented Polymer Structure Characterization Richard A Pethrick, 2015-10-20 The different physical properties displayed by low molar mass organic materials and polymers are a result of their molecular organisation In order to understand the structure property relationship of a material it is necessary to first look at the interactions at a molecular level This new edition of Polymer Structure Characterization provides readers with the background needed to understand the factors that influence molecular organization and how this affects the morphology and bulk physical properties of a material In order to introduce the concepts the book first looks at small molecular systems and builds up to complex macromolecular systems The second edition has been fully revised and updated to include new examples and references Topics covered include organic crystals liquid crystals plastic crystals polymer crystal growth amorphous glassy materials polymer surfaces and interfaces colloids and molecular organization in

liquids as well as two new chapters on self assembly and biopolymer systems The book is intended to provide complimentary material for a range of undergraduate and postgraduate courses in materials science molecular chemistry and chemical physics In addition to polymer and material scientists the book would also be of interest to chemists and physicists studying the properties of organic materials

Surface and Interface Science, Volumes 9 and 10 Klaus Wandelt, 2020-03-30 In ten volumes this unique handbook covers all fundamental aspects of surface and interface science and offers a comprehensive overview of this research area for scientists working in the field as well as an introduction for newcomers

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