

EXAFS SPECTROSCOPY

B.K. Teo; D.C. Joy

Exafs Spectroscopy Techniques And Applications

**Paul A. Fenter, Mark L. Rivers, Neil
Sturchio, Stephen R. Sutton**



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NEXAFS Spectroscopy Joachim Stöhr, 1992-08-06 Develops all concepts of the fundamental principles and applications of NEXAFS spectroscopy presenting a unified picture of the latest theoretical and experimental results The power of this technique is demonstrated in particular in the application to low Z molecules bonded to surfaces systems of special interest in surface chemistry where NEXAFS reveals the electronic and structural properties of the molecules and details state of the art instrumentation in analysis techniques and results along with tabulated information about the various molecular adsorption systems that have already been studied by NEXAFS

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and partial local order including solutions gases liquids glasses and powders This new volume of International Tables for Crystallography has nine parts and over 150 chapters contributed by a wide range of international experts Part 1 provides a brief overview and introduction to the background of X ray absorption spectroscopy XAS and experimental facilities Part 2 discusses the quantum theory of XAS and related approaches Part 3 describes both standard and advanced experimental methods used in XAS X ray emission spectroscopy XES and related techniques Part 4 covers both standard and more advanced pre processing of data Part 5 gives an extensive overview of the analysis of experimental data Part 6 provides details of the major software packages for data collection reduction and analysis Part 7 outlines the importance in science reporting and hypothesis testing of the exchange of input and processed output data and data deposition It also presents excerpts of tables of data and supplementary material for XAS pre edge studies X ray absorption near edge spectroscopy XANES and X ray absorption fine structure XAFS studies These tables are also available in full as online supporting information Part 8 explores a wide range of applications of XAS in fields including materials science physics chemistry biology earth sciences catalysis and cultural heritage Part 9 presents definitions of the terms and quantities used as developed by the International Union of Crystallography's Commission on XAFS The volume has been written for the worldwide XAS community of thousands of practitioners beamline scientists experts and academics and for the novice user who wishes to know what XAS and XES can do for them and how they may use these techniques for their particular purposes The volume is therefore intended to be a self contained authoritative reference work that can also be used for training learning or teaching providing practical guidance for readers of all levels of experience More information on the volumes in the series International Tables for Crystallography can be found at <https://it.iucr.org>

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Experimental and Theoretical Approaches to Actinide Chemistry John K. Gibson, Wibe A. de Jong, 2018-03-19 A review of contemporary actinide research that focuses on new advances in experiment and theory and the interplay between these two realms *Experimental and Theoretical Approaches to Actinide Chemistry* offers a comprehensive review of the key aspects of actinide research Written by noted experts in the field the text includes information on new advances in experiment and theory and reveals the interplay between these two

realms The authors offer a multidisciplinary and multimodal approach to the nature of actinide chemistry and explore the interplay between multiple experiments and theory as well as between basic and applied actinide chemistry The text covers the basic science used in contemporary studies of the actinide systems from basic synthesis to state of the art spectroscopic and computational techniques The authors provide contemporary overviews of each topic area presented and describe the current and anticipated experimental approaches for the field as well as the current and future computational chemistry and materials techniques In addition the authors explore the combination of experiment and theory This important resource Provides an essential resource the reviews the key aspects of contemporary actinide research Includes information on new advances in experiment and theory and the interplay between the two Covers the basic science used in contemporary studies of the actinide systems from basic synthesis to state of the art spectroscopic and computational techniques Focuses on the interplay between multiple experiments and theory as well as between basic and applied actinide chemistry Written for academics students professionals and researchers this vital text contains a thorough review of the key aspects of actinide research and explores the most recent advances in experiment and theory

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Applications of Synchrotron Radiation in Low-Temperature Geochemistry and Environmental Science Paul A. Fenter, Mark L. Rivers, Neil Sturchio, Stephen R. Sutton, 2018-12-17 Volume 49 of Reviews in Mineralogy and Geochemistry reviews the state of the art of synchrotron radiation applications in low temperature geochemistry and environmental science and offer speculations on future developments The reader of this volume will acquire an appreciation of the theory and applications of synchrotron radiation in low temperature geochemistry and environmental science as well as the significant advances that have been made in this area in the past two decades It gives a fairly comprehensive overview of synchrotron radiation applications in low temperature geochemistry and environmental

science describes the ways that synchrotron radiation is generated including a history of synchrotrons and a discussion of aspects of synchrotron radiation that are important to the experimentalist describes specific synchrotron methods that are most useful for single crystal surface and mineral fluid interface studies as well as methods that can be used more generally for investigating complex polyphase fine grained or amorphous materials including soils rocks and organic matter

Advanced Analytical Methods in Tribology Martin Dienwiebel, Maria-Isabel De Barros Bouchet, 2018-10-04 This book presents the basics and methods of nanoscale analytical techniques for tribology field It gives guidance to the application of mechanical microstructural chemical characterization methods and topography analysis of materials It provides an overview of the of state of the art for researchers and practitioners in the field of tribology It shows different examples to the application of mechanical microstructural chemical characterization methods and topography analysis of materials Friction and Wear phenomena are governed by complexe processes at the interface of sliding surfaces For a detailed understanding of these phenomena many surface sensitive techniques have become available in recent years The applied methods are atom probe tomography in situ TEM SERS NEXAFS in situ XPS nanoindentation and in situ Raman spectroscopy A survey of new related numerical calculations completes this book This concerns ab initio coupling numerical calculations for mechanical aspects and density functional theory DFT to study chemical reactivity

Modern Physical Chemistry: Engineering Models, Materials, and Methods with Applications Reza K. Haghi, Emili Besalu, Maciej Jaroszewski, Sabu Thomas, Praveen K.M., 2018-09-03 This volume brings together innovative research new concepts and novel developments in the application of new tools for chemical engineers It presents significant research reporting on new methodologies and important applications in the field of chemical engineering Highlighting theoretical foundations real world cases and future directions this book covers selected topics in a variety of areas including chemoinformatics and computational chemistry advanced dielectric materials nanotechniques polymer composites It also presents several advanced case studies The topics discussed in this volume will be valuable for researchers practitioners professionals and students of chemistry material and chemical engineering

Surface and Nanomolecular Catalysis Ryan Richards, 2006-05-25 Using new instrumentation and experimental techniques that allow scientists to observe chemical reactions and molecular properties at the nanoscale the authors of Surface and Nanomolecular Catalysis reveal new insights into the surface chemistry of catalysts and the reaction mechanisms that actually occur at a molecular level during catalys

Advances in Sensors: Reviews, Vol. 6 Sergey Yurish, 2018-06-18 The Vol 6 of this Book Series contains 21 chapters written by 94 contributors experts from universities and research centres from 21 countries Argentina Austria Brazil China Czech Republic Denmark Finland France Germany India Italy Japan Mexico Poland Romania Russia Slovenia Switzerland Thailand UK and USA This volume is devoted to various chemical sensors sensors for various gases nucleic acids organic compounds nanosensors etc and biosensors This book ensures that our readers will stay at the cutting edge of the field and get the right and effective start point and road

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engineers working on the production and development of new materials will find it an invaluable reference source. Physicists, chemists, chemical engineers, material scientists and engineers from every area of materials research will benefit from the wealth of practical advice the book provides. **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 (ISISS) held at the University of Wisconsin Milwaukee in August 1983. The objective of ISISS 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. *X-ray Characterization of Nanostructured Energy Materials by Synchrotron Radiation* Mehdi Khodaei, Luca Petaccia, 2017-03-22 Nowadays nanomaterials are attracting huge attentions not only from a basic research point of view but also for their potential applications. Since finding the structure-property-processing relationships can open new windows in the application of materials, the material characterizations play a crucial role in the research and development of materials science. The increasing demand for energy with the necessity to find alternative renewable and sustainable energy sources leads to the rapid growth in attention to energy materials. In this book the results of some outstanding researches on synchrotron-based characterization of nanostructured materials related to energy applications are presented.

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