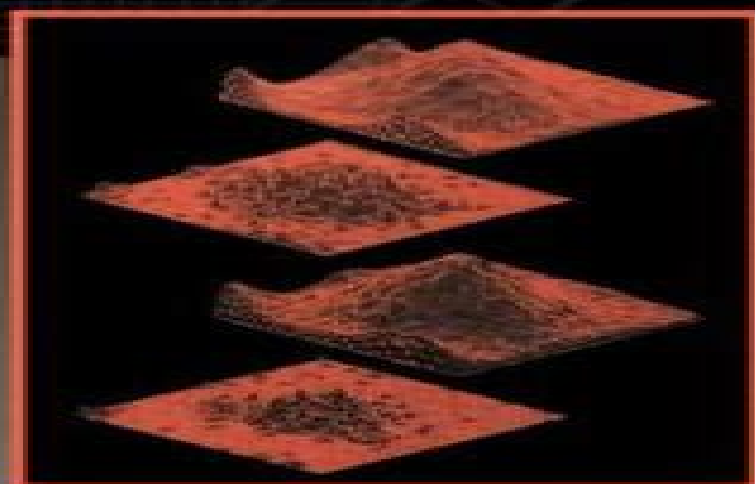


Edited by
Sven A. E. Johansson
John L. Campbell
Klas G. Malmqvist

PARTICLE-INDUCED X-RAY EMISSION SPECTROMETRY (PIXE)



*Volume 133 in Chemical Analysis: A Series of Monographs on
Analytical Chemistry and Its Applications*

J. D. Winefordner, Series Editor

Particle Induced X Ray Emission Spectrometry Pixe

**Sven A. E. Johansson, John L.
Campbell, Klas G. Malmqvist**



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Particle-Induced X-Ray Emission Spectrometry (PIXE) Sven A. E. Johansson, John L. Campbell, Klas G. Malmqvist, 1995-08-18 The authoritative handbook to exploiting the full power and versatility of PIXE now and in the next century Respected for its practical accuracy and detection range of parts per million particle induced X ray emission has enjoyed a secure place in the analytical arsenal of the nuclear physics laboratory Yet its undeniable analytical potential in other areas of science has scarcely been tapped This unique reference from PIXE specialists in biomedicine atmospheric science earth science and art and archaeology features a user based look at PIXE s conceptual basics and methodology with a view toward new and creative analytical work Touching on every facet of PIXE technology from basic instrumentation specimens the characteristics of X ray spectroscopy standardization of quantitative analysis to the accuracy of PIXE analysis and its limits of detection the book offers an unprecedented look at the newer uses of PIXE in such areas as Applications of macro and micro PIXE in medicine zoology and botany Analysis of atmospheric aerosols Geological and extra terrestrial material Analysis of gem stones pottery glass and alloys As an exploratory tool for pigments and paintings and paper like materials Complete with a comparative look contrasting PIXE with more conventional forms of analysis this important reference is key to grasping the technique s practical specifics and exploiting its full analytical potential *Particle-Induced X-Ray Emission Spectrometry (PIXE) (Volume 133)*. Johansson SAE., 1995 [Ion Beam Analysis](#) Michael Nastasi, James W. Mayer, Yongqiang Wang, 2014-08-27 Ion Beam Analysis Fundamentals and Applications explains the basic characteristics of ion beams as applied to the analysis of materials as well as ion beam analysis IBA of art archaeological objects It focuses on the fundamentals and applications of ion beam methods of materials characterization The book explains how ions interact with solids and describes what information can be gained It starts by covering the fundamentals of ion beam analysis including kinematics ion stopping Rutherford backscattering channeling elastic recoil detection particle induced x ray emission and nuclear reaction analysis The second part turns to applications looking at the broad range of potential uses in thin film reactions ion implantation nuclear energy biology and art archaeology Examines classical collision theory Details the fundamentals of five specific ion beam analysis techniques Illustrates specific applications including biomedicine and thin film analysis Provides examples of ion beam analysis in traditional and emerging research fields Supplying readers with the means to understand the benefits and limitations of IBA the book offers practical information that users can immediately apply to their own work It covers the broad range of current and emerging applications in materials science physics art archaeology and biology It also includes a chapter on computer applications of IBA **High Temperature Gas-Solid Reactions in Earth and Planetary Processes** Penelope King, Bruce Fegley, Terry Seward, 2018-12-03 High temperature gas solid reactions are ubiquitous on planetary bodies distributing chemical elements over a range of geologic settings and temperatures This volume reviews the critical role gas solid reactions play in early solar system formation volcanism

metamorphism and industrial processes The field evidence experimental and theoretical approaches for examining gas solid reaction are presented building on advances in fields outside of Earth Sciences Computational chemistry techniques are used to probe the nature of molecular clusters and solvation in volcanic vapors and mineral gas reaction mechanisms Specialised analytical methods for characterising solid reaction products are included since these reactions commonly form thin or dispersed films and metastable minerals Finally the volume contains rich field examples laboratory experiments and thermodynamic modelling and kinetics of gas solid reactions on Earth Venus and beyond *Cumulated Index Medicus* ,1984

Elemental Analysis by Particle Accelerators Zeev Alfassi,Max Peisach,2020-11-25 Elemental Analysis by Particle Accelerators describes the theory methodology and applications for a wide variety of sensitive non destructive methods of analysis capable of both high selectivity and multielemental determinations Specific methods discussed include radioactive methods particle backscatter analysis recoil techniques and nuclear reaction analysis The use of multielemental PIXE and PIGME analyses of real world thick samples in environmental studies trace element applications in biology and provenance studies in archaeology are also covered The book is a useful reference for practicing specialists and an essential text for students **Electrochemistry for Cultural Heritage** Antonio Doménech-Carbó,María Teresa

Doménech-Carbó,2023-07-05 This monograph overviews the importance of electrochemistry in the field of cultural heritage including archaeology conservation and restoration topics The application of electrochemical techniques in these domains have experienced a notable growth during the last ten years in particular with regards to the elucidation of composition manufacturing techniques and chronology of archaeological artefacts This book describes the application of solid state electrochemistry techniques for the use of samples at the nanogram level from paintings metallic ceramic glass glazed wooden and other objects and it also includes the description of new dating procedures for archaeological objects made of these materials It is a valuable contribution to the field of cultural heritage and will be of great interest to archaeologists conservators and restorers as well as to physicists and chemists working on the scientific examination of works of art

Index Medicus ,2001 Vols for 1963 include as pt 2 of the Jan issue Medical subject headings **Atomic and Molecular Spectroscopy** Sune Svanberg,2012-12-06 A wide ranging review of modern spectroscopic techniques such as X ray photoelectron optical and laser spectroscopy and radiofrequency and microwave techniques On the fundamental side the book focuses on physical principles and the impact of spectroscopy on our understanding of the building blocks of matter while in the area of applications particular attention is given to those in chemical analysis photochemistry surface characterisation environmental and medical diagnostics remote sensing and astrophysics The Fourth Edition also provides the reader with an update on laser cooling and trapping Bose Einstein condensation ultra fast spectroscopy high power laser matter interaction satellite based astronomy and spectroscopic aspects of laser medicine **Medical Subject Headings** National Library of Medicine (U.S.),1995 **Charged Particle and Photon Interactions with Matter** A.

Mozumder, Yoshihiko Hatano, 2003-11-14 *Charged Particle and Photon Interactions with Matter* offers in depth perspectives on phenomena of ionization and excitation induced by charged particle and photon interactions with matter in vivo and in vitro This reference probes concepts not only in radiation and photochemistry but also in radiation physics radiation biochemistry and radiatio

Medical Subject Headings, 2004 *Analytical Techniques for Trace Elements in Geochemical Exploration* Raghuw Saran, 2022-12-07 Trace element analysis plays a prominent role in various fields from mineralogy and geology to semiconductor manufacture and foods In geochemical exploration the analysis of trace elements assumes high significance due to the multifaceted role played by them The analyte is at the detection limit of many instrumental techniques This makes their determination difficult This book covers a wide spectrum of destructive and non destructive analytical techniques and recent developments in them used all over the world including developing countries for quantitation of trace elements With revolutionary progress in the last three to four decades in analytical techniques several ICP based techniques like ICP OES and ICP MS and other nuclear analytical techniques have enabled determination of trace elements at the ppb level However these methods require expensive instrumentation and cannot be made available everywhere The quality of analytical data is dependent on valid reference standards The book contains detailed sample preparation in varying matrices and an important chapter on statistical treatment of analytical data for the purpose of quality control and quality assurance Pulling together the book containing the work carried out by the author s group in India will be useful to analysts involved in geochemical explorations

Encyclopedia of Spectroscopy and Spectrometry, 2016-09-22 This third edition of the Encyclopedia of Spectroscopy and Spectrometry Three Volume Set provides authoritative and comprehensive coverage of all aspects of spectroscopy and closely related subjects that use the same fundamental principles including mass spectrometry imaging techniques and applications It includes the history theoretical background details of instrumentation and technology and current applications of the key areas of spectroscopy The new edition will include over 80 new articles across the field These will complement those from the previous edition which have been brought up to date to reflect the latest trends in the field Coverage in the third edition includes Atomic spectroscopy Electronic spectroscopy Fundamentals in spectroscopy High Energy spectroscopy Magnetic resonance Mass spectrometry Spatially resolved spectroscopic analysis Vibrational rotational and Raman spectroscopies The new edition is aimed at professional scientists seeking to familiarize themselves with particular topics quickly and easily This major reference work continues to be clear and accessible and focus on the fundamental principles techniques and applications of spectroscopy and spectrometry Incorporates more than 150 color figures 5 000 references and 300 articles for a thorough examination of the field Highlights new research and promotes innovation in applied areas ranging from food science and forensics to biomedicine and health Presents a one stop resource for quick access to answers and an in depth examination of topics in the spectroscopy and spectrometry arenas

Control and Fate of Atmospheric Trace Metals Jozef M. Pacyna, Brynjulf Ottar, 2012-12-06 The

increasing production of industrial goods heat and energy as well as traffic has led to the release of considerable amounts of toxic trace metals to the atmosphere The result is elevated concentrations of toxic metals in local populations and eco systems Recently the problem of atmospheric long range transport of trace metals has also been recognized Significant amounts of these pollutants are disposed and deposited both on regional and global scales In the atmosphere they may influence the chemical reactions Of particular interest is their catalytic effect on the oxidation processes taking place in water droplets or on the surface of wet particles e g the oxidation of sulphur dioxide to sulphate however the main environmental impact starts when the atmospheric trace metals are deposited on ground and vegetation and subsequently brought into the water circulation During the later years significant progress has been made in the development of equipment to reduce and control the atmospheric emissions of toxic trace metals This particularly applies to electrostatic precipitators and wet scrubbers for the collection of fine particles The main objective of the workshop was to survey present knowledge concerning the sources atmospheric fluxes sinks and chemical impact of the atmospheric trace metals and to review the developments of emission control equipment and the perspectives to reduce the potential risks from toxic metals During the first two days of the meeting 15 invited review papers were presented *Hazardous Metals in the Environment* M. Stoeppler, 1992-04-13 The execution of detailed studies on the fate and levels of hazardous elements in the environment foodstuffs and in human beings has become a major task in environmental research and especially in analytical chemistry This has led to a demand to develop new methodology and optimize that already in use The book offers the reader a general introduction to the problem areas that are currently being tackled followed by chapters on sampling and sample preservation strategies and applications of the archiving of selected representative specimens for long term storage in environmental specimen banks This is supplemented by the example of wine as a preserved frequently already historical specimen which clearly reflects technological changes over time The following chapters review sample treatment present an overview on the most frequently and successfully applied trace analytical methods for metals and metal compounds and introduce the increasingly important methods for identifying and quantifying metal species in sediments and soils speciation The chapters in the second part of the book provide data on analytical methods for determining the levels of toxicologically ecotoxicologically and ecologically important elements in environmental and biological materials including information on the separation and quantification of chemical and organometallic species The elements treated are aluminium arsenic cadmium chromium cobalt lead mercury nickel selenium and thallium The final chapter treats quality assurance and the importance of the continuous use of appropriate reference materials to avoid erroneous results **Encyclopedia of Analytical Science**, 2019-04-02 The third edition of the Encyclopedia of Analytical Science Ten Volume Set is a definitive collection of articles covering the latest technologies in application areas such as medicine environmental science food science and geology Meticulously organized clearly written and fully interdisciplinary the Encyclopedia of Analytical Science Ten Volume Set

provides foundational knowledge across the scope of modern analytical chemistry linking fundamental topics with the latest methodologies Articles will cover three broad areas analytical techniques e g mass spectrometry liquid chromatography atomic spectrometry areas of application e g forensic environmental and clinical and analytes e g arsenic nucleic acids and polycyclic aromatic hydrocarbons providing a one stop resource for analytical scientists Offers readers a one stop resource with access to information across the entire scope of modern analytical science Presents articles split into three broad areas analytical techniques areas of application and and analytes creating an ideal resource for students researchers and professionals Provides concise and accessible information that is ideal for non specialists and readers from undergraduate levels and higher **December** H. Neels,W. Kleber,2022-01-19 No detailed description available for December

Additives in Polymers Jan C. J. Bart,2005-04-08 This industrially relevant resource covers all established and emerging analytical methods for the deformation of polymeric materials with emphasis on the non polymeric components Each technique is evaluated on its technical and industrial merits Emphasis is on understanding principles and characteristics and industrial applicability Extensively illustrated throughout with over 200 figures 400 tables and 3 000 references *Ewing's Analytical Instrumentation Handbook, Fourth Edition* Nelu Grinberg,Sonia Rodriguez,2019-02-21 This handbook is a guide for workers in analytical chemistry who need a starting place for information about a specific instrumental technique It gives a basic introduction to the techniques and provides leading references on the theory and methodology for an instrumental technique This edition thoroughly expands and updates the chapters to include concepts applications and key references from recent literature It also contains a new chapter on process analytical technology

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