Chemistry And Analysis Of Radionuclides Laboratory Techniques And Methodology

SAGE ISSAC

Applied in Spent Nuclear Fuel Research Elsevier
Radiochemistry and Nuclear Chemistry theme is a component of Encyclopedia of Chemical Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The content of the Theme on Radiochemistry and Nuclear Chemistry provides the essential aspects and a myriad of issues of great relevance to our world such as: Isotope Effects, Isotope Separation and Isotope Fractionation; Radiometric Dating and Tracing; Radiochemical Techniques; Radionuclides in Chemical Research; Nuclear Methods in Material Research; Radiation Chemistry; Radiation Biology and Radiation Protection; Radiochemistry and Radiopharmaceutical Chemistry for Medicine; Chemistry of the Actinide Elements; Production And Chemistry Of Transactinide Elements; Nuclear Waste Management and the Nuclear Fuel Cycle; High-intensity Lasers in Nuclear Science; Nuclear Forensics; Nuclear Processes in Nature; Subatomic Particles, Nuclear Structure and Stability. These two volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, managers, and decision makers and NGOs.
Photon Activation Analysis Springer Science & Business Media
Environmental Radiochemical Analysis III is an authoritative, up to date review of research contributions presented at the 10th International Symposium on Environmental Radiochemical Analysis. Representing the work of leading scientists across the globe this edition provides information on: - new methods of radioanalyses - waste steams during decommissioning - radioactivity measurements in the environment - hazard assessment in decommissioning - improvements in measurement instrumentation - application of software to measurements - current IAEA activities for the ALMERA network - pro ciency testing and research and development in the NDA. This exceptional work o ers an insight into topical areas of research and is a key point of reference for graduates and professionals alike who work across elds involving analytical chemistry, environmental science and technology, and hazards and waste research and disposal.
Environmental Radiochemical Analysis V John Wiley & Sons
Flow Analysis: A Practical Guide reviews flow techniques for automating chemical analysis with the goal of increasing efficiency and producing better analytical results. Various applications for flow techniques are reviewed including industrial process monitoring (for example, foods and beverages, drugs and pharmaceuticals); as well as agricultural, life science, radioactivity, and environmental analysis with an emphasis on the latter. This book is a valuable resource for young scientists or graduate-level students who want to learn how to introduce flow techniques into their experiments, and for experts who need specific and technical details to develop complete experimental systems. Includes descriptions of the theoretical and technical bases of the most important flow techniques Focuses on new trends in the field such as using flow techniques for radioactivity and environmental applications Features instructions for coupling different types of detectors online with flow systems
Handbook of Radioactivity Analysis Springer
London : Elsevier Applied Science, c1991.
Radiopharmaceutical Chemistry Amer Chemical Society
The IAEA has compiled this overview of current applications of nuclear analytical techniques (NATs). The contributions included in this book describe a variety of nuclear techniques and applications, such as those in the fields of environment and health, industrial processes, non-destructive testing, forensic and archaeological investigations, cosmochemistry and method validation. The techniques covered range from classical instrumental neutron activation analysis (INAA), its radiochemical derivative RNAA, in-beam methods such as prompt y neutron activation analysis (PGNAA) and accelerator mass spectrometry (AMS), to X ray fluorescence (XRF) and proton induced X ray emission (PIXE) spectroscopy. Isotopic techniques to investigate element behaviour in biology and medicine, and also to validate other non-nuclear analytical techniques, are described. Destructive and non-destructiveapproaches are presented, along with their use to investigate very small and very large samples, archaeological samples and extraterrestrial samples. Several nuclear analytical applications in industry are described that have considerable socioeconomic impact wherever they can be implemented.
Application of ICP-MS Radionuclide Analysis to {open_quotes}real World{close_quotes} Samples of Department of Energy Radioactive Waste Chemistry and Analysis of RadionuclidesLaboratory Techniques and Methodology
Written by chemists for chemists, this is a comprehensive guide to the important radionuclides as well as techniques for their separation and analysis. It introduces readers to the important laboratory techniques and methodologies in the field, providing practical instructions on how to handle nuclear waste and radioactivity in the environment.
Flow Analysis Wiley-Interscience
This book provides extensive and comprehensive information to researchers and academicians who are interested in radionuclide contamination, its sources and environmental impact. It is also useful for graduate and undergraduate students specializing in radioactive-waste disposal and its impact on natural as well as manmade environments. A number of sites are affected by large legacies of waste from the mining and processing of radioactive minerals. Over recent decades, several hundred radioactive isotopes (radioisotopes) of natural elements have been produced artificially, including 90Sr, 137Cs and 131I. Several other anthropogenic radioactive elements have also been produced in large quantities, for example technetium, neptunium, plutonium and americium, although plutonium does occur naturally in trace amounts in uranium ores. The deposition of radionuclides on vegetation and soil, as well as the uptake from polluted aquifers (root uptake or irrigation) are the initial point for their transfer into the terrestrial environment and into food chains. There are two principal deposition processes for the removal of pollutants from the atmosphere: dry deposition is the direct transfer through absorption of gases and particles by natural surfaces, such as vegetation, whereas showery or wet deposition is the transport of a substance from the atmosphere to the ground by snow, hail or rain. Once deposited on any vegetation, radionuclides are removed from plants by the airstre am and rain, either through percolation or by cuticular scratch. The increase in biomass during plant growth does not cause a loss of activity, but it does lead to a decrease in activity concentration due to effective dilution. There is also systemic transport (translocation) of radionuclides within the plant subsequent to foliar uptake, leading the transfer of chemical components to other parts of the plant that have not been contaminated directly.
Fundamentals and Applications Newnes
This book is a comprehensive guide to radiopharmaceutical chemistry. The stunning clinical successes of nuclear imaging and targeted radiotherapy have resulted in rapid growth in the field of radiopharmaceutical chemistry, an essential component of nuclear medicine and radiology. However, at this point, interest in the field outpaces the academic and educational infrastructure needed to train radiopharmaceutical chemists. For example, the vast majority of texts that address radiopharmaceutical chemistry do so only peripherally, focusing instead on nuclear chemistry (i.e. nuclear reactions in reactors), heavy element radiochemistry (i.e. the decomposition of radioactive waste), or solely on the clinical applications of radiopharmaceuticals (e.g. the use of PET tracers in oncology). This text fills that gap by focusing on the chemistry of radiopharmaceuticals, with key coverage of how that knowledge translates to the development of diagnostic and therapeutic radiopharmaceuticals for the clinic. The text is divided into three overarching sections: First Principles, Radiochemistry, and Special Topics. The first is a general overview covering fundamental and broad issues like “The Production of Radionuclides” and “Basics of Radiochemistry”. The second

section is the main focus of the book. In this section, each chapter's author will delve much deeper into the subject matter, covering both well established and state-of-the-art techniques in radiopharmaceutical chemistry. This section will be divided according to radionuclide and will include chapters on radiolabeling methods using all of the common nuclides employed in radiopharmaceuticals, including four chapters on the ubiquitously used fluorine-18 and a "Best of the Rest" chapter to cover emerging radionuclides. Finally, the third section of the book is dedicated to special topics with important information for radiochemists, including "Bioconjugation Methods," "Click Chemistry in Radiochemistry", and "Radiochemical Instrumentation." This is an ideal educational guide for nuclear medicine physicians, radiologists, and radiopharmaceutical chemists, as well as residents and trainees in all of these areas.

Chemical Analysis of Food: Techniques and Applications Academic Press

This handbook is unique in its comprehensive coverage of the subject and focus on practical applications in diverse fields. It includes methods for sample preparation, the role of certified reference materials, calibration methods and statistical evaluation of the results. Problems concerning inorganic and bioinorganic speciation analysis, as well as special aspects such as trace analysis of noble metals, radionuclides and volatile organic compounds are also discussed. A significant part of the content presents applications of methods and procedures in medicine (metabolomics and therapeutic drug monitoring); pharmacy (the analysis of contaminants in drugs); studies of environmental samples; food samples and forensic analytics – essential examples that will also facilitate problem solving in related areas.

Nuclear and Radiochemistry, 2 Volume Set Wiley-Interscience

A recipient of the PROSE 2017 Honorable Mention in Chemistry & Physics, Radioactivity: Introduction and History, From the Quantum to Quarks, Second Edition provides a greatly expanded overview of radioactivity from natural and artificial sources on earth, radiation of cosmic origins, and an introduction to the atom and its nucleus. The book also includes historical accounts of the lives, works, and major achievements of many famous pioneers and Nobel Laureates from 1895 to the present. These leaders in the field have contributed to our knowledge of the science of the atom, its nucleus, nuclear decay, and subatomic particles that are part of our current knowledge of the structure of matter, including the role of quarks, leptons, and the bosons (force carriers). Users will find a completely revised and greatly expanded text that includes all new material that further describes the significant historical events on the topic dating from the 1950s to the present. Provides a detailed account of nuclear radiation – its origin and properties, the atom, its nucleus, and subatomic particles including quarks, leptons, and force carriers (bosons) Includes fascinating biographies of the pioneers in the field, including captivating anecdotes and insights Presents meticulous accounts of experiments and calculations used by pioneers to confirm their findings

Applications of Nuclear and Radiochemistry Royal Society of Chemistry

Disposal of Department of Energy (DOE) radioactive waste into repositories such as the Waste Isolation Pilot Plant (WIPP) and the Nevada Test Site (NTS) requires characterization to ensure regulatory and transportation requirements are met. Characterization is also used to collect information regarding chemistry of the waste for processing concerns. The range of characterization typically includes radio nuclide activity, RCRA metals and organic compounds, process metals, and risk assessment. Recent addition of an inductively coupled plasma quadrupole mass spectrometer in a radioactive contaminated laboratory at the Oak Ridge National Laboratory (ORNL) has provided cost savings, time savings, reduced personnel exposure to radiation, and in some cases, improved accuracy over the traditional techniques for radionuclides, risk assessment and metals analysis. Application of ICP-MS to ORNL waste tank characterization has also provided the opportunity to estimate never-before-measured radionuclides and metals without increased cost. Data from analyses of ORNL waste tank sludges and supernates indicate the benefit of using this technique over counting techniques and Thermal Ionization Mass Spectrometry (TIMS) for analysis of fission products and U isotopics as well as the ability to estimate certain radionuclides and metals for the first time in these tanks.

Radionuclides in the Environment Elsevier

Applications of Nuclear and Radiochemistry is a collection of articles focusing on contemporary applied research on radioactive isotopes. The monograph is based on the Second Chemical Congress of the North American Continent, held at Las Vegas, Nevada in August 1980. The book contains articles on developments in nuclear chemistry and radiochemistry, emphasizing the topic of radiopharmaceutical chemistry. The text is composed of two parts, wherein the first part is comprised of papers dealing with advances in the production of radionuclides for nuclear medicine, in the synthesis of labeled pharmaceuticals, and in the design and use of specific diagnostic agents. These sections cover research areas on machines used for research, such as compact accelerators, positron emission, and single photon tomographs. Emphasis is given to the radiochemistry and design of radiopharmaceuticals for receptor studies and for determining physiological function and metabolism of the brain, heart, and tumors. The second part examines contemporary advances including the impact of radiochemistry in China pertaining to the fallout from Chinese nuclear tests. This part also contains a section covering a list of uncommon topics. The text is of interest to nuclear scientists, academicians in the field of radiology and radiochemistry, researchers in nuclear medicine, nuclear engineers, and environmental researchers.

Environmental Radiochemical Analysis IV Royal Society of Chemistry

From nuclear dating methods to nucleosynthesis in stars. it's all here. The first practical, comprehensive guide to the science of radiochemistry. Radiochemistry and Nuclear Methods of Analysis is the first thorough and up-to-date look for the nonspecialist at the fundamentals of radiochemistry as well as the full range of advances currently made possible by the applications of radioactivity. Without an emphasis on high-level mathematics or abstruse theoretical physics, the book provides a clear, fundamentals-first look at radioactivity, the principles of radioactive decay, and nuclear reactions, as well as: * Modern radiochemical instrumentation * Nuclear dating methods * Methods for the production of radionuclides * The use of tracers and nuclear methods of analysis * The origin of the chemical elements * The biological effects of radiation The book's user-friendly instructional format, designed for both beginning and advanced students, includes numerous end-of-chapter problems ranging from the simple to complex which familiarize the reader with equations and concepts in the text. References to recent monographs, available in most college and university libraries, provide direction to more specialized literature. Invaluable to both students and professionals in search of a practical grasp of the subject, Radiochemistry and Nuclear Methods of Analysis is a clear introduction to radioactivity and radionuclear chemistry's principles, methods, and applications.

Laboratory Techniques and Methodology Elsevier

Chemical Analysis of Food: Techniques and Applications reviews new technology and challenges in food analysis from multiple perspectives: a review of novel technologies being used in food analysis, an in-depth analysis of several specific approaches, and an examination of the most innovative applications and future trends. This book won a 2012 PROSE Award Honorable Mention in Chemistry and Physics from the Association of American Publishers. The book is structured in two parts: the first describes the role of the latest developments in analytical and bio-analytical techniques and the second reviews the most innovative applications and issues in food analysis. Each chapter is written by experts on the subject and is extensively referenced in order to serve as an effective resource for more detailed information. The techniques discussed range from the non-invasive and non-destructive, such as infrared spectroscopy and ultrasound, to emerging areas such as nanotechnology, biosensors and electronic noses and tongues. Important tools for problem-solving in chemical and biological analysis are discussed in detail. Winner of a PROSE Award 2012, Book: Honorable Mention in Physical Sciences and Mathematics - Chemistry and Physics from the American Association of Publishers Provides researchers with a single source for up-to-date information in food analysis Single go-to reference for emerging techniques and technologies Over 20 renowned international contributors Broad coverage of many important techniques makes this reference useful for a range of food scientists

Environmental Radiochemical Analysis IV de Gruyter

Handbook of Radioactivity Analysis: Radiation Physics and Detectors, Volume One, and Radioanalytical Applications, Volume Two, Fourth Edition, is an authoritative reference on the principles, practical techniques and procedures for the accurate measurement of radioactivity - everything from the very low levels encountered in the environment, to higher levels measured in radioisotope research, clinical laboratories, biological sciences, radionuclide standardization, nuclear medicine, nuclear power, and fuel cycle facilities, and in the implementation of nuclear forensic analysis and nuclear safeguards. It includes sample preparation techniques for all types of matrices found in the environment, including soil, water, air, plant matter and animal tissue, and surface swipes. Users will find a detailed discussion of our current understanding of the atomic nucleus, nuclear stability and decay, nuclear radiation, and the interaction of radiation with matter relating to the best methods for radionuclide detection and measurement. Spans two volumes, Radiation Physics and Detectors and Radioanalytical Applications Includes a much-expanded treatment of calculations required in the measurement of radionuclide decay, energy of decay, nuclear reactions, radiation attenuation, nuclear recoil, cosmic radiation, and synchrotron radiation Includes the latest advances in liquid and solid scintillation analysis, alpha- and gamma spectrometry, mass spectrometric analysis, gas ionization and nuclear track analysis, and neutron detection and measurement Covers high-sample-throughput microplate techniques and multi-detector assay methods

Activation Analysis, Instrumentation Radiation Techniques, and Radio Isotope Techniques, July 1963 to June 1964 Academic Press

Green Solvents for Environmental Remediation provides an in-depth overview of environmental remediation by using eutectic solvents, ionic liquids, biosolvents, and switchable solvents, of ionic-liquids, biosolvents, Gas-expanded solvents Liquid polymers, supercritical fluids, Polymer-based green solvents, Switchable solvents, etc. This book offers all-types of green solvents for the removal of contaminations from the soil, air, and water. It summarizes in-depth literature on the application of various green solvents in the areas such as municipal water, extraction, bioremediation, phytoremediation, soil and sediment remediation, toxic gases removal, and various industrial effluents. A brief introduction, limitations, and advantages to the practical use of green solvents are also discussed. This book is authored by experts in a broad range of fields. It is an invaluable reference guide for the sustainable and environmentally friendly development of synthetic methodologies for environmental, analytical, engineering, and industrial technology. Provides an up-to-date research record on green solvents for environmental protection Includes latest advances in environmental remediation Outlines eco-friendly green solvents for toxic contaminants degradation and purification Covers all-types of green solvent-driven environmental remediation technologies Key references to obtain great results in environmental remediation using green solvents

Nuclear Environmental Chemical Analysis John Wiley & Sons

Environmental Radiochemical Analysis IV is a collection of original papers presented at the Eleventh International Symposium on Environmental Radiochemical Analysis. Representing the work of leading scientists across the globe this new edition provides information on: "new methods of radionuclide analyses "developments and improvements in existing methods "mass spectrometry in radionuclide measurements "results of an intercomparison study "gamma detector performance "emergency radiological foodchain monitoring. The book is essential reading for practising radioanalysts and students who are specialising in radiochemical analysis.

Handbook of Radioactivity Analysis Royal Society of Chemistry

How do plants react to elements in the soil? A vital question, particulary in today's world of increasing environmental contamination... The answer can be found in this book. It has an extraordinarily broad basis, compiling up-to-date information from numerous specialist disciplines. Key articles are devoted to - Soil Chemistry and Bioavailability - Metal-tolerant Plants - Metalloenzymes - Toxic Effects of Metals - Radionuclides Moreover emphasis is placed on environmental aspects, with detailed considerations of plants that hyperaccumulate heavy metals and plants that are indicators for pollution. A discussion of experimental techniques rounds off the book. They include sampling, sample preparation, analytical methods and aspects of quality assurance. All in all a valuable forum for the exchange of current thinking across a broad spectrum of disciplines.

Modern Nuclear Chemistry Elsevier

Radiochemistry or Nuclear Chemistry is the study of radiation from an atomic or molecular perspective, including elemental transformation and reaction effects, as well as physical, health and medical properties. This revised edition of one of the earliest and best known books on the subject has been updated to bring into teaching the latest developments in research and the current hot topics in the field. In order to further enhance the functionality of this text, the authors have added numerous teaching aids that include an interactive website that features testing, examples in MathCAD with variable quantities and options, hotlinks to relevant text sections from the book, and online self-grading texts. As in the previous edition, readers can closely follow the structure of the chapters from the broad introduction through the more in depth descriptions of radiochemistry then nuclear radiation chemistry and finally the guide to nuclear energy (including energy production, fuel cycle, and waste management). New edition of a well-known, respected text in the specialized field of nuclear/radiochemistry Includes an interactive website with testing and evaluation modules based on exercises in the book Suitable for both radiochemistry and nuclear chemistry courses

Radiochemistry and Nuclear Methods of Analysis Butterworth-Heinemann

The third edition of this classic in the field is completely updated and revised with approximately 30% new content so as to include the latest developments. The handbook and ready reference comprehensively covers nuclear and radiochemistry in a well-structured and readily accessible manner, dealing with the theory and fundamentals in the first half, followed by chapters devoted to such specific topics as nuclear energy and reactors, radiotracers, and radionuclides in the life sciences. The result is a valuable resource for both newcomers as well as established scientists in the field.

Related with Chemistry And Analysis Of Radionuclides Laboratory Techniques And Methodology:

• Trig Ratios Practice Worksheet : click here