Analytical Chemistry of the Actinide Elements - Alfred J. Moses
2013-10-22 Analytical Chemistry of the Actinide Elements presents a number of pertinent techniques for the analysis of actinides and provides sufficient information to guide the analyst in modifying procedures to meet special situations. The book begins with an introductory chapter on the discovery of elements 89-103, their oxidation state, and their electronic configuration. Information is provided on the safe handling of radioactive materials (all actinides are radioactive). The use of nuclear techniques in determining trace concentrations of actinides has led to the inclusion of chapters dealing with nuclear instrumentation and nuclear methods. Topics discussed include the preliminary treatment of samples; separations; emission spectroscopy and mass spectrometry; electrochemical, x-ray, and fluorimetric methods; isotopic analysis of uranium and some other actinides; and non-instrumental methods. Thus, the analytical chemist, if he is not already familiar with these techniques, is indoctrinated in a basic amount of nucleonics, to aid him in analyzing unusual materials with unusual techniques.

Analytical Chemistry of the Actinide Elements - Alfred James Moses
1963

The Chemistry of the Actinide and Transactinide Elements (Set Vol.1-6) - L.R. Morss 2010-10-21 The fourth edition of "The Chemistry of the Actinide and Transactinide Elements" comprises all chapters in volumes 1 through 5 of the third edition (published in 2006) plus a new volume 6. To remain consistent with the plan of the first edition, “...to provide a comprehensive and uniform treatment of the chemistry of the actinide [and transactinide] elements for both the nuclear technologist and the inorganic and physical chemist,” and to be consistent with the maturity of the field,
The fourth edition is organized in three parts. The first group of chapters follows the format of the first and second editions with chapters on individual elements or groups of elements that describe and interpret their chemical properties. A chapter on the chemical properties of the transactinide elements follows. The second group, chapters 15-26, summarizes and correlates physical and chemical properties that are in general unique to the actinide elements, because most of these elements contain partially-filled shells of 5f electrons whether present as isolated atoms or ions, as metals, as compounds, or as ions in solution. The third group, chapters 27-39, focuses on specialized topics that encompass contemporary fields related to actinides in the environment, in the human body, and in storage or wastes. Two appendices at the end of volume 5 tabulate important nuclear properties of all actinide and transactinide isotopes. Volume 6 (Chapters 32 through 39) consists of new chapters that focus on actinide species in the environment, actinide waste forms, nuclear fuels, analytical chemistry of plutonium, actinide chalcogenide and hydrothermal synthesis of actinide compounds. The subject and author indices and list of contributors encompass all six volumes.

The Chemistry of the Actinide and Transactinide Elements - Norman Edelstein 2010-10-04 This volume is a continuation of the five volumes of "The Chemistry of the Actinide and Transactinide Elements" (published 2006). It expounds on topics in actinide science that are undergoing rapid scientific developments and that are germane to the safe development of nuclear energy in the 21st century, from nuclear fuels to the environmental science and management of waste. The scope of Volume 6 encompasses: actinides in the geosphere, subsurface interactions of actinides species with microorganisms, chemistry of nuclear fuels, actinide waste forms and radiation effects, analytical chemistry of plutonium, actinide chalcogenide compounds, molecular spectroscopy and reaction of the actinide ions in the gas phase and rare gas matrices, and hydrothermal synthesis of actinide compounds. This volume is written by active practitioners and recognized experts in their specialty areas. Each of the topics represents the current state of knowledge in this fascinating area of science and technology.

Vol.1-6)-L.R. Morss 2016-08-23 The fourth edition of "The Chemistry of the Actinide and Transactinide Elements" comprises all chapters in volumes 1 through 5 of the third edition (published in 2006) plus a new volume 6. To remain consistent with the plan of the first edition, "... to provide a comprehensive and uniform treatment of the chemistry of the actinide (and transactinide) elements for both the nuclear technologist and the inorganic and physical chemist," and to be consistent with the maturity of the field, the fourth edition is organized in three parts. The first group of chapters follows the format of the first and second editions with chapters on individual elements or groups of elements that describe and interpret their chemical properties. A chapter on the chemical properties of the transactinide elements follows. The second group, chapters 15-26, summarizes and correlates physical and chemical properties that are in general unique to the actinide elements, because most of these elements contain partially-filled shells of 5f electrons whether present as isolated atoms or ions, as metals, as compounds, or as ions in solution. The third group, chapters 27-39, focuses on specialized topics that encompass contemporary fields related to actinides in the environment, in the human body, and in storage or wastes. Two appendices at the end of volume 5 tabulate important nuclear properties of all actinide and transactinide isotopes. Volume 6 (Chapters 32 through 39) consists of new chapters that focus on actinide species in the environment, actinide waste forms, nuclear fuels, analytical chemistry of plutonium, actinide chalcogenide and hydrothermal synthesis of actinide compounds. The subject and author indices and list of contributors encompass all six volumes.

Treatise on Analytical Chemistry -I. M. Kolthoff 1961

Capabilities and Challenges in Actinide Analytical Chemistry at Los Alamos National Laboratory- 2011

Actinide Analytical Chemistry Capabilities -Los Alamos National Laboratory- 2016 This report discusses LANL's actinide analytical chemistry capabilities.
Process Analytical Chemistry Applied to Actinide Waste Streams
1994 The Department of Energy is being called upon to clean up its legacy of waste from the nuclear complex generated during the cold war period. Los Alamos National Laboratory is actively involved in waste minimization and waste stream polishing activities associated with this clean up. The Advanced Testing Line for Actinide Separations (ATLAS) at Los Alamos serves as a developmental test bed for integrating flow sheet development of nitric acid waste streams with process analytical chemistry and process control techniques. The wastes require processing in glove boxes because of the radioactive components, thus adding to the difficulties of making analytical measurements. Process analytical chemistry methods provide real-time chemical analysis in support of existing waste stream operations and enhances the development of new waste stream polishing initiatives. The instrumentation and methods being developed on ATLAS are designed to supply near-real time analyses on virtually all of the chemical parameters found in nitric acid processing of actinide waste. These measurements supply information on important processing parameters including actinide oxidation states, free acid concentration, interfering anions and metal impurities.

Analytical Chemistry of the Elements. (Section A: Systematic Analytical Chemistry of the Elements)- 1962

The Chemistry of the Actinides
S. Ahrland 2016-06-07 The Chemistry of the Actinides contains selected chapters from the Comprehensive Inorganic Chemistry to meet the needs of certain specialists in this field. The book describes the 14 elements after actinium in the Periodic Table, known as the actinide elements or the 5f transition series. The book notes the occurrence, separation, chemical properties, chemical structures, and preparation of the metals. In a discussion of analytical chemistry, the radioactive properties of the actinides and the lanthanides are compared. The text then describes the nuclear or radiochemical records and chemical properties of the different members of the actinide series such as thorium, uranium, plutonium, and einsteinium. The book also explains the differences between the 5f shell and the 4f shell. One paper then discusses the groups of alloy compounds, including rare earths and intra-actinides. Another paper examines the general properties of actinide ions as to their electronic structure and oxidation states; the stability and preparation of the different oxidation states; and the applicability of solvent extraction in separating and purifying various substances. The text is suitable for researchers in organic chemistry, nuclear and atomic physicists, scientists, and academicians whose work involves radioactive materials.


Radiation Problems Associated with the Handling of the Actinide Elements-Martin J. Steindler 1962 The hazards connected with the handling of actinide elements are surveyed. Emphasis is placed on Thorium, Uranium, Neptunium, and Plutonium. It is pointed out that the chemical toxicity of the actinides is usually minor when compared with radiochemical toxicity. Inhalation and ingestion are the important routes of entry but direct injection into the blood stream through wounds also requires consideration. Special enclosures, such as glove boxes, function primarily to minimize the risk of inhalation and aid in confinement. The external hazard from actinide elements, primarily due to gamma and fast neutron emission, varies considerably with the element and its source. Irradiated actinides, such as Thorium and Plutonium, usually show an increase in the external hazard from gamma radiation with extent of irradiation.

Treatise on Analytical Chemistry
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Relativistic all-electron approaches to the study of f- element chemistry
Relativistic pseudopotentials and their applications Gaussian basis sets for lanthanide and actinide elements
Applied computational actinide chemistry
This book will serve as a comprehensive reference work for quantum chemists and computational chemists, both those already working in, and those planning to enter the field of quantum chemistry for f-elements. Experimentalists will also find important information concerning the capabilities of modern quantum chemical methods to assist in the interpretation or even to predict the outcome of their experiments.

Soviet Research on the Lanthanide and Actinide Elements 1949-1957

Analytical Chemistry-T. T.. Sugihara 1962

The Chemistry of the Actinide and Transactinide Elements (3rd ed., Volumes 1-5)-L.R. Morss 2007-12-31
The Chemistry of the Actinide and Transactinide Elements is a contemporary and definitive compilation of chemical properties of all of the actinide elements, especially of the technologically important elements uranium and plutonium, as well as the transactinide elements. In addition to the comprehensive treatment of the chemical properties of each element, ion, and compound from atomic number 89 (actinium) through to 109 (meitnerium), this multi-volume work has specialized and definitive chapters on electronic theory, optical and laser fluorescence spectroscopy, X-ray absorption spectroscopy, organoactinide chemistry, thermodynamics, magnetic properties, the metals, coordination chemistry, separations, and trace analysis. Several chapters deal with environmental science, safe handling, and biological interactions of the actinide elements. The Editors invited teams of authors, who are active practitioners and recognized experts in their specialty, to write each chapter and have endeavoured to provide a balanced and insightful treatment of these fascinating elements at the frontier of the periodic table. Because the field has expanded with new spectroscopic techniques and environmental focus, the work encompasses five volumes, each of which groups chapters on related topics. All chapters represent the current state of research in the chemistry of these elements and related fields.

Modern Analytical Chemistry-William F. Pickering 1971
For a one or two semester undergraduate course in modern methods of chemical analysis at junior colleges, four-year colleges, or universities.

Experimental and Theoretical Approaches to Actinide Chemistry-John K. Gibson 2018-01-08
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.
The maintenance of strong scientific expertise is critical to the U.S. nuclear attribution community. It is particularly important to train students in actinide chemistry and physics. Neutron-cross-section data are vital components to strategies for detecting explosives and fissile materials, and these measurements require expertise in chemical separations, actinide target preparation, nuclear spectroscopy, and analytical chemistry. At the University of California, Berkeley and the Lawrence Berkeley National Laboratory we have trained students in actinide chemistry for many years. LBNL is a leader in nuclear data and has published the Table of Isotopes for over 60 years. Recently, LBNL led an international collaboration to measure thermal-neutron capture radiative cross sections and prepared the Evaluated Gamma-ray Activation File (EGAF) in collaboration with the IAEA. This file of 35,000 prompt and delayed gamma-ray cross-sections for elements from Z=1-92 is essential for the neutron interrogation of nuclear materials. LBNL has also developed new, high flux neutron generators and recently opened a 1010 n/s D+D neutron generatorexperimental facility.

International Series of Monographs in Analytical Chemistry - 1972

The Analytical Chemistry of Cobalt - Roland Stansfield Young 1966

The Journal of Analytical Chemistry of the USSR - 1981

The Chemistry of the Actinide Elements - G.T. Seaborg 2012-12-06 The first edition of this work appeared almost thirty years ago, when, as we can see in retrospect, the study of the actinide elements was in its first bloom. Although the broad features of the chemistry of the actinide elements were by then quite well delineated, the treatment of the subject in the first edition was of necessity largely descriptive in nature. A detailed understanding of the chemical consequences of the characteristic presence of 5f electrons in most of the members of the actinide series was still for the future, and many of the systematic features of the actinide elements were only dimly apprehended. In the past thirty years all this has changed. The application of new spectroscopic techniques, which came into general use during this period, and new theoretical insights, which came from a better understanding of chemical bonding, inorganic chemistry, and solid state phenomena, were among the important factors that led to a great expansion and maturation in actinide element research and a large number of new and important findings. The first edition consisted of a serial description of the individual actinide elements, with a single chapter devoted to the six heaviest elements (lawrencium, the heaviest actinide, was yet to be discovered). Less than 15% of the text was devoted to a consideration of the systematics of the actinide elements.

Soviet Research on the Lanthanide and Actinide Elements - 1958

Nuclear Forensics at Los Alamos National Laboratory - 2012 The overview of this presentation is: (1) Introduction to nonproliferation efforts; (2) Scope of activities at Los Alamos National Laboratory; (3) Facilities for radioanalytical work at LANL; (4) Radiochemical characterization capabilities; and (5) Bulk chemical and materials analysis capabilities. Some conclusions are: (1) Analytical chemistry measurements on plutonium and uranium matrices are critical to numerous defense and non-defense programs including safeguards accountancy verification measurements; (2) Los Alamos National Laboratory operates capable actinide analytical chemistry and material science laboratories suitable for nuclear material forensic characterization; (3) Actinide analytical chemistry uses numerous means to validate and independently verify that measurement data quality objectives are met; and (4) Numerous LANL nuclear facilities support the nuclear material handling, preparation, and analysis capabilities necessary to evaluate samples containing nearly any mass of an actinide (attogram to kilogram levels).
Transplutonium Elements-Charles E. Stuber 1977

Actinides in Perspective-Norman M. Edelstein 2013-09-11 Actinides in Perspective presents in proceedings of the Actinides-1981 Conference held in Pacific Grove, California, USA on September 10-15, 1981. The book contains papers on the different aspect of the physics and chemistry of the actinides. The text includes papers on the history of the discovery of the transplutonium elements; the photoemission techniques; and the neutron scattering studies of the actinides. The new elements in the transfermium region; the isotope identification in the transfermium region by ?-? correlation after in-flight-separation; and the fission properties of the actinides are also considered. The book further tackles papers on the status of superheavy element research; the single crystal preparation of actinides and actinide compounds; and the preparation of transplutonium metals and compounds, protactinium metal and compounds, and actinide metals. The text also includes papers on the complex oxide systems of the actinides; thermodynamic properties of the actinides; and the chemical and physicochemical properties of actinide organometallic compounds.

Soviet Research on the Lanthanide and Actinide Elements- 1958