The Chemistry Of Gold

#gold chemistry #chemical properties of gold #gold compounds #aurum reactions #noble metal characteristics

Explore the fascinating world of gold chemistry, delving into the unique chemical properties that make this noble metal so valuable. This includes its remarkable resistance to corrosion, various oxidation states, and the diverse gold compounds it forms through intriguing reactions. Understand why gold's chemical behavior is crucial in applications from electronics to medicine.

The Chemistry of Gold Extraction

Extensively revised and updated, this edition provides the broad base of knowledge required by all working in the gold extraction and gold processing industries. It bridges the gap between research and industry by emphasizing practical applications of chemical principles and techniques.

The Chemistry of Gold

Filling a gap in our systematic knowledge of gold, this monograph covers the fundamental aspects, while also considering new applications of gold compounds in catalysis, as nanoparticles, and their potential application as luminescent compounds. Written by an eminent team of authors from academia, the book analyzes the current status of gold chemistry, its special characteristics, oxidation states and main type of complexes, before going on to look at the synthesis of supramolecular aggregates due to the formation of gold-gold, gold-metal interactions or other secondary bonds. Final sections deal with LEDs, solvoluminescent and electroluminescent materials, liquid crystals and catalysis. While of interest to advanced chemistry students, this book is also useful for researchers interested in the chemistry of gold and its applications, as well as those involved in metal-metal interactions, heteronuclear chemistry or in the optical properties of coordination compounds.

The Chemistry of Gold

The Chemistry of Gold Extraction provides the broad base of knowledge now required by all those working in the gold extraction and gold processing industries. The book bridges the gap between research and industry by emphasizing the practical applications of chemical principles and techniques. The technical reference includes in-depth discussions on historical developments; ore deposits and process mineralogy; process selection; principles of gold hydrometallurgy; oxidative pretreatment; leaching; solution purification and concentration; recovery; surface chemical methods; refining; effluent treatment; and industrial applications. This book is a valuable asset for all professionals involved in the precious metals industries. It will be of particular interest and use to engineers and scientists (including extractive metallurgists, mineral/metallurgical engineers, electro chemists, chemical engineers, mineral

technologists, mining engineers, and material scientists), plant operators and managers, academics, educators, and students working in gold extraction in either production, research, or consulting capacities."

The Chemistry of Gold

Written by world-class authors, this most recent major book on the topic highlights new and current trends as well as future directions. It is comprehensive in its scope, covering all aspects of gold chemistry -- from homogeneous to heterogeneous catalysis, from supramolecular assemblies to sensors and medicinal applications. The result is an invaluable work for both organic and inorganic chemists working in universities and industry, as well as material scientists.

Modern Supramolecular Gold Chemistry

The Chemistry of Copper, Silver and Gold deals with the chemistry of copper, silver, and gold and covers topics ranging from the occurrence and metallurgy of copper to copper compounds and compounds containing copper-metal bonds, compounds of silver, and gold alloys. Hydrides and halides, cyanides and oxides, hydroxides and oxyacids, and thiocyanates and selenocyanates are also discussed. This volume is comprised of three chapters and opens with a brief history of copper, along with its occurrence and metallurgy, analysis, and compounds. The next chapter is devoted to silver and its compounds, while the last chapter describes gold, its isotopes and alloys, chemistry, and gold hydrides and halides, cyanides and oxides, hydroxides and oxyacids. Gold sulfides, selenides and tellurides, and nitrates are also considered, along with nitrides, azides, phosphides, and arsenides; and thiosulfates, selenates, selenites, thiocyanates, and selenocyanates. The final sections look at gold complexes and the organometallic and analytical chemistry of gold. This book will be a valuable source of information for inorganic chemists.

The Chemistry of Gold

Some 20 years ago, I was privileged to share in writing a book on the descriptive chemistry of the 4d, 5d, 4f and 5f metals that included these eight elements within its compass (S.A. Cotton and F.A. Hart, The Heavy Transition Elements, Macmillan, 1975). This volume shares the same aim of covering the descriptive chemistry of silver, gold and the six platinum metals in some detail at a level suitable for advanced undergraduate and postgraduate study. It does not attempt to be a comprehensive treatise on the chemistry of these metals. It attempts to fill a slot between the general text and the in-depth review or monograph. The organometallic chemistry is confined to a-bonded com pounds in normal oxidation states; compounds with IT-bonding ligands are generally excluded. Their inclusion would have increased the length of the book considerably and, moreover, their recent chemistry has been extensively and expertly reviewed in the new Comprehensive Organometallic Chemistry, II, eds G. Wilkinson, F.G.A. Stone and E.W. Abel, Pergamon, Oxford, 1995.

The Chemistry of Gold(I) Compounds

For thousands of years the human race has been fascinated by gold. Initially gold was used extensively in coinage and jewellery but today the applications for gold are vast, ranging from metallurgy to physics, chemistry, biochemistry and medicine. Gold: Progress in Chemistry, Biochemistry and Technology is an extremely comprehensive work covering the history of gold, from the work of the early prospectors to the use of gold in decorative effects and dentistry. Further chapters present a complete overview of the current knowledge of gold technology from mineral deposits to technical applications and emphasise the developments in coordination, organometallic and cluster chemistry of gold and its applications in synthesis. An international group of contributors have reviewed the modern advances in the science of gold to produce the first comprehensive monograph reflecting the state of the art, the impact and applications of recent developments in gold research.

The Chemistry of Gold Extraction

The 100th volume in this highly successful and renowned Patai andRappoport series 'The Chemistry of Functional Groups' is fittinglydevoted to the precious metals, gold and silver. Gold is a soft metal occurring naturally as particles in quartz oras nuggets. Gold was initially used extensively in coinage andjewellery and has recently found applications in biochemistry,medicine and material science. Gold readily forms organometalliccompounds (R-Au-L with L = sulphide, phosphine and isocyanide),oxides

and halides. Silver is a ductile metal which was used incoinage and for mirrors. It is now used for jewellery, electricalconductors, dental and surgical components. Silver forms stablesilver halides for use in Photography and i.r. spectroscopy as asupport material. Other silver compounds are also used incatalysis. This volume contains 16 chapters dealing with calculations onorganogold compounds, physical and spectroscopic properties (NMR,ESR, PES, Mossbauer spectra), thermochemical and analyticalproperties, the synthesis and uses of the title compounds and theirreactions such as re-arrangements, pyrolysis and photochemicalreactions. The medicinal use of organogold compounds and theincreased use of gold-thiol monolayers are also summarized. Each of the chapters has been prepared by leading scientists inthis field making this volume invaluable for researchers inacademia and industry working with gold and silver, inbiochemistry, pharmaceutical and materials chemistry. Organic compunds containg Nitrogen are of outstanding importnce inbiochemistry and in environmental sys-tems. This volume gives asound introduction into physical chemistry of amino, nitriso, nitroand related functional groups. This volume is now available in electronic format from BooksOnline.

Geological Aspects of the Chemistry of Gold

Excerpt from A Study of the Chemistry of Gold at High Temperatures and Pressures: A Thesis Submit-ted to the Graduate School of the University of Wisconsin in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy, 1917 Above the cap was placed a plug of asbestos about 3 inches deep so that the bomb when in place, would be in about the center of the furnace, and so be more evenly heated. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at www.forgottenbooks.com This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works.

The Chemistry of Gold

Gold Nanoparticles for Physics, Chemistry and Biology offers an overview of recent research into gold nanoparticles, covering their discovery, usage and contemporary practical applications. This Second Edition begins with a history of over 2000 years of the use of gold nanoparticles, with a review of the specific properties which make gold unique. Updated chapters include gold nanoparticle preparation methods, their plasmon resonance and thermo-optical properties, their catalytic properties and their future technological applications. New chapters have been included, and reveal the growing impact of plasmonics in research, with an introduction to quantum plasmonics, plasmon assisted catalysis and electro-photon conversion. The growing field of nanoparticles for health is also addressed with a study of gold nanoparticles as radiosensibiliser for radiotherapy, and of gold nanoparticle functionalisation. This new edition also considers the relevance of bimetallic nanoparticles for specific applications. World-class scientists provide the most up-to-date findings for an introduction to gold nanoparticles within the related areas of chemistry, biology, material science, optics and physics. It is perfectly suited to advanced level students and researchers looking to enhance their knowledge in the study of gold nanoparticles.

A Study of the Chemistry of Gold at High Temperatures and Pressures

Gold is used in a wide range of industrial and medical applications and accounts for over 10 percent of the annual demand for metal, worth billions of dollars annually. While much has been written about the mystique and trade of gold, very little has been written about the science and technology in which it is involved. Edited by two respected authorities from the World Gold Council, Gold: Science and Applications provides researchers with the definitive handbook on the current science and applications of this valuable and beautiful precious metal. Packed with contributions from the world’s leading experts, this volume brings in authoritative information from a number of sciences, including chemistry, physics, nanotechnology and metallurgy. The book presents a myriad of applications, ranging from electronics to medicine and optics. A comprehensive overview chapter provides historical perspectives of the element and each chapter describes potential further uses, including applications currently being developed. Gold Applications in Use Today Include: Medical Dental Electronics Engineering Industrial Pollution Control Photography Catalysts Nanotechnology

Gold Chemistry

This book presents an overview of cancer and the genesis, and development of different treatment strategies and modalities against cancer. The emergence of gold and its complexes as promising anticancer chemotherapeutic agents have the potential to substitute or replace the platinum based chemotherapeutic agents. Gold complexes have demonstrated considerable anti-proliferative properties, chiefly attributed to their anti-mitochondrial effects, they make gold complexes excellent candidates as anti-cancer agents compared to their platinum-based counterparts. This book provides a critical review of recent advances made in the development of gold complexes as anti-cancer agents. In this context, it examines a number of different ligand architectures, provides comprehensive information on gold complexes' mechanism of action and toxicity issues and, in closing, outlines future research directions.

The Chemistry of Copper, Silver and Gold

High purity, thin metal coatings have a variety of important commercial applications, for example, in the microelectronics industry, as catalysts, as protective and decorative coatings as well as in gas-diffusion barriers. This book offers detailed, up- to-date coverage of the chemistry behind the vapor deposition of different metals from organometallic precursors. In nine chapters, the CVD of metals including aluminum, tungsten, gold, silver, platinum, palladium, nickel, as well as copper from copper(I) and copper(II) compounds is covered. The synthesis and properties of the precursors, the growth process, morphology, quality and adhesion of the resulting films as well as laser- assisted, ion- assisted and plasma-assisted methods are discussed. Present applications and prospects for future developments are summarized. With ca. 1000 references and a glossary, this book is a unique source of in-depth information. It is indispensable for chemists, physicists, engineers and materials scientists working with metal- coating processes and technologies. From Reviews: 'I highly recommend this book to anyone interested in learning more about the chemistry of metal CVD.' J. Am Chem. Soc.

Chemistry of Precious Metals

Volume 18, entitled Metallo-Drugs: Development and Action of Anticancer Agents of the series Metal Ions in Life Sciences centers on biological, medicinal inorganic chemistry. The serendipitous discovery of the antitumor activity of cis-diamminodichloroplatinum(II) (cisplatin) by Barnett Rosenberg in the 1960s is a landmark in metallodrug-based chemotherapy. The success of cisplatin in the clinic, followed by oxaliplatin and carboplatin, along with their drawbacks relating mainly to resistance development and severe toxicity, initiated research on polynuclear platinum complexes and on Pt(IV) complexes as prodrugs. Furthermore, the indicated shortcomings led to the exploration of other transition and main group metal ions, among them Ru(II/III), Au(I/III), Ti(IV), V(IV/V), and Ga(III) including also the essential metal ions Fe(II/III), Cu(I/II), and Zn(II). Ionic as well as covalent and non-covalent interactions between structurally very different complexes and biomolecules like nucleic acids, proteins, and carbohydrates are studied and discussed with regard to their possible anticancer actions. Hence, MILS-18 summarizes the research at the forefront of medicinal inorganic chemistry, including studies on the next-generation, tailor-made anticancer drugs. All this and more is treated in an authoritative and timely manner in the 17 stimulating chapters of this book, written by 39 internationally recognized experts from 10 nations (from the US via Europe to China and Australia). The impact of this vibrant research area is manifested by more than 2700 references, nearly 150 illustrations (more than half in color) and several comprehensive tables. Metallo-Drugs: Development and Action of Anticancer Agents is an essential resource for scientists working in the wide range from enzymology, material sciences, analytical, organic, and inorganic biochemistry all the way through to medicine including the clinic ... not forgetting that it also provides excellent information for teaching.

Gold

Research on designing new catalytic systems has been one of the most important fields in modern organic chemistry. One reason for this is the predominant contribution of catalysis to the concepts of atom economy and green chemistry in the 21st century. Gold, considered catalytically inactive for a long time, is now a fascinating partner of modern chemistry, as scientists such as Bond, Teles, Haruta, Hutchings, Ito and Hayashi opened new perspectives for the whole synthetic chemist community. This book presents the major advances in homogeneous catalysis, emphasizing the methodologies that create carbon–carbon and carbon–heteroatom bonds, the applications that create diversity and synthesize natural products, and the recent advances and challenges in asymmetric catalysis and

computational research. It provides readers with in-depth information about homogeneous gold-catalyzed reactions and presents several explanations for the scientific design of a catalyst. Readers will be able to understand the entire gold area and find solutions to problems in catalysis. Gold Catalysis — An Homogeneous Approach is part of the Catalytic Science Series and features prominent authors who are experts in their respective fields. Contents:From Gold in Nature to Gold Catalysts (Søren Kramer and Fabien Gagosz)Homogeneous Gold-Catalyzed Oxidation and Reduction Reactions (Liming Zhang)Gold-Catalyzed Addition of Carbon Nucleophiles to C–C Multiple Bonds, Carbonyls, and other Electrophiles (Bryon L Simmons and Hong C Shen)Gold-Catalyzed Addition of Heteroatom Nucleophile to C–C Multiple Bond (Naoki Asao, Naoya Hatakeyama and Yoshinori Yamamoto)Gold-Catalyzed Synthesis of Heterocycles (Antonio Arcadi)Gold-Catalyzed Multi-Component Reactions (Rachid Skouta and Chao-Jun Li)Gold Catalysis on Tandem and Cascade Reactions (Rai-Shung Liu)Cycloisomerization Reactions of 1, N-Enynes (Núria Huguet and Antonio M Echavarren)Gold-Catalyzed Reactions of Propargylic Esters (Louis Fensterbank, Jean-Philippe Goddard, Max Malacria and Antoine Simonneau)Gold-Catalyzed Cross-Coupling Reactions (Suzanne A Blum)Gold-Catalyzed Reactions: A Computational Approach (Elena Soriano and José Marco-Contelles)Recent Developments in Asymmetric Catalysis (Patrick Y Toullec, Alexandre Pradal and Véronique Michelet)Gold Catalysis in Natural Product Synthesis (Michael R Gesinski and F Dean Toste) Readership: Graduate students and researchers in organic chemistry. Key Features:First book on homogeneous gold catalysisProminent authorsFrom catalysts design to target-oriented applicationsA fascinating partner for modern chemistryKeywords:Gold;Catalysis;Heterocycles;Tandem;Cascade ReactionsReviews: “Gold Catalysis gives an excellent overview of a rapidly growing field. All of the thirteen chapters are written by the best practitioners. This book is certainly a “must” for laboratories working with coinage metals, but also for any organometallic group.” Guy Bertrand Distinguished Professor, University of California, San Diego Director of the UCSD/CNRS Joint Research Chemistry Laboratory (UMI 3555)

Studies on the Chemistry of Gold Attached to Solid Supports and in Mixed-metal Complexes Containing a PNP Ligand

How did the elements get their names? The origins of californium may be obvious, but what about oxygen? Investigating their origins takes Peter Wothers deep into history. Drawing on a wide variety of original sources, he brings to light the astonishing, the unusual, and the downright weird origins behind the element names we take for granted.

A Practical Treatise on the Chemistry of Gold, Silver, Quicksilver and Lead

Some 20 years ago, I was privileged to share in writing a book on the descriptive chemistry of the 4d, 5d, 4f and 5f metals that included these eight elements within its compass (S.A. Cotton and F.A. Hart, The Heavy Transition Elements, Macmillan, 1975). This volume shares the same aim of covering the descriptive chemistry of silver, gold and the six platinum metals in some detail at a level suitable for advanced undergraduate and postgraduate study. It does not attempt to be a comprehensive treatise on the chemistry of these metals. It attempts to fill a slot between the general text and the in-depth review or monograph. The organometallic chemistry is confined to a-bonded com pounds in normal oxidation states; compounds with IT-bonding ligands are generally excluded. Their inclusion would have increased the length of the book considerably and, moreover, their recent chemistry has been extensively and expertly reviewed in the new Comprehensive Organometallic Chemistry, II, eds G. Wilkinson, F.G.A. Stone and E.W. Abel, Pergamon, Oxford, 1995.

The Chemistry of Gold Cluster Compounds

The first book in the PATAI Series was published in 1964 and the Series will celebrate its 50th Anniversary in 2014. This "Golden Jubilee" is accompanied by the publication of the first volume on the chemistry of organogold. In the history of the PATAI Series there was, so far, no volume dedicated to gold alone. In 1999 we published a volume on The Chemistry of Gold and Silver Compounds. Since then a lot of new chemistry using gold has been developed and it is timely to focus a volume on methods and applications of organogold compounds in organic synthesis, reflecting the enormous progress which has been made in the use of gold compounds as reagents and catalysts. A second area of great importance covered in the book is the use of gold surfaces in the synthesis of peptides, proteins and other natural products. A whole range of applications in the area of biochemistry has resulted from these developments. A third area of interest is the synthesis and engineering of nanostructures, where organogold chemistry has opened the door for a wide range of methods and applications in the field

of nanoscience and materials science. As with all new volumes, the chapters are first published online in Patai's Chemistry of Functional Groups. Once a volume is completed online, it is then published in print format. The printed book offers the traditional quality of the Patai Book Series, complete with an extensive index.

The Chemistry of Gold Cluster Compounds

Pergamon Texts in Inorganic Chemistry, Volume 14: The Chemistry of Germanium, Tin, and Lead focuses on the properties, characteristics, transformations, and reactions of lead, germanium, and tin. The book focuses on germanium and compounds of Ge(I) and Ge(II). Discussions focus on germanium(II) compounds of phosphorus and arsenic, germanium(II) imide and nitride, monohalides, analytical determination, biological activity, chemical behavior of germanium, and production and industrial use of germanium. The text then elaborates on organogermanium compounds, complexes of germanium(IV), and tin. Topics include nuclear magnetic resonance, chemical properties of tin metal, isotopes of tin, occurrence and distribution of tin, and fluorogermanates and chlorogermanates. The manuscript takes a look at nuclear magnetic resonance, extraction, industrial and commercial utilization, toxicity, and chemical properties of metallic lead. The publication is a vital source of data for researchers interested in the chemistry of lead, germanium, and tin.

The Chemistry of Organic Derivatives of Gold and Silver

This book is about supramolecular gold chemistry. This book provides a unique international forum aimed at covering a broad description of results involving the supramolecular chemistry of gold with a special focus on the gold–sulfur interface leading to hybrid materials ranging from gold–thiolate complexes to thiolate-protected gold nanoclusters and gold–thiolate supramolecular assemblies or nanoparticles. The role of thiolates on the structure and optical features of gold nanohybrid systems (ranging from plasmonic gold nanoparticles and fluorescent gold nanoclusters to self-assembled Au-containing thiolated coordination polymers) is highlighted in the 12 papers presented in this book.

A Study of the Chemistry of Gold at High Temperatures and Pressures

Gold Nanoparticles For Physics, Chemistry And Biology (Second Edition)