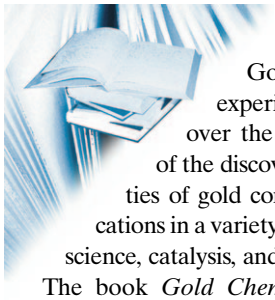


Gold Chemistry

Gold chemistry has been experiencing a renaissance over the last thirty years because of the discovery of the unique properties of gold compounds and their applications in a variety of fields such as materials science, catalysis, and the life sciences.

The book *Gold Chemistry*, edited by Fabian Mohr, is an interesting collection of chapters divided in two main parts: chemistry of gold and current and future applications of gold derivatives. Mohr has assembled a body of very good scientists from all over the world, not just from those countries considered "historical" gold-chemistry schools in Europe (mainly Germany and Spain) and the United States.

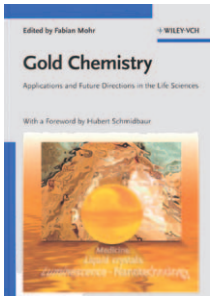
The first four chapters dealing with the chemistry of gold focus on the chemistry and applications of gold(I) and gold(III) with less usual ligands, pentafluorophenylgold complexes, and theoretical aspects of gold chemistry. Especially relevant are the first two chapters by J. P. Fackler, Jr., and M. A. Cinellu which do a fine job in highlighting the advances in the chemistry of gold(I) with nitrogen ligands and the chemistry of gold(III) compounds with nitrogen and more elusive oxygen ligands, respectively. Nitrogen ligands have led to gold(I) derivatives that show unusual structural arrangements, interesting supramolecular chemistry, and photophysical properties are worth further exploration. Gold(III) complexes with chelating or pincer ligands containing at least one nitrogen donor atom have allowed the preparation of oxo and hydroxo derivatives as well as the stabilization of gold(III) centers in physiological media. Thus, these compounds are very relevant in oxidation reactions and in biological (and medicinal) chemistry. Pentaflurophenylgold complexes are reviewed by M. Laguna in a detailed but unnecessarily long chapter which covers all recent and past advances in the field. In chapter 4, P. Schwerdtfeger and M. Lein offer a thorough yet succinct review on the theoretical chemistry of gold, gold complexes, clusters, surfaces, and the solid state. This chapter, with very useful references for previous reviews on the topic, highlights the most recent advances in theoretical and computational methods for studying atomic gold, inorganic and organometallic compounds, clusters, and infinite systems. While a specific chapter on gold–carbene compounds would have been an excellent addition to the book, because of their increasing relevance in homogeneous catalysis and medicinal applications, some chapters mention this type of compounds, including references.

The second part of the book focuses on the applications of gold complexes excluding catalysis. In chapter 5 the photophysical properties and luminiscence of gold compounds is excellently covered and discussed by C.-M. Che. E. R. T. Tiekink and M. W. Whitehouse offer a good highlight on the applications of gold compounds in medicine (potential antiarthitric, antitumor, and anti-HIV activities) as well as the biochemistry (reactions with proteins and mitochondria) of, mainly, gold(I) compounds. This chapter encourages the reader to revise some of the published data and think about the role of gold compounds as precursors and "pro-drugs" instead of drugs. It also recommends study of the generation of "metabolites" and the various transformations of gold compounds in vivo, to design more efficient drugs.

In chapter 7, M. Cortie reviews the current state of the nanoscience of gold and gold surfaces. This chapter makes the reader familiar with the physical and chemical properties (e.g. plasmon resonance effect) displayed by small gold structures that can be very different from those of the bulk phase. These unique properties are paving the way to novel and diverse applications in materials science (self-assembled monolayers and other composite structures), nanotechnology, and medicine (imaging and new therapeutics). The book comes to an adequate close with a chapter by S. Coco and P. Espinet. This last chapter is an easy-to-follow and well-written review on liquid crystals based on gold compounds.

This book appears in a timely manner to complement nicely other books published very recently on heterogeneous (edited by Bond, Louise, and Thompson) and homogeneous (edited by Hashmi and Toste) catalysis by gold and supramolecular chemistry of gold (edited by A. Laguna). While these books focus on special areas, Mohr's is a more general book on recent developments in gold coordination and organometallic chemistry, and applications and future directions in the life sciences. The reader is going to find with ease updated references for previous reviews and articles, while gaining understanding of the theoretical chemistry and nanoscience of gold and gold complexes, photophysical properties, behavior as liquid crystals, and relevant current and potential applications (with a special focus on biology) of a variety of gold compounds, small structures, and surfaces.

This book is highly recommended to researchers and students interested not only in gold chemistry and technology but in organometallic and coordination chemistry as well as materials science in general. It will be an excellent choice for academic and industrial libraries, and a good inspiration for graduate students and researchers in the early stages of their professional careers as well as those wanting to expand the boundaries of their research topics.



Gold Chemistry
Applications and Future Directions in the Life Sciences. Edited by Fabian Mohr. Wiley-VCH, Weinheim 2009. 408 pp., hardcover € 149.00.—ISBN 978-3527320868

As quoted by Schwerdtfeger and Lein, "*Aurum scientiaque potestas sunt*" or "Gold and knowledge are power." Don't miss this powerful and enjoyable book!

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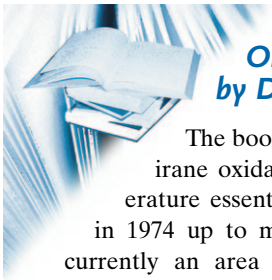
DOI: 10.1002/anie.200904805



Oxidation of Organic Compounds by Dioxiranes

The book is concerned with dioxirane oxidations and covers the literature essentially from the beginning in 1974 up to mid-2008. Dioxiranes are currently an area of much research. The literature on dioxiranes is well over 1000 publications, and the book reaffirms their usefulness in synthetic organic chemistry. Dioxiranes are reactive, yet mild and selective oxidants. Organic compounds can be oxidized by two routes, either stoichiometrically by isolated dioxiranes or catalytically by dioxiranes prepared in situ from ketone precursors. The in situ preparation, however, requires that substrates and products are hydrolytically stable.

The first chapter of the book describes dioxirane epoxidations of electron-rich, electron-poor, and unfunctionalized alkenes. A table showing functional group tolerance to epoxide-forming reactions was also included which is quite useful. The second chapter describes dioxirane oxidations of allenes, alkynes, arenes, heteroatom substrates, alkanes, silanes, and organometallic compounds. Here, dioxiranes readily oxidize compounds with π-bonds, heteroatom compounds with lone-pair electrons, and certain transition-metal compounds. In some cases, dioxiranes can insert an oxygen atom into C–H and Si–H σ-bonds.

Various facets of the dioxirane theme are weighted well. Comparisons of dioxirane oxidations were made with other oxidation methods. The book has uses for different types of readers. There are sections of experimental conditions and procedures, encouraging researchers (even first timers) to try these reactions. For many readers, half the fun will be scanning the tabular surveys of dioxirane reactions at the end of the chapters. Meticulous care was taken to produce these tabular surveys.

Synthetically, dioxiranes are now established and renowned for their oxidations of organic compounds. Historically, they show strained structures with unstable O–O bonds just as was first envisioned for them in the Baeyer–Villiger reaction 110 years ago. I anticipate the book will be highly valued by organic chemists for years to come.

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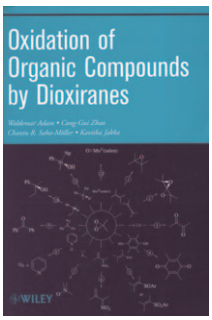

Oxidation of Organic Compounds by Dioxiranes
By Waldemar Adam, Cong-Gui Zhao, Chantu R. Saha-Möller and Kavitha Jakka. John Wiley & Sons, Hoboken 2009. 670 pp., softcover € 84.90.—ISBN 978-0470454077