BOOK REVIEW

Gold Chemistry: Applications and Future Directions in the Life Sciences

Fabian Mohr (editor), 424 pages, ISBN 978-3-527-32086-8, Wiley-VCH, Weinheim, Germany, $215.00, hardcover.

Reviewed by Tapas Kar, Utah State University, Department of Chemistry and Biochemistry, Logan, UT 84322-0300, USA, tapas.kar@usu.edu.

Gold was used as early as in the late Stone Age for jewelry, and later on as a plating material due to its unique corrosion resistivity, malleability, and ductility. Gold has also been used worldwide for medicinal purpose for thousands of years. Fundamental research during the last few centuries has revealed the unique properties of gold leading to wider application in a variety of fields. Several monographs, books and review articles have already been published, and this book is a collection of articles covering the recent developments in gold chemistry. Several properties of gold change significantly at the nanoscale, thereby opening several diverse windows for researchers to explore, and this book offers a valuable source of information in selected areas.

This edited book consists of eight review articles on specific topics with the central theme of gold chemistry and applications of gold compounds in life sciences. The articles, authored by leading scientists well known on the subject matter, cover the literature up to the end of 2007.

The first two chapters review gold (I) and gold (III) complexes with nitrogen and oxygen ligands, respectively. Such complexes are uncommon and recent synthetic developments are described briefly. Both chapters depict plenty of structures and geometric features including some theoretical results. Although applications of such complexes are discussed when appropriate throughout different sections, it would have been nice to have a section dedicated to application areas. Chapter 3 thoroughly describes several pentafluorophenyl gold derivatives, that include neutral, ionic and heteronuclear complexes with various other heavy metals and ligands containing elements of group V and VI. The fourth chapter by Peter Schwerdtfeger and Matthias Lein is a review of theoretical and computations works on gold. This chapter starts with “gold maximum of relativistic effects” followed by theoretical predictions of the properties and the structures of atomic to molecular gold, gold clusters, gold surfaces and the solid state of gold. Comparison of different theoretical methods is provided and different properties of gold are compared with other elements in the same Group. This chapter is certainly an excellent source of theoretical references (about 500) published so far on several aspects of gold chemistry.

The last four chapters exclusively describe current applications of gold in different areas and some hints of future research directions. Since applications of gold compounds to life sciences are in an early stage, these chapters are brief but cover several key issues. Chapter 5 provides an overview of spectroscopic investigations into the photophysics of luminescent mono- and polynuclear gold (I) and gold (III) complexes. Several possible applications with fundamental aspects of gold compounds in medicine are discussed in Chapter 6. The next chapter, by

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Cortie and McDonagh, describes different forms and shapes of gold clusters at the beginning, followed by assemblages of gold nanoparticles and surface chemistry, where gold surfaces provide a convenient platform to assemble other structures of diverse organic molecules. A few lines are devoted at the end of the chapter to applications in life sciences as well as in materials sciences. The last chapter summarizes liquid crystals based on gold compounds. After a brief description of general concepts of liquid crystals, the authors summarize reported results on several possible gold compounds for liquid-crystal studies.

The title of the book is somewhat misleading as none of these chapters tells us about applications of gold compounds in life sciences and future research directions in significant detail. Some chapters present uses of gold in other areas too. Comparison of other materials currently used in relevant application areas would have been beneficial in connection with gold complexes and clusters. Overall, this book is a fine source of literature published in this area.