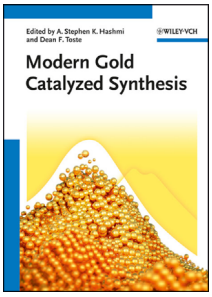

Modern Gold Catalyzed Synthesis
Edited by A. Stephen K. Hashmi and F. Dean Toste. Wiley-VCH, Weinheim, 2012. 402 pp., hardcover, € 139.00.—ISBN 978-3527319527

Modern Gold Catalyzed Synthesis

The aim of this book is to give an overview of the most important aspects of gold-catalyzed synthesis. Considering that this field is moving rapidly, the publication of the book is timely. Although it is focused on modern aspects, the literature coverage extends from the first steps of this chemistry in the 1980s up to 2011. The editors have grouped the chapters under 16 subject areas, which cover the essential topics. Many well-known experts on gold catalysis have contributed to this book.

Since many of the substrates involved in gold-catalyzed reactions are alkynes or alkenes, two informative chapters focus on structural organometallic chemistry and theoretical studies related to gold(I) and gold(III) alkyne and alkene complexes. This part of the book is useful to understand the unique catalytic activity of gold.

The largest part of the book consists of 10 chapters concerned with homogeneous gold catalysis. This nice collection of examples clearly shows the immense potential of gold in organic chemistry. Gold-catalyzed benzannulations, reactions of propargyl esters, hydroarylation and hydration of alkynes, aldol reactions, additions to alkenes and allenes, oxidative couplings, and so on, are clearly explained. In each category, particular attention has been paid to reaction mechanisms and the control of selectivity. All these sections also provide useful information about the choice of catalyst, and about what can be expected on the basis of ligand electronic properties.

Mature topics such as enyne cycloisomerizations have been treated from the point of view of natural products synthesis. This nice chapter is subdivided into 10 sections according to reaction types. They describe how reactions such as alkyne and allene hydration, hydroalkoxylation, hydroamination, and other nucleophilic additions, as well as propargyl ester rearrangements, can be used for the rapid construction of complex molecules, thus clearly demonstrating the great value of gold chemistry. Readers interested in natural products synthesis will certainly find inspiration in this chapter.

With regard to heterogeneous catalysis, four chapters dealing with hydrochlorination of alkynes, oxidation of alkenes, alcohols and carbohydrates, reduction of multiple carbon–carbon bonds, and reduction of α,β-unsaturated aldehydes and of nitroarenes are presented. The factors governing the selectivity, such as the size and shape of the gold nanoparticles, are discussed in a very informative way. Reaction mechanisms are also shown. I found it particularly interesting that heterogeneous and homogeneous catalysis are treated within the same book.

A slight criticism is that it is hard to understand the organization of the chapters. For example, the two organometallic chapters mentioned above are inserted between two sections devoted to reactivity. Heterogeneous gold-catalyzed oxidations do not come immediately after reductions. Gold-catalyzed addition reactions to allenes are not treated directly after the corresponding reactions with alkynes and alkenes. If there is logic in the choices made by the editors, it would have been helpful to have it explained in an introduction.

Apart from these problems of organization, I think that it is definitely worth buying this book. I read it with enthusiasm and learned many things, even though I am myself involved in gold catalysis. I think it is suitable for advanced students and for postdoctoral researchers who need a quick survey of the field, and it also contains technical and mechanistic details of some gold-catalyzed transformations.

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