

Book Review

JIRO TSUJI

Palladium reagents and catalysts: new perspectives for the 21st century

Wiley-VCH, 2004

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The need for continued innovation in organic chemistry, and for further development of existing synthetic methodologies, is considerable. To a large extent, this need is driven by the requirement for compounds with ever-improving properties in a whole range of applications, e.g. better pharmaceuticals with higher potency and greater selectivity with minimal side-effects, liquid crystals that can satisfy the stringent operating demands of the latest full-colour, flat-panel displays, materials for molecular electronics for light-emitting devices, robust and flexible semiconductors and light-harvesting applications. Additionally, the need is driven by a desire for a greater understanding of organic chemistry, which ultimately will facilitate the generation of compounds for applications.

Perhaps the greatest, and most revolutionary, aspect of organic synthesis over the past 20 years has been concerned with the many and varied reactions involving palladium catalysis; in the majority of cases the reactions are not just amazing that they occur, but they are often stereospecific, and extremely high yielding and efficient. Such chemistry has had a considerably impact on our increased understanding of organic chemistry, and on available and possible future applications exemplified above.

So to this book by Jiro Tsuji, simply titled *Palladium Reagents and Catalysts: New Perspectives for the 21st Century*, which considers, in great detail with superb accurate references, the fantastic developments that have occurred since the launch of the author's widely acclaimed 1995 book, the similarly titled

Palladium Reagents and Catalysts: Innovations in Organic Synthesis.

This latest book must complement, and compete with, the encyclopaedic *Handbook of Organopalladium Chemistry* (edited by Negishi in 2002), and such has been the advance in the area of palladium in organic synthesis in recent years that this new up-to-date volume is certainly a most welcome addition to the library of synthetic organic chemists everywhere; and, of course, it is always useful to have access to a different perspective and emphasis on such an important and wide-ranging topic.

The book consists of 10 chapters, each beautifully broken down into logical sections with a vast array of helpful references. Referencing is extensive, with much attention to detail. However, in some chapters the references are located after each section, whereas in others all the references are right at the end; this situation will likely result in some initial confusion.

The first chapter is a basic introduction to the chemistry of organopalladium compounds, which is certain to be useful to readers new to the area. In fact, all the other chapters also have brief introductions to the specific topics; such introductory aspects and the good attention to detail will be particularly useful for uninitiated readers.

The chapters are arranged on a topic basis according to the reacting substrate; such an arrangement makes it easy to pinpoint a particular area of interest, and many references allow the reader to take things further as necessary. The chapters are very much illustrative, being in the form of elegant synthetic schemes, much of which is self-explanatory to the initiated; as a result, some explanations are rather brief. Such brevity is most understandable, and welcome, considering the vast range of topics covered, and the excellent use of references.

Given the illustrative nature of the book and the lack of illustration available in a book review, it is not possible to convey the value of this book adequately. However, Chapter 2 deals with the many and varied aspects of oxidative reactions with palladium(II) compounds, Chapter 3 discusses palladium(0)-catalysed reactions of sp^2 organic halides and pseudo halides (clearly a lengthy chapter), and Chapter 4 considers palladium(0)-catalysed reactions of allylic compounds via allylpalladium complexes. Chapters 5, 6, 7, and 8 are concerned with palladium(0)-catalysed reactions involving (i) 1,3-dienes, 1,2-dienes (allenes), and methylenecyclopropanes, (ii) propargyl compounds, (iii) alkynes and benzynes, and (iv) alkenes respectively. Rounding the book off are two rather short, but nevertheless useful and interesting, chapters: Chapter 9 considers palladium(0)-catalysed miscellaneous reactions of carbon monoxide, and Chapter 10 considers miscellaneous reactions catalysed by chiral and achiral palladium(II) complexes.

Overall, what more could a synthetic organic chemist require in a research text? The book's emphasis is on natural product and medicinal aspects of organic synthesis, and some important examples in materials chemistry seem to have been overlooked—but it is impossible to include everything. This book is beautifully illustrated, very well referenced, and covers a wide range of exciting synthetic methods that are sure to be applicable to many areas of synthetic organic chemistry.

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