

Book Review

Palladium Reagents and Catalysts. Innovations in Organic Synthesis. By J. Tsuji. Wiley: New York, 1995, 560 pp., hardback. £ 125. ISBN 0-471-95483-7.

There can be little doubt about the importance of palladium chemistry to organic synthesis. A modern book which discusses the reactions of palladium with respect to organic synthesis is therefore invaluable. Tsuji has taken on a formidable task in preparing "Palladium Reagents and Catalysts: Innovations in Organic Synthesis" but the result is a success, and will certainly be of benefit to readers.

The first two chapters are effective in laying the foundations for the rest of the book. Basic palladium catalysts are described as well as an explanation of the fundamental reactions which are involved in the heart of palladium catalysed transformations. The reactions which are catalysed by Pd(II) and Pd(0) are summarised, with cross references to the rest of the book. This information could have been somewhat more detailed, but was nevertheless useful.

The first major chapter describes various oxidative reactions involving Pd(II) reagents. Logically starting with a review of the Wacker reaction and the principles of recycling the palladium catalyst, the chapter progresses through over 500 references. Included in this discussion are an analysis of the stereochemistry of the oxidation of dienes, oxidative reactions involving C-C bond formation and carbonylation.

The next chapter, chapter 4 is 400 pages long and forms the bulk of the book. However, this chapter is fairly well subdivided, with references provided at the end of each major sub-section. The Heck reaction is discussed early on, although it was not obvious from the index that this was where the most detailed discussion of the Heck reaction would be found. Inter- and intramolecular examples, as well as related reactions involving alkynes were all well documented, making a valuable account of this reaction. Cross-coupling reactions between halides (and pseudo-halides) and organometal reagents are described including Stille

and Suzuki reactions as well as the coupling of other organometal reagents. There are many synthetic examples given, including Stille macrocyclisation reactions, and the Nicolaou rapamycin synthesis. The organisation of this section was more by reaction type than by the substrate involved, which enabled a comparison between related reactions (e.g. organozinc reagent versus organoboron).

Allylic compounds were treated separately from other substrates, and the next major section gave a good account of palladium catalysed allylic substitution reactions, especially from a synthetic perspective. Other reactions involving allyl substrates were also given fair coverage, including rearrangement reactions and carbonylation reactions. The remaining sections within this enormous chapter involved discussions of reactions involving more specialised substrates including dienes, propargylic compounds, alkynes and alkenes. Other reactions including hydrosilylation, reduction and the use of methylene-cyclopropanes are also discussed at the end of this chapter.

The final chapter is, in comparison, only 20 pages long, and picks up a few reactions which were not otherwise discussed, and were generally more specialised.

Overall, I was impressed by this book, and I am sure that those people involved with palladium chemistry who have not already bought the book, should do. Any library which serves an organic chemistry group will need a copy, as will non-palladium chemists with an interest in the area.

The book is easy to read, and the diagrams are clear and well-constructed. Palladium chemistry is a difficult subject to arrange in a clear order, and although this book contains a great deal of useful information, I found that it was not always easy to look up a particular reaction or area quickly, and further cross-referencing would have been useful in a work of this size.

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