

**The Mizoroki–Heck Reaction**; edited by Martin Oestreich, John Wiley & Sons: Hoboken, 2009, hardcover, 608 pp., £95/€109.30, ISBN: 978-0-470-03394-4

Over the past few years two different approaches have emerged to cover major areas of transition metal chemistry as applied to organic synthesis in book-form: one approach is centered around a particular metal, the other is focused on a certain synthetic transformation – or named reaction. The most recent addition to the latter class of books is a volume edited by Martin Oestreich with the clear and brief title “The Mizoroki–Heck reaction”. For two reasons, the editor can afford to choose such a succinct title: firstly, every chemist, including undergraduate students, all over the world should have at least a rough idea about this reaction, secondly, there is to the best of my knowledge no other book available covering this reaction in comparable depth and comprehensiveness.

In 16 chapters various aspects of this reaction are discussed. The first three chapters are dedicated to more mechanistic issues: chapter 1 provides a survey of the various catalytic cycles and discusses the individual organometallic elementary steps in detail. I am indeed not aware of a similarly detailed and informative account of this topic. In the second chapter, practical aspects of the Mizoroki–Heck reaction (choice of precatalyst, ligand, base, solvent, etc.) are discussed and correlated with mechanistic aspects. Particularly noteworthy and potentially very useful for the practitioner might be the attempt to provide taxonomy of the plethora of conditions reported to date. In the following section, regioselectivity issues are addressed, with special emphasis on terminal vs. internal arylations. Mechanistic issues and “real life” examples are nicely linked. The following chapter gives an overview of waste-minimized variants and includes catalytic oxidative reactions as well as the use of carboxylic acid derivatives. Chapters 5 and 6 explicitly address intramolecular Mizoroki–Heck reactions as applied to the synthesis of carbocycles and heterocycles, respectively. In both chapters the descriptors of Baldwin’s rules are used to organize the manifold of examples which nicely contributes to the homogeneity of this section of the book. Chapter 7 describes how chelating substituents can be used to contribute to the efficiency and selectivity of Mizoroki–Heck reactions. Efficiency in synthesis is also the focus of the next chapter, which is dedicated to domino processes including one or more Mizoroki–Heck reactions. Chapters 9 and 10 illustrate that general schemes often found in

textbooks (or on the cover of this volume) probably no longer fully describe the Mizoroki–Heck reaction: the first of these two chapters deals with Heck-type reactions without a leaving group, i.e. oxidative reactions. This topic has briefly been highlighted in chapter 4 from the sustainable chemistry angle, here a more detailed account is provided. The following chapter demonstrates that other metals than palladium are often also capable of catalysing this reaction. The next three chapters (11 to 13) are dedicated to the large and important field of enantioselective Mizoroki–Heck reactions. Ligand design, enantioselective intramolecular reactions and desymmetrization are the specific topics covered in these chapters. The three final chapters discuss aspects of combinatorial and solid phase synthesis, non-conventional solvent systems and reaction conditions, such as ionic liquids or reactions under microwave irradiation, and finally the application of the asymmetric Mizoroki–Heck reaction in the synthesis of natural products.

I will only mention a few reasons, why this title was so urgently needed. The Mizoroki–Heck reaction is covered in undergraduate teaching and lab courses, and consequently this book will be a great help for lecturers and professors who prepare a new or revise an existing teaching course in advanced organic synthesis or homogeneous catalysis. Individual chapters of this book can also be recommended as a useful source for undergraduate students who have to prepare a seminar on their own, with the caveat that guidance by an experienced tutor is mandatory if the book is used in this way. A second reason is illustrated by the following figures: even a non-refined search in a common scientific database comes back with ca. 5000 hits on the terms Mizoroki–Heck reaction or Heck reaction, and hardly a single issue of a general or primary-organic chemistry journal is published which does not contain at least one example of this reaction. I am convinced that this book will rapidly become the most important reference text for research chemists in academia and industry who seek orientation in the rapidly growing and – for the layman – confusing field described as the “Mizoroki–Heck reaction”.

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