



The Mizoroki–Heck Reaction

The Mizoroki–Heck reaction has been proven to be one of the most important methods for carbon–carbon bond formation in organic chemistry. It is used in a wide variety of organic transformations and thus it now belongs to an indispensable set of palladium-catalyzed cross-coupling reactions. The book *The Mizoroki–Heck Reaction*, edited by Martin Oestreich, consists of 16 chapters that introduce the reader to diverse aspects of this important reaction, thus providing a general and comprehensive overview of present knowledge and reviewing the enormously rapid development and progress achieved within the last few decades. Along with fundamental mechanistic and conceptual aspects of the Mizoroki–Heck reaction, various chapters demonstrate its applicability in synthetic organic chemistry, such as the synthesis of natural products, with many impressive examples. Although some of the chapters look rather like a list of numerous (mainly important) reaction examples, they not only demonstrate the applicability of the reaction in organic synthesis but also make the book a valuable reference source. The discussions about current problems, possible future achievements, and desirable improvements of the Mizoroki–Heck reaction at the ends of some of the chapters give it an additional perspective.

The first two chapters contain discussions of the mechanisms of the Mizoroki–Heck reaction, classified according to the catalysts used. Thus, the reader is immediately brought into the subject without needing to read a long and tedious introduction. Unfortunately, however, although the first chapter discusses palladacyclic Mizoroki–Heck catalysts, pincer-type systems are not even mentioned despite their importance, which rests firstly on the fact that these highly active systems are still widely used, and secondly on the fact that their introduction initiated a long debate about the mechanism by which they catalyze the Mizoroki–Heck reaction. The second chapter, which is of very high quality and excellently written, classifies the modern catalysts in four groups, all of which are

discussed in detail. In the following chapter the focus is on the development of environmentally benign versions of the Mizoroki–Heck reaction, which is now becoming an increasingly important issue. The regioselective product outcome in organic synthesis, which is very important in, for example, the preparation of (hetero)cyclic and polycyclic organic compounds, is among the topics of the following chapters, fortunately not ignoring the important role of the catalyst. The fact that Mizoroki–Heck reactions are also possible by the activation of C–H bonds, or with metals other than palladium, is demonstrated in Chapters 9 and 10.

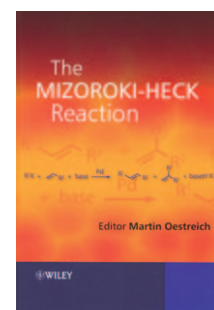
The next chapters are focused on enantioselective and asymmetric Mizoroki–Heck reactions. Those are followed by two chapters that are different from all the others in this book; they introduce the reader to combinatorial Mizoroki–Heck reactions, solid-phase syntheses, and catalytic reactions in special modern solvent systems such as ionic liquids, fluorinated solvents, supercritical fluids, and aqueous solvent mixtures, and to techniques such as ultrasound- or microwave-assisted reactions. The last chapter of the book gives some impressive examples of the Mizoroki–Heck reaction and its applications in the total synthesis of natural products.

The selection and clear arrangement of the competently written chapters of this book is well done, giving a rapid general overview of current knowledge about various aspects of this important reaction. Each of the chapters can stand by itself (as a consequence of the multi-author nature of the book), but the book is also suitable for reading through chapter-by-chapter. The book is suitable for every organic or organometallic chemist who is interested in any aspect of the Mizoroki–Heck reaction, since it provides a comprehensive update about the achievements and advances since its discovery, and impressively demonstrates that there is far more behind this reaction than the simple coupling of olefins and aryl halides.

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