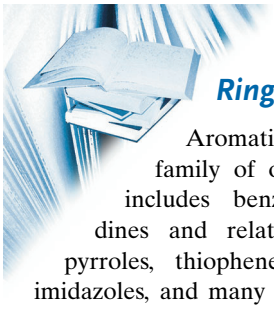

Transition-Metal-Mediated Aromatic Ring Construction

Aromatic rings are a broad family of organic compounds that includes benzene derivatives, pyridines and related compounds, furans, pyrroles, thiophenes, oxazoles, pyrazoles, imidazoles, and many other heteroarene rings. A wide variety of moieties are present in most of the natural products and biologically relevant compounds, as well as in chemical reagents (catalysts and ligands), organic materials, and devices with photophysical or (opto)electrical properties. Whereas, for decades, organic chemists focused their efforts on the selective functionalization of "preformed" aromatic rings to introduce diverse functional groups, the direct construction of variously substituted aromatic rings has recently attracted much attention. This has led to the development of numerous strategies, which take into account the concepts of atom economy and green chemistry for the trend towards a more sustainable chemistry. This book provides an intelligible and complete overview of the transition-metal-catalyzed transformations that allow the construction of aromatic rings as reported during the past decade. The feat of the editor Ken Tanaka is the smart cutting up of the subject into well-defined parts and chapters according to the reactions and reactive species that have been used. As a result, the presentation is clear and repetitions are avoided. The content of this well-organized book of about 800 pages has been divided into five main sections.

Part I is devoted to metal-mediated [2+2+2] cycloadditions and related reactions for the synthesis of benzene and pyridine rings. Chapters 1–6 and Chapter 11 describe [2+2+2] and [2+2+1] cycloadditions spanning the different metals for achieving these transformations. An important part of the discussion is centered on mechanisms. Chapter 7 describes applications to the preparation of natural products, and Chapters 8–10 cover the formation of chiral aromatic compounds via [2+2+2] cycloadditions.

Part II deals with [4+2], [3+2], and analogous cycloadditions. Of course, one chapter is devoted to Diels–Alder reactions (Chapter 13). [4+2] cycloadditions using alternative strategies (C–C and C–H bond activations, or elimination reactions of small molecules) are reviewed in Chapter 12. The following chapters describe the use of various partners or reactive intermediates (enynes, pyryliums, 1,3-dipoles, and transition-metal carbenoids).

The synthesis of heteroarene rings is mainly reviewed in the third and fourth parts. Chapters 18–21 summarize electrocyclization reactions: hydroarylation, intramolecular C–X bond formations, additions to diynes, and cycloaromatizations of metal cumulenylidenes. Chapters 22–25 describe coupling and addition reactions for the formation of C–C, C–E, and C–X bonds. The final part, Chapters 26–28, summarizes other transformations such as olefin metathesis, rearrangement reactions, and reactions using arynes or *o*-quinodimethanes to give access to aromatic compounds.

Ken Tanaka has gathered several specialists of the area and internationally recognized authors to present this easily readable book. Although the subject matter covered is very broad, the reasonable number of authors provides a good consistency. Altogether, the chapters are well structured and well written, and provide adequate literature references, thus avoiding the need for too detailed and tedious insights.

Although the book's subject is nominally restricted to the synthesis of aromatic rings, on many occasions it has been broadened to include the preparation of heterocyclic compounds such as pyrones, pyridones, quinolones, indolozinones, siloles, etc., which are not aromatic rings. Therefore, it is addressed to a wider readership than the title suggests, probably the whole organic synthesis community. Throughout the book, issues related to the reactivity and selectivity of transition metals towards carbon–carbon and carbon–heteroatom multiple bonds, such as in alkynes, allenes, alkenes, or nitriles, are well covered. It delivers the most important information for a student who is just starting in the field of transition metal catalysis. However, I think it would have been nice, from time to time, to put the synthetic usefulness of the methods in context by a brief comparison with alternative methodologies commonly employed in organic synthesis.

In summary, I personally have read *Transition-Metal-Mediated Aromatic Ring Construction* with great interest, and I believe this book is a rich source for both academic and industrial researchers. It provides a valuable addition to the range of textbooks on organic synthesis, aromatic rings, and heterocyclic chemistry. Therefore, I warmly recommend this book and I will strongly encourage my students and colleagues to explore it.

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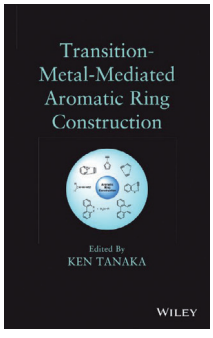

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