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BOOK REVIEW

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Review of C—H Activation. Topics in Current Chemistry, 292

Review of C—H Activation. Topics in Current Chemistry, 292. Edited by Jin-Quan Yu. (Scripps Research Institute, La Jolla, CA) and Zhangjie Shi. (Peking University, Beijing, China). Springer-Verlag: Berlin, Heidelberg. 2010. xx + 384 pp. $309. ISBN 978-3-642-12355-9.

For years chemists have been fascinated by reactions that transform C—H bonds, which despite their ubiquity are relatively inert. Over the past decade, the field of transition-metal-catalyzed C—H bond functionalizations has blossomed, the fruits of which are the synthetic methods whose appeal is broad and will continue to increase. Thus, it is fitting that Volume 292 in the *Topics in Current Chemistry* series is dedicated to C—H activation.

Editors Yu and Shi have assembled a timely volume consisting of 12 chapters contributed by leading scientists in the field. The topics covered are representative of the recent literature. For example, there is a broad coverage of transformations of sp^2-hybridized C—H bonds in aromatic and heteroaromatic compounds. The majority of these are palladium-catalyzed reactions that generate C—C bonds from C—H bonds. These chapters cover C—C bond formation from metal—carbon bonds in C—H activation intermediates via cross-couplings with carbon electrophiles, e.g., organohalides, insertions of substrates containing C=C, C≡C, C=N, and C=O bonds, or coupling with other C—H bonds.

Chapters are also dedicated to transformations of sp^3-hybridized C—H bonds, which are typically more challenging. Topics include allylic C—H oxidations that form C—O bonds, insertions of C—H bonds into metal—carbene bonds, oxidations of C—H to C—N bonds, cross dehydrogenative couplings of C—H bonds, and relay-directed activations of remote C—H bonds.

Given the potential applications of C—H activations in industrial settings, two chapters are devoted to transformations of pyrroles, indoles, and more densely heteroatom substrates like diazines and azole *N*-oxides. Likewise, chemistry mediated by less expensive metals like iron, copper, and ruthenium is discussed, complementing methods utilizing more precious catalysts like palladium and rhodium.

The consistent theme uniting the chapters is the application to organic synthesis. Examples range from construction of pharmaceutically relevant compounds to functionalization of C—H bonds of complex molecules in the arena of total synthesis. Without question, methodology is the main focus in this volume. Nevertheless, a reasonable balance is struck with discussions of mechanistic underpinnings of catalytic transformations gleaned from both experiment and theory. There is little discussion of chemistry relevant to the synthesis of commodity chemicals, but doing so would have compromised the focus of the work.

The coverage with regard to the literature is excellent. The development of the field is highlighted by seminal contributions from its pioneers, and each chapter includes numerous examples of developments through 2009. Consequently, this volume should appeal to a wide audience of chemists, including students who are learning about C—H activation to scientists in academia and industry who wish to apply C—H bond functionalizations to their research.

Lastly, this volume is dedicated to the memory of Keith Fagnou, who was also a contributing author. Mark Lautens and Mark Taylor provide a poignant obituary that captures the essence of a rising star who left us too soon. This treatise on C—H activation is a fitting tribute to Keith's memory.

Milton R. Smith, III
Michigan State University

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