

**Heterocyclic Chemistry**, by John A. Joule and Keith Mills, 5th ed., John Wiley & Sons: Chichester, 2010, hardcover, 718 pp., €155, ISBN: 978-1-4051-9365-8

*Updated and highly recommended book on heterocyclic chemistry*

Synthesis of heterocyclic entities is a key discipline representing the basis for modern materials and life sciences. Because of the tremendous advances in organic chemistry, the synthetic repertoire for heterocyclic chemistry experienced in the recent years a dramatic enrichment. In 1972, Joule published together with Smith the first edition of this textbook on heterocyclic chemistry. The following editions the co-authors changed and this textbook found a strong recognition in the chemical community. This book was in particular popular among undergraduates and graduates, because of the easy-to-read style and the well-documented examples. Actually, the fifth edition was published. Since most parts of the previous editions represent the blueprint of my own lecture series on heterocyclic chemistry I was very curious about the updated version.

Like the previous editions the current book continues with a focus on the synthetic aspects of heterocyclic chemistry. Furthermore, the authors concentrate on the synthetic utility and on the most common five- and six-membered ring systems. Consequently, many other systems are only scarcely treated or not mentioned at all. Many theoretical aspects, e.g. NICS, which belong to a deeper understanding of aromaticity, are not considered. Therefore, this book provides no general overview in heterocyclic chemistry, but gives rather an easy entry into the synthesis of this very important field of organic chemistry.

The book is divided in 33 chapters. The initial few chapters are devoted to the general topics like structures, spectroscopic properties, substitution reactions, catalysis, and nomenclature. Unfortunately, the latter is only treated on a very low level. No systematic nomenclature is introduced. Presentation of the two different and accepted naming strategies for heterocycles would be appropriate. The naming of condensed heterocycles could be treated with some examples and exercises on a few pages. Additionally,  $pK_a$  values are also not systematically treated in

this textbook. The knowledge about the basic or acidic character is of utmost importance for the purification of nitrogen-containing heterocyclic compounds. For some heterocycles the data are given in the individual chapters.

A large fraction of the book is dealing with transition-metal-catalyzed cross-coupling reactions. The given survey of this particular topic is unique and contains all significant examples and refers to the literature up to 2008. Even very modern aspects, like low-valent iron catalysis and oxidative palladation reaction have found the respective space in the book. Moreover, recent techniques like microwave irradiation and flow microreactors are discussed. Modern concepts dealing with heterocycles equipped with a set of leaving groups that can be selectively addressed is also part of this book.

The chapters about the individual heterocyclic systems consist of a short survey about the general reactivity, followed by reactions and syntheses, which occupy the largest part. In this edition, the newly formed bonds or introduced functions are labeled in red allowing a rapid understanding of the specific conversion. Transformations similar to the discussed one are adjacently displayed in reduced size. In addition, some revision exercises and advanced problems are given. The whole book includes more than 3600 well-chosen references.

The book was very carefully made and the mistakes are rare and consist in wrong coordination of the cations in lithiated intermediates (e.g., pages 41, 43, 55, etc.). In relationship to size and content of the book, the index is too small. Remarkably, the table of contents is more effective when looking for a specific subject.

In summary, the fifth edition is a high-quality book, which represents a very valuable and concise source of information about heterocyclic chemistry. In the covered topics the book provides as a textbook a new gold standard. Despite some weak points, this book is highly recommended. Due to the modern aspects it will be a compulsory reading for synthetically oriented chemists working in the field of heterocyclic chemistry.

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