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Book review

Chemical photocatalysis

Burkhard König (Ed.)
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The use of solar energy is the ultimate green activation mode to enable chemical transformations. However, many organic molecules do not contain a chromophoric group which can absorb efficiently visible light. Many chemists have sought for efficient bypasses to circumvent this important problem. The most efficient one is the use of photoredox catalysts which allow to absorb visible light and transform it to electric potential energy which can be utilized to complete transformations via a single electron transfer. The use of such photoredox catalysts has been very popular for water splitting purposes and energy storage. However, its use in organic chemistry has been largely ignored, with the exception of a few isolated examples. Recently, things are changing dramatically and the field of photoredox catalysis has become one of the hot areas in organic synthetic chemistry.

The publication of the book *Chemical photocatalysis*, edited by Burkhard König, comes in this aspect at a perfect moment and will become a landmark publication for researchers in this field. The 16 chapters, all written by specialists in the field, describe the most important aspects of photocatalysis.

After a short introduction (Chapter 1), the history of organic photochemistry is discussed in Chapter 2. This chapter gives an interesting and succinct overview of the slow emergence of this field and its key players throughout history. Chapter 3 describes the photophysics of photocatalysis and provides a theoretical description of the different processes involved in photocatalysis. Although this is specialists work, the author has limited himself to describe only the most important aspects. In this fashion, the information can be digested even by non-specialists. The next chapter (Chapter 4) deals with the use of flavins as photocatalysts in synthetic chemistry. This class of photoreceptors are used by Nature to absorb solar energy for their survival. Chapter 5 discusses template enantioselective photocatalysis. The chiral template coordinates to the substrate via hydrogen bonds and allows to perform the reaction in an enantioselective fashion. Chapter 6 covers the use of nucleic acids and peptides in photocatalysis. Chapters 7–13 deal with the use of metals as photocatalysts (Ruthenium, other metals than Ru and Ir, synergistic catalysis, the α-functionalization of amines, hydrogen evolution, heterogeneous semiconductors and polyoxometalates). These chapters are strongly focused on the application of these catalysts in synthetic transformations. Chapter 14 is again a more theoretical chapter dealing with the description of the excited states by means of molecular modeling. Chapter 15 (transient absorption) and Chapter 16 (Time Resolved spectroscopy in photocatalysis) are also more theoretical but make the story about photocatalysis complete.

Most of the chapters in this book are well written and provide an interesting insight in the field of photocatalysis. The examples discussed in the different chapters give an up-to-date overview describing both theoretical and practical aspects. I personally enjoyed reading this book and it will become an inspiration point for my own research. To the best of my knowledge, this is the first book in photocatalysis which has a strong focus on synthetic organic chemistry. Therefore, it is my firm belief that this book will be of great interest for those who are working in photocatalysis as well as for organic and organometallic chemists in academia and industry.

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