Radical and Radical Ion Reactivity in Nucleic Acid Chemistry

This book edited by Marc Greenberg presents some very good insights into the knowledge about DNA radicals and radical anions that has been gained in the last few years. These reactive intermediates are present in humans and other organisms (oxidative stress, enzymatic reactions) and can cause damaging effects (mutations, cleavage of the DNA strand). Therefore, knowledge about the formation, stability, and reactions of these species is very important.

The state of the art is described in 14 chapters written by scientists who are working in these areas. The literature coverage extends up to 2008, and many citations come from that year. Several methods for generating these radicals and radical anions are described: 1) ionizing irradiation, 2) electron detachment, 3) electrochemistry, 4) the use of modified nucleic acids (modification at the base or the deoxyribose), and 5) the use of artificial π systems that are photoexcited. The chemical reactions that are caused by these radicals and radical anions and affect the nucleic acid bases and the deoxyribose are described in detail. This also includes the transfer of electrons and electron holes through DNA.

The reviews are mainly focused on experiments. Theoretical calculations are only rarely included. The list of authors who describe their areas of science in the book is impressive. It includes M. Sevilla, W. Bernhard, J. Cadet, C. Chatgilialoglu, M. Greenberg, H. Sugiyama, K. Kawai, T. Majima, A. Wagenknecht, L. Sanche, P. Wardman, V. Shafirovich, N. Geacintov, H. Thorp, S. Kerwin, and R. Manderville.

The text and the figures are well presented. Scientists who like to understand life sciences at a molecular level will use these reviews for at least the next 10 years.

Bernd Giese
Department of Chemistry
University of Basel (Switzerland)

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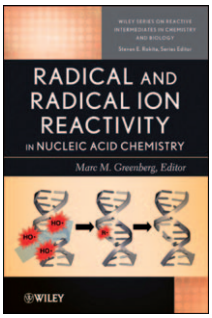
Chiral Ferrocenes in Asymmetric Catalysis

Following the earlier books *Ferrocenes*, edited by A. Togni and T. Hayashi (VCH Verlagsgesellschaft, 1995), and the now three-years-old *Ferrocenes: Ligands, Materials and Biomolecules*, edited by P. Štěpnička (John Wiley&Sons), both of which deal with applications of ferrocenes in very diverse fields of chemistry, the newly published work by Li-Xin Dai and Xue-Long Hou focuses on applications in asymmetric catalysis. This specialization appears to be reasonable in view of the plethora of successful applications of ferrocenyl ligands during the last few years. Alongside axially chiral binaphthalenes, chiral ferrocenes arguably constitute the most useful of all types of chiral ligands. In the present compendium, the problem of bringing order to the bewildering diversity of developments in the area has been solved by a skillful organization of the contents, based mainly on the structural types of the ligands.

Following an introduction in which the editors describe the special structural, chemical, and physical characteristics of ferrocenes, which form the basis for their observed efficiency in catalysis, the second chapter, by Deng, Snieckus, and Metallinos, gives an overview of the different strategies for synthesizing the ligands, with particular emphasis on stereoselective *ortho*-lithiations.

The following ten chapters describe applications in asymmetric catalysis. Xia, Jamison, and You review the use of monodentate ligands, which have become especially important in recent years, mainly because of the work on nickel-catalyzed reductive coupling reactions. Blaser and Lotz then highlight the great successes with bidentate 1,2-P,P ligands, with a focus on asymmetric hydrogenations and industrial applications. Zhou and Hou discuss the wide range of applications of 1,2-P,N ligands, based on the pioneering work by Kumada and Hayashi, who prepared the very first scalemic planar chiral ferrocenyl ligand— PPFA—also providing the synthetic basis for the Josiphos ligands described in the previous chapter.

Bolm and co-workers summarize the work with N,O ligands, mainly for 1,2 additions to aldehydes by employing organozinc or boron reagents. In Chapter 7 (by Zhang and Liu) and Chapter 8 (by You), symmetrical and asymmetrical 1,1′ bidentate ligands are discussed. It has been shown that by using a combination of many different donors and/or other substituents at the 2,2′ positions, a great variety of applications can be carried out. The area of ligands with sulfur donor moieties (such as Fesulphos) has developed rapidly in the last few years, as summarized by Carretero and co-workers.



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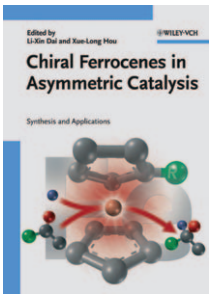

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