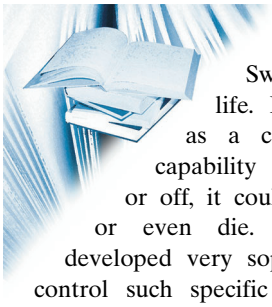

Molecular Switches

Switching is the basis of life. If a living system such as a cell did not have the capability to switch functions on or off, it could not exist, proliferate, or even die. Although nature has developed very sophisticated strategies to control such specific tasks on a molecular level, research on artificial switches still has many challenges to overcome. In 2001 Ben Feringa brought together specialists in the field to present the state of the art, to be published as the first edition of the book *Molecular Switches*. Since then the topic has advanced exponentially, making a new edition more than overdue. In particular, the wide-ranging applications of molecular switches are transforming this area of research from just a curiosity into a useful tool in functional materials. Therefore, it is not surprising that the new edition comes with nearly twice as many chapters as before, presented in a two-volume form. Nevertheless, an attempt to give a complete overview of all known systems featuring a molecular switch would be like a suicide mission. Accordingly, most of the authors begin their contributions with a general introduction, and then illustrate their concepts with selected examples.

Because of the expanded content, the editors have chosen to structure the book in three parts. The first part, "Molecular Switching", deals with specific switchable molecular entities, such as diarylethenes, spiro-pyrans and -oxazines, fulgides, and flavylium compounds, as well as more complex systems, such as transition-metal complexes of catenanes and rotaxanes, chiro-optical molecular switches, and switches based on nucleic acids. The second part, "Switching in Containers, Polymers and Channels", is concerned with more complicated systems, with a strong focus on applications in functional devices. This section begins with a chapter on switchable cavitands, containers, and capsules, followed by chapters on cyclodextrin-based switches, various switchable polymers, and applications of responsive molecular gels or switchable proteins and channels. The last part, "Molecular Switching in Logic Systems and Electronics", covers concepts such as light-driven molecular machines, photoinduced motion, molecular logic systems, and finally the principles of switching fluorescence and conductance on a molecular level. A small number of these topics (those of Chapters 1, 3, 4, 5, 6, 10, and 18) were already included in the first edition. Most of the authors of these chapters specifically address this issue by concentrating their reports on current and up-to-date examples. However, in the chapters on photochromic flavylium compounds and photo-switchable peptides there is considerable overlapping with the first edition.

In general, the second edition gives a nice flavor of how the field of molecular switches has progressed in recent years. All the chapters are written in an easily comprehensible and informative style, with a strong emphasis on important concepts. Sophisticated syntheses and complex mathematical formulas have been reduced to a minimum, thus making the book understandable for a broad readership working in the field. Some overlapping, especially in the introductory parts, is unavoidable, and it ensures that each chapter can be read separately without necessarily having to read the whole book.

Although most topics can be located easily through the titles of the chapters, there are others that are distributed throughout the book. Some molecular switches (e.g., the azobenzene switch) or concepts have been applied to many different systems, and consequently they are mentioned at a number of places. The index could have been a useful tool to compensate for this difficulty, but unfortunately the opportunity to do that has not been taken; there are practically no cross-references or multiple links to related topics. As one example, the index entry "azobenzene, photoisomerization of" points to only one specific subsection (13.2.2), even though it is a topic that pervades through the whole book.

The level of mistakes is pleasantly low (the usual suspects occur, such as formatting, e.g., cis/cisoid on pages 44 and 45, or wrong numbering, e.g., Figure 5.19, p. 141 or Section 13.1, p. 425). However, one that is worth mentioning is the déjà vu experience on reading the beginnings of Chapters 10.6 and 10.7.

In summary, the book not only provides an excellent starting point for newcomers to the field, but also gives a solid basis for further reading in the form of the plentiful references to review articles. Also, for scientists already active in the field the book is a superb source of examples of molecular switches in various contexts. Although the field of molecular switches has already undergone a quantum leap since the first edition, future developments promise exciting applications, leading to great expectations for the third edition in 10 years!

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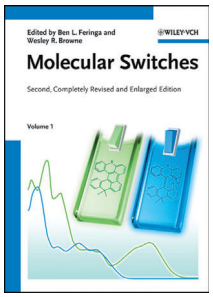

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