

## Preface to the Second Edition

A few years ago, because of the rapidly growing interest in supramolecular systems capable of performing useful functions, we felt that a monograph was needed to cover the introductory features and present a unifying and stimulating overview of this new frontier of scientific research. We, therefore, decided to write *Molecular Devices and Machines: A Journey into the Nanoworld*, a book that was published by Wiley-VCH in February 2003. The book was well received in the scientific community, as demonstrated by several flattering reviews published in the most important scientific journals. In 2005 the book was translated in Chinese by Professors He Tian and Liming Wang (East China University, Shanghai) and published by Chinese Chemical Industry Press (Beijing). A Japanese translation is going to be published very soon by NTS, Inc., Tokyo.

In the last few years, there has been a continuously growing interest in designing, synthesizing, and operating artificial molecular devices and machines. New fundamental concepts have emerged and a wealth of novel systems have been investigated. In Spring 2006, Wiley-VCH informed us that a few printed copies of our book were still available and suggested that, instead of making a reprint, it would have been more useful for the scientific community to produce a new edition of our monograph. After having consulted several colleagues, we indeed realized that it was the right time to revise and update *Molecular Devices and Machines: A Journey into the Nanoworld*. We have kept the title but changed the subtitle to emphasize that it is really a new edition of the same book.

*Molecular Devices and Machines: Concepts and Perspectives for the Nanoworld* indeed maintains the fundamental structure of the previous book, while the content has been substantially changed. The chapters and sections dealing with the fundamental principles have been largely rewritten with the aim of helping the reader to realize emerging trends, to find a sound discussion of fundamental processes like electron and energy transfer, to be cautious about naïve similarities with devices and machines of the macroscopic world, and to understand that the nanoworld is characterized by some unfamiliar features that prevent the realization of nanoscale devices and machines as described in science-fiction films, television series, and novels. The chapters devoted to specific classes of devices and machines have been refreshed and updated, and new chapters have been added.

As in the first edition, concepts that are then illustrated by paradigmatic models and enriched with examples taken from very recent publications have been emphasized. Although this book mainly deals with artificial molecular-level devices and machines, natural and biomimetic systems are also presented to give the reader an idea of the extremely different level of complexity between the “artificial” and “natural,” and a flavor of the beauty of the chemical mechanisms responsible for the material aspects of life. A chapter is dedicated to illustrate the most important examples of devices and machines based on heterogeneous or solid-state systems, a field closer to applications than that of systems in solution. The glossary in the appendix and the subject index have been revised and expanded.

The most important feature of our book is the abundance of illustrations. Cartoons and chemical formulas are, indeed, essential for understanding the composition and the way in which molecular devices and machines operate. We have tried to make it even better than in the previous edition, in which, “the illustrations alone are worth the price of the book,” as commented by Steven A. Edwards on p. 52 of his volume on *The Nanotech Pioneers* (Wiley-VCH, 2006).

At the end of the book, we have added some comments on “Science and Society,” with our thoughts and reflections on being scientists in the present day. We do believe that scientists should play a more important role in the society, not for obtaining more funds but for leading the public opinion and helping the policy makers to build a more civilized and more peaceful world.

We feel that this book can be useful not only for scientists engaged in research in the fields of chemistry, physics, biology, and nanotechnology, but also as a basic text or a complementary reading source for graduate and postgraduate courses dealing, for example, with supramolecular chemistry, physical organic chemistry, photochemistry, electrochemistry, and energy- and electron-transfer processes. Indeed, the first edition of the book has already been used for teaching purposes. No doubt that, in a few years, courses focusing on molecular-level devices and machines will become a must in all major universities.

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*Vincenzo Balzani, Alberto Credi,  
and Margherita Venturi*