Preface

In recent years supramolecular, homogeneous catalysis has undergone a renaissance and the activities in this area are growing rapidly. In the seventies, supramolecular catalysis was largely equivalent to mimicking enzymes via host-guest catalysis and the reactions studied were mainly of the types also occurring in enzymes, such as hydrolysis or oxidation reactions. Occasionally enormous accelerations were noted, or changes in selectivity, but applications in synthetic chemistry remained elusive. Of the non-enzymatic reactions, the Diels-Alder reaction was also studied successfully. Progress into other directions, amongst them organometallic catalysis, was slow mainly due to the tedious synthesis of host molecules equipped with catalytic entities. Organometallic catalysts have played a key role in the syntheses of chemical commodities as well as fine chemicals since the late 1960s and in the last decade its contribution to fine chemical syntheses has rapidly grown. In view of the required better use of feedstocks and the change in feedstocks, the role of selective catalysis will become even more important. Enzymes remain a source of inspiration, but more convenient routes to catalyst systems based on organometallic catalysts and containing supramolecular features, such as host-guest interaction, are needed.

In the last decade several new approaches have been introduced which avoid the use of elaborate syntheses. Both cavities and ligands are prepared via assembly processes which speed up the process enormously and assembly also leads to a large number of catalyst systems where only a limited number of building blocks have to be synthesized. In just a few years time this has led to an outburst of “supramolecular” catalysts, of astounding beauty, with unprecedented selectivities, or with high practicality. Of the latter group a few hold even promise for industrial application.

To highlight the recent advances in supramolecular catalysis, the Catalan Institution for Research and Advanced Studies (ICREA foundation) and the Institute of Chemical Research of Catalonia (ICIQ) organized the Conference on Supramolecular Approaches to Catalysis (SUPRAcat, March 2008, Barcelona). The conference brought together some of the leading and internationally recognized researchers in the field to discuss the development of these novel supramolecular catalysts and to
identify future directions for this exciting area of research. This book was inspired by
the conference and a selection of the presenting speakers has contributed to this
work. The organizers of the conference, Pablo Ballester and Anton Vidal, wrote the
introductory chapter, thus highlighting basic concepts, different approaches, and a
few of the many successes. The remaining nine chapters of the book give a cross
section of the field and many aspects of modern supramolecular catalysis are dealt
with.

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