

# Topics in Organometallic Chemistry

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## Aims and Scope

The series *Topics in Organometallic Chemistry* presents critical overviews of research results in organometallic chemistry. As our understanding of organometallic structure, properties and mechanisms increases, new ways are opened for the design of organometallic compounds and reactions tailored to the needs of such diverse areas as organic synthesis, medical research, biology and materials science. Thus the scope of coverage includes a broad range of topics of pure and applied organometallic chemistry, where new breakthroughs are being achieved that are of significance to a larger scientific audience.

The individual volumes of *Topics in Organometallic Chemistry* are thematic. Review articles are generally invited by the volume editors. All chapters from *Topics in Organometallic Chemistry* are published OnlineFirst with an individual DOI. In references, *Topics in Organometallic Chemistry* is abbreviated as *Top Organomet Chem* and cited as a journal.

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Elena Fernández • Andrew Whiting  
Editors

# Synthesis and Application of Organoboron Compounds

With contributions by

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# Preface

From the early explorative days of organoboron chemistry to the present day, this area has never ceased to be a vital and exciting area of chemical research. Major themes have emerged, one after another, keeping organoboron chemistry at the forefront of our science, perhaps starting with major and long-term contributions of H. C. Brown. His work gave us the possibility to hydroborate and off-the-shelf hydride reducing agents that we now take for granted, and of course, this contributed to his Nobel Prize in 1979. Organoboron chemistry moved from stoichiometric to a catalytic manifold, and this fact opened up unexpected applications and unlimited possibilities. In addition to these fundamental studies elucidating the basics of organoboron chemistry, there were major strides into asymmetric synthesis and this contributed to our science in innumerable ways, allowing us to routinely achieve non-chiral pool synthesis of chiral molecules. Further remarkable contributions carried out by D. S. Matteson have laid the foundations for considerable amounts of the research reported in this book. Along the way, A. Suzuki and N. Miyaura found new uses for organoboron compounds in cross-coupling reactions, creating major impacts upon the way in which we assemble molecules, especially using automated systems for biological evaluation. In turn, and following fundamental studies by E. Vedejs, new types of organoboron compounds were spun out which pushed forward the boundaries of stability and created an ever-widening range of applications for further synthetic transformations. Interestingly, we still need new ways, not only to make organoboron compounds, but to exploit the huge and untapped potential for these compounds. In this book, we can see how new methods for the introduction of boron into carbon frameworks are creating their own revolutions of what is possible to make, and this science is moving on from simple boron-based Lewis acid catalysis to new types of activation pathways and who knows exactly where this will lead us. One thing is certain of course, for those of us who are addicted to organoboron chemistry, it will continue to stimulate and even better, surprise. We hope this snapshot of where organoboron is today will not only be a vital reference book but we hope it will provide you with an insight into where things might go in the future, and maybe it will spark that idea that opens the way for yet another major advance in our science.

Finally, as editors, we would like to thank all the contributors for their participation in this project, both authors of chapters and reviewers (Holger Braunschweig, Warren E. Piers, Webster Santos, Kalman J. Szabó, Bertrand Carboni, R. Tom Baker, Jörg Pietruszka, Tom Sheppard, and Emmanuel Lacôte). We appreciate their efforts to complete the chapters and revisions on time and for all the constructive and positive comments we have received from them along this period of gestation of the entire book.

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