

Book Review of Phosphorus Compounds: Advanced Tools in Catalysis and Material Sciences

Phosphorus Compounds: Advanced Tools in Catalysis and Material Sciences. Edited by Maurizio Peruzzini and Luca Gonsalvi (Institute of Chemistry of Organometallic Compounds of the Italian National Research Council, Sesto Fiorentino, Italy). From the series, *Catalysis by Metal Complexes*, 37. Edited by C. Bianchini, D. J. Cole-Hamilton, P. W. N. M. van Leeuwen. Springer: Dordrecht, Heidelberg, London, New York. 2011. xviii + 470 pp. \$189.00. ISBN 978-90-481-3816-6.

This book, written and edited by members of the European Phosphorus Sciences Network, reflects the breadth and diversity of phosphorus chemistry. Several chapters are consistent with the theme of the series title, “Catalysis by Metal Complexes”, covering the use of phosphorus compounds as ligands in metal-catalyzed reactions, such as hydroformylation, hydrosilylation, and enyne cycloisomerization. Others concern phosphorus chemistry applied to materials, including dendrimers, OLEDs, nonlinear optical materials, and precursors for metal phosphides, or in biology, as in a brief chapter on metal phosphine complexes as antitumor agents. The use of computational chemistry to analyze the anomalous air stability of some primary phosphines or the mechanism of Pd-catalyzed cross-coupling reactions, for example, is described in a few chapters.

Some chapters are detailed reviews whose subjects include macrocyclic phosphorus ligands and the addition of P–H bonds to unsaturated substrates, both with more than 200 references. Other chapters are accounts of work from individual groups on topics such as planar chiral ferrocenylphosphines, and still others highlight the authors’ own work in the context of analogous research in the literature. For readers who are not specialists on the individual topics, the most useful chapters will likely be those, such as the one on phosphinine-based ligands, that present a general introduction to the subject before detailing the latest advances. In several chapters, the authors also include valuable critical assessment and insight, as when questioning structural assignments in the literature, e.g., small molecules vs polymers, in a chapter on phosphine acetylenic macrocycles and cages, or commenting on how impurities in a commercial reagent may make it difficult to reproduce published catalytic P–H addition reactions.

The book is attractively produced, with several color figures, and includes a brief index. References in most chapters show coverage through 2010. The book will certainly be useful to readers interested in phosphorus chemistry and its applications; individual chapters will also be valuable to nonspecialists as entries to the literature in a specific area.

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