

Preface

Although organometallic catalysts have been used on a large scale for the manufacture of bulk chemicals for many years, their application in the fine chemicals industry is more recent. Despite the high impact of homogeneous catalysts on organic chemistry, highlighted by three Nobel Prizes in the last decade, their application for the industrial synthesis of more complex molecules is growing rather slowly. The main purpose of this volume is to illustrate the potential of organometallic catalysis for the manufacture of intermediates and products as they are encountered in the fine chemicals, agrochemicals, or pharmaceuticals industry. The focus is on realized industrial applications described exclusively by authors experienced with concrete, “real-world” synthetic challenges. Discussed are problems that can arise when more complex, multifunctional substrates are involved, as well as successful approaches to tackle these problems.

The various chapters demonstrate to organic chemists working in process design and development that organometallic catalysis is not just an academic toy, but is really a suitable tool for the large-scale production of complex intermediates. The book will hopefully also serve as a source of information and provide inspiration for academic researchers.

The book consists of two types of contributions, overview chapters on selected technologies and case studies. Considering that publishing is not a top priority for industrial scientists, we are very happy that we could find competent authors in both categories.

The technology chapters cover the most important reaction types used in the industry: Johannes G. de Vries (DSM) gives an overview on “Palladium-Catalysed Coupling Reactions”; Gregory T. Whiteker (Dow AgroSciences) and Christopher J. Copley (Chirotech Technology) review “Applications of Rhodium-Catalyzed Hydroformylation in the Pharmaceutical, Agrochemical and Fragrance Industries”; Philippe Dupau (Firmenich) describes the “Ruthenium-Catalyzed Selective Hydrogenation for Flavor and Fragrance Applications”; and Hans-Ulrich Blaser, Benoît Pugin, and Felix Spindler (Solvias) have authored the chapter on “Asymmetric Hydrogenation.”

Case studies have been written by Ioannis Houpis (Janssen Pharmaceutica) on “Sequential Pd-catalyzed Cross Coupling Reactions; Challenges on Scale-up,” by Adriano F. Indolese (RohnerChem) on “Pilot Plant Scale Synthesis of an Aryl-indole – Scale up of a Suzuki Coupling,” by Per Ryberg (AstraZeneca) on the “Development of a Mild and Robust Method for Palladium Catalysed Cyanation on Large Scale,” and by Cheng-yi Chen (Merck Research Laboratories) on the “Application of Ring Closing Metathesis Strategy to the Synthesis of Vaniprevir (MK-7009), a 20-Membered Macrocyclic HCV Protease Inhibitor.”

We thank all the authors for their efforts and we hope that our readers find their contributions enlightening.

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