Volume Editor's Preface

Houben–Weyl Methods of Organic Chemistry has nearly 100 years of history. Numerous synthetic methods described in the hitherto published **Houben–Weyl** series have greatly contributed to the development of organic chemistry and related fields. On the other hand, dramatic developments in organometallic chemistry during the past few decades have provided a large number of new organometallic reagents useful for organic transformations and have greatly promoted the development of synthetic organic chemistry. This scientific progress and the increasing importance of organometallic complexes in synthesis are clearly reflected in the new series, **Science of Synthesis, Houben–Weyl Methods of Molecular Transformations**. Thus, organometallics occupies a considerably large part consisting of eight volumes in Category 1 of this new series. Among them, this volume deals with organometallic complexes of groups 7-3 covering Mn, Tc, Re, Cr, Mo, W, V, Nb, Ta, Ti, Zr, Hf, Sc, Y, lanthanides, and actinides. It constitutes the second volume in the organometallics category and the second volume of the **Science of Synthesis** series.

The elements of groups 7-3 as well as other metallic elements provide numerous organometallic complexes that present a variety of bonding styles and molecular structures. Although these complexes exhibit characteristic physicochemical properties and biological activities, their degree of utility in organic synthesis depends largely on each element. For example, many organometallic complexes of titanium, zirconium, chromium, manganese, and the lanthanides play important roles as reagents or catalysts in organic synthesis, whereas technetium and actinide complexes are rarely used in synthesis despite their unique reactivity. It is also true that the well-characterized complexes prepared by reliable methods are not always important in synthesis because of their relatively lower reactivity, and, in contrast, in some cases, the uncharacterized reactive complexes are very useful for organic transformations. The main aim of **Science of Synthesis** is to provide useful methods for the synthesis of target compounds with descriptions of their scientific aspects rather than to describe all types of complexes comprehensively. Describing a variety of organometallic complexes of the early transition metals in a systematic manner according to the concept of **Science of Synthesis** does not constitute an easy task. Therefore, some chapters in this volume deal mostly with complexes that are not always synthetically useful but structurally interesting and/or important in other scientific fields.

In general, each chapter consists of a product class of one element, whereas chromium, molybdenum, and tungsten are described in a combined product class to avoid the redundancy of the closely related methods. A similar approach is also employed for niobium and tantalum, zirconium and hafnium, and for scandium, yttrium, and the lanthanides. Each product class is divided into product subclasses that are described in order of descending hapticity of the ligands. The section Applications [of the Product Subclass] in Organic Synthesis is utilized when the product subclass is employed as a reagent or catalyst in organic transformations. Synthetically important but uncharacterized complexes are also described in this section.

An unexpectedly long time has passed since this project started. The delay in publication is due to some changes in the guidelines for authors and my lack of experience in this type of editorial work. In this regard, I deeply apologize to the authors who submitted their manuscripts a considerably long time ago.

It is my great pleasure to thank Professor Ryoji Noyori and Dr. Guido F. Herrmann for their helpful discussions on the overview of this volume. I am very grateful to all the authors for their active participation in the development of our common project. Appreciа-

tion is also due to their cooperation to accept suggestions and comments that were given by the editorial office and me.

I am deeply indebted to the Science of Synthesis team of the publishing house, especially Dr. M. Fiona Shortt, Dr. Karen M. Muirhead, and Ms. Lindsey A. Sturdy for their enthusiastic cooperation to complete this project.

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Tsuneo Imamoto