

in crude oil prices in the mid 1980s, the selectivity problems in hydrocarbonylation reactions together with the severe reaction conditions generally required and the corrosive nature of the catalyst components (e.g. iodide promoters) have certainly also contributed to the decision of many industrial and academic research groups to discontinue the study of this type of syngas chemistry. However, oil prices may escalate again and even if this does not happen, syngas will become abundantly available from emerging new technologies for the relatively inexpensive syngas manufacture from widely available sources such as natural gas. Industrial interest in syngas as a feedstock for chemicals will therefore certainly remain, provided highly active and selective, non-corrosive catalyst systems can be developed for syngas conversions.

I value the book for two reasons. First, as an overview of the present state of the art of hydrocarbonylation syngas chemistry, the book may function as starting point for further studies and inspire the industrial chemical community to look at existing chemical and technological problems in this field with renewed creativity and enthusiasm. Second, for organometallic and theoretical chemists the review offers many challenges to contribute towards a better understanding of catalytic syngas chemistry by organometallic complexes. Together with the traditional organometallic chemistry approach, the increasing applicability to organometallic systems of the newly emerging techniques of computer-aided molecular modelling and molecular mechanics, in combination with quantum mechanical calculations, may prove instrumental in achieving this understanding. Such studies could bear fruit in designing (rather than finding by the trial and error approach mainly used so far) of highly active and selective catalysts for the desired selective and efficient conversions of syngas.

**E. Drent**

*Koninklijke / Shell Laboratorium  
Amsterdam  
Netherlands*

*The Organometallic Chemistry of the Transition Metals*  
R.H. Crabtree, Wiley, New York, 2nd edn., 1994, 487  
+ xvii pages, £49.50  
ISBN 0-471-59240-4

This book is an expanded, corrected, and amended version of the first edition which appeared in 1988. Although it keeps essentially to the same pattern as the first edition, it seems altogether a more polished production, reflected in its appearance (hard back, rather

than paper) and its price (£49.50 rather than £16.50). Whether students will still buy it at such a price is open to question, even though the author says in his preface that "this is what you need to know to get started in the field". Started for what? Perhaps the answer should be – for passing examinations.

This is a good text book. It is designed for senior undergraduate and graduate courses in organometallic chemistry, and for that it seems to function very well. It starts with an introduction and first chapter covering the basic coordination chemistry principles that are required for an understanding of organometallic chemistry but are sometimes not taught in that context. Each chapter includes problems (with solutions) and selected references. However, it is a pity that the author does not use full IUPAC notation (such as square brackets, etc.), because this is the basic language of chemistry; but he is not alone in that. If he had done so, some minor solecisms, such as  $\text{Rh}(\text{PPh}_3)_3^+$  rather than  $[\text{Rh}(\text{PPh}_3)_3]^+$  might have been avoided. Thereafter, organometallic compounds are treated in classes: alkyls, aryls and hydrides; carbonyls, phosphine complexes (with a long discussion of substitution reactions); and alkene and alkyne complexes (including dienes, cyclopentadienyls, arenes, etc.).

It is refreshing that the emphasis is placed upon practical characterisation and reactions rather than on structure, which has often been the case in the past. The presentation of structural types is succeeded by chapters on oxidative addition and reductive elimination, on insertion and elimination, and on nucleophilic and electrophilic reactions.

The last group of chapters deals with application: homogeneous catalysis, alkyne metathesis, activation of small molecules, organic synthesis, and so on. There is a final chapter on bioorganometallic chemistry. However, even if one admits that nitrogen fixation involves organometallic chemistry, the brief discussion of the subject does contain the occasional error (apart from omitting the reviewer's name from one reference!).

This book presents the information in a very easily digestible form, and is written in a very relaxed style. It covers the whole field of organometallic chemistry of the transition metals in a way likely to appeal to student and professor alike. It should provide strong competition for the texts already in the field. With minor reservations, I recommend it warmly.

**G.J. Leigh**

*Nitrogen Fixation Laboratory  
University of Sussex  
Brighton BN1 9RQ  
UK*