

# Chemical Reviews

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Volume 88, Number 7

November 1988

## Transition-Metal Organometallic Chemistry: Introduction

Organometallic chemistry has been one of the most rapidly growing areas of chemistry over the past three decades. Although the field may be achieving a degree of "maturity", the 17 articles in this special issue describe an exciting array of emerging research themes that presage continued growth and vitality.

One series of reviews are organized around a property of the metal center. For example, Astruc and Baird have authored complementary articles on 19 and 17 valence electron complexes, respectively. Beck and Sünkel detail the rapidly growing area of organometallic Lewis acids. Messerle provides a comprehensive picture of the synthesis, structure, and reactivity of early transition-metal complexes with metal-metal bonds.

Another series of reviews are organized around a ligand type of interest. For example, Roper and Brothers describe the fascinating area of dihalocarbene complexes. Rothwell and Durfee detail the properties of  $\eta^2$ -acyl and  $\eta^2$ -iminoacyl complexes. Buchwald and Nielsen report on novel group 4 complexes of benzynes, alkynes, and alkenes, and Nixon describes the wealth of unusual compounds that contain phosphorus-carbon multiple bonds. Ernst gives a detailed treatise on pentadienyl complexes. Tam and Brynzda augment the descriptive chemistry of late transition-metal alkoxide and amide complexes with valuable thermochemical data. The nitrosyl ligand is both a spectator and a participant in the chemistry surveyed by Legzdins and Richter-Addo. The porphyrin ligand provides a similar focus in the review by Guillard and Kadish.

Two articles by Schore and Ojima describe applications of transition-metal chemistry in organic synthesis. There is a healthy emphasis on mechanism in each of these, and the majority of reactions covered are catalytic in metal. Brown and Cooley detail the current mechanistic understanding of carbon-carbon bond forming elimination reactions at metal centers. This topic is also important in organic synthesis, particularly catalytic cross-coupling. Eisenberg and Deutsch take an in-depth look at the stereochemistry of one of the most pervasive fundamental steps in catalysis,  $H_2$  oxidative addition. Finally, Cutler, Hanna, and Vites describe stoichiometric reactions of iron complexes that model many key steps in catalytic reactions of CO and  $CO_2$ .

In summary, the 17 articles in this issue provide an up-to-date perspective of many of the frontier research topics in transition-metal organometallic chemistry. Single copies of this issue may be purchased at a modest price, as detailed on the masthead page.

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