

Collman J P. Patterns of organometallic reactions related to homogeneous catalysis. *Account. Chem. Res.* 1:136-43, 1968.

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Patterns of reactions involving organotransition metal complexes are described. Concepts such as coordinative unsaturation, oxidative addition, and intramolecular atom transfer redox reactions are illustrated. Catalytic acetylene cyclization, complexes of molecular nitrogen, and reactions of coordinated dioxygen are discussed in the framework of these ideas. [The *SC*[®] indicates that this paper has been cited over 350 times since 1968.]

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June 4, 1981

"I was pleased to learn that one of my papers has become a *Citation Classic*. However, it was sobering to re-read this article after an interim of 13 years. During this period, the explosive growth of organotransition metal chemistry has rendered my review obsolete and has removed any luster it may once have had. Such decay of scientific papers is a frustrating characteristic of science, which is ever changing.

"In this review, written soon after I had come from the University of North Carolina to Stanford, I had drawn together examples from my work and that of others in attempting to classify organometallic reactions and to show the relationships these transformations have to homogeneously catalyzed processes. The timing was propitious, since both academic

and industrial chemists were just then becoming increasingly interested in the *reactions* of organotransition metal complexes because of the applications to synthetic methodology. For some time, inorganic chemists had been interested in the structures and physical properties of organometallic compounds. This review probably had some heuristic value to organic chemists who had little formal education in this emerging field. Recently, I have coauthored a text¹ which could be said to have had its origin in this article.

"This review was also widely read since it was published in a new journal which at that time was sent *without charge* to all members of the American Chemical Society. The citation of a paper, no matter what its intrinsic quality, is obviously also related to the readership of the journal in which it is published. My article also served to popularize a term, 'oxidative addition,' which Warren Roper and I had coined^{2,3} to classify a large body of reactions that are characteristic of transition metal compounds. This term is now universally employed.

"The review described the preparation of transition metal complexes of molecular nitrogen, which was then a popular new field; however, expectations of that time concerning homogeneous catalytic reduction of N₂ have not so far been realized. My article also mentioned the binding and activation of O₂ by transition metals, an interest which subsequently led me to more significant accomplishments. However, I doubt that these scientifically more important papers concerning oxygen carriers⁴ and electrocatalytic oxygen reduction⁵ will ever become *Citation Classics*."

1. Collman J P & Hegedus L S. *Principles and applications of organotransition metal chemistry*. Mill Valley, CA: University Science Books, 1980. 715 p.
2. Collman J P & Roper W R. Preparation and oxidative addition reactions of a monomeric ruthenium (0) complex. *J. Amer. Chem. Soc.* 87:4008-9, 1965.
3., Oxidative addition reactions of d⁹ complexes. (Stone F G A & West R, eds.) *Advances in organometallic chemistry*. New York: Academic Press, 1968. Vol. 7. p. 53-94.
4. Collman J P. Synthetic models for the oxygen-binding heraproteins. *Account. Chem. Res.* 10:265-72, 1977. [The *SC*[®] indicates that this paper has been cited over 115 times since 1977.]
5. Collman J P, Denisevich P, Konal Y, Marrocco M, Koval C & Anson F C. Electrode catalysis of the four-electron reduction of oxygen to water by dicobalt face-to-face porphyrins. *J.*