BOOK REVIEWS

Iron Porphyrins, Parts I and II
(Volumes 1 and 2 of Physical Bioinorganic Chemistry Series). A. B. P. Lever and H. B. Gray, (eds.)
Addison-Wesley, 1983, Vol. 1, 281 p., Tables, Figures, Indexes; Vol. 2, 254 p., Tables, Figures, Indexes

These two volumes inaugurate an open-ended series which is aimed to cover, at an advanced but still pedagogical level, the physico-chemical theories and techniques used for the investigation of the structure and role of metal ions in living systems. The volumes are appropriately dedicated to iron porphyrins, which are probably the most familiar examples of bioinorganic chemistry to non specialists in the field. Some of the most outstanding personalities in this field have contributed chapters covering the various physico-chemical aspects of iron porphyrin chemistry.

Part I.

Chapter 1 by Gilda H. Loew (87 pages, 157 refs.) reflects the long-standing experience of the author, who assembles the theoretical methods for the investigation of iron porphyrins, from the relatively old all-valence extended Hückel to its iterative, exchange-energy-corrected version, to INDO, Xα, and *ab initio* approaches. Chapter 2 by Robert W. Scheidt and Martin Gouterman (50 pages, 120 refs.) gives in a clear and well organized way the theoretical basis for establishing relationships among nature of the ligands, spin state, and geometry in iron porphyrins and other metalloporphyrins. These two chapters together are an excellent updating of reviews which appeared in 'The Porphyrins' series five years before. Chapter 3 by Marvin W. Makinen and Antonie K. Churg (94 pages, 187 refs.) dealing with the electronic spectra of hemeproteins gives a sound theoretical basis for the assignment of the charge transfer transitions in several oxidation and spin states of the iron, among which the high oxidation numbers are now of particular interest, and establishes an interesting relationship between redox potentials and transition energies. The first volume ends with a Chapter by Harold M. Goff (44 pages, 198 refs.) on the NMR or iron porphyrins containing selected topics among the vast literature on the subject. While not as deep as other review articles on the matter, it is still a useful guideline for experimentalists.

Part II.

Chapter 1 by Samaresh Mitra (42 pages, 80 refs.) is the first detailed review article on magnetic susceptibility as applied to heme-containing systems and, as such, constitutes a precious tool for anyone approaching the field. In Chapter 2 (45 pages, 89 refs.) Graham Palmer gives a plain introduction to EPR spectroscopy as applied to hemeproteins where one can find both the theoretical background for the interpretation of the spectra and a substantial updating of the literature since the appearance of a review article by the same author in 'The Porphyrins' series (1979). Chapter 3 by Thomas J. Spiro (70 pages, 236 refs.) gives a deep and updated account of the Resonance Raman technique as applied to metalloporphyrins and hemeproteins. Finally, Chapter 4 by Karl M. Kadish (88 pages, 176 refs.) covers extensively the various electrochemical techniques applied to the study of iron porphyrins in non aqueous media, and their implications for the understanding of the electron transfer process.

All together, these two volumes are an excellent contribution to the area of bioinorganic-biophysical chemistry; the Editors' personalities and the outstanding standard of these volumes are the best guarantee for the success of the series.

Claudio Luchinat

Advances in Inorganic and Bioinorganic Mechanisms.
Edited by A. G. Sykes, Academic Press Volume 1 (1982)

This first volume of a new series deals with seven separate subjects, five of which relate to inorganic chemistry and two to structure and function of iron and copper-containing proteins. The volume is consistent in one respect in that it contains a comprehensive kinetic treatment in support of most of the proposed mechanisms.

The first chapter by James Espenson deals with the synthesis and reactivity of the Cr^{III}–C σ bond. There are many similarities between this chemistry and that of the well established field of Co^{III}–C organometallic chemistry. Espenson's strength is in his treatment of the kinetics of these reactions which show that S_{E^2} and S_{H^2} reactions predominate. The S_{H^2} reactions are particularly interesting since they provide further experimental support for Jay Kochi's ideas on electron-transfer.

The second chapter by Fraser Armstrong is largely a literature survey on the iron–sulfur proteins and is rather non-critical but it does supply some useful data on the kinetics of electron-transfer. The weakest part is the discussion of the newly discovered Fe_3S_3 systems, and their equilibria with Fe_4S_4 complexes. Both Fe_3S_3 and Fe_4S_4 complexes on the same pro-

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