

Manganese Redox Enzymes, edited by V.L. Pecoraro, VCH Publishers, New York, 1992, 290 pp., US\$186.00, ISBN 0-89573-729-9.

This authoritative monograph presents 12 chapters prepared by 11 groups of leading experts working at the interface of inorganic biochemistry of mangano-enzymes.

Seven chapters review biochemical and biophysical approaches used to investigate the photosynthetic water-oxidizing enzyme, two more emphasize synthetic inorganic modelling studies of this enzyme, one chapter focuses on structural studies of the dimanganese catalases and another reviews oxygen transfer reactions of oxo-manganese porphyrins. The editor has also provided an introductory chapter which gives a general overview of these and other mangano-enzymes including Mn superoxide dismutase, Mn ribonucleotide reductase, Mn thiosulfate oxidase and Mn peroxidase. This chapter also introduces fundamental concepts of coordination chemistry and magnetism of elementary Mn complexes, which provides a foundation for the chapters which follow. The emphasis on the photosynthetic water oxidase reflects the current popularity of research on this important enzyme. The nine chapters on this enzyme cover a wide range of topics including: alternative substrates (Frasch), ligand substitution reactions (Brudvig and Beck), the calcium and chloride cofactors (Yocum), optical (Dekker), EPR (Vanngard, Hansson and Haddy) and X-ray absorption (Sauer, Yachandra, Britt and Klein) properties, NMR proton relaxation (Sharp) and synthesis and characterization of polynuclear Mn clusters (Armstrong; Pecoraro). The literature in this field has become enormous, as exemplified by a recent review article citing 1000 publications (R.J. Debus, *Biochim. Biophys. Acta*, 1102 (1992) 269). Hence, the opportunity to read focused reviews by the leading practitioners enables the interested reader to become quickly informed of a vast literature. Structural and mechanistic studies of the bacterial catalases are surveyed by Penner-Hahn in a timely article illustrating a simpler dimanganese enzyme which shares some structural and functional properties with the water oxidase. This is wisely placed as the second chapter if one is reading in sequence. Stern and Groves present one of the best chapters with their extensive review of the literature concerning the chemistry of oxo atom transfer reactions by synthetic Mn-porphyrins. These are compared with the chemistry catalyzed by the analogous Fe-porphyrin complexes, which are functional models of the cytochrome-P450 class of heme enzymes.

It would have been useful to include a concluding chapter summarizing the oxo/peroxo/dioxygen chemistry of the various Mn_x structural units discussed in the preceding chapters. Even without this aid, the book is superb.

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