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Book reviews

Metal Ions in Biological Systems: Vol. 12: Properties of Copper: Vol. 13: Copper Proteins: General Editor; Helmut Sigel, multi-author specialist work as listed below. Marcel Dekker, Inc., New York, 1981, xx + 353 pages, SFr. 165 (~ £49), ISBN 0-8247-1429-6, and xx + 394 pages, SFr. 168 (~ £50), ISBN 0-8247-1504-7, respectively.

The twelfth volume of this well-known series on metal ions in biological systems is devoted to a review of the properties of copper which are judged to be important for its study in biological systems, and volume thirteen goes on to review the properties of the individual copper proteins in detail.

Copper is an important element which occurs in some enzymes and proteins, and is widely distributed in both animals and plants. It is involved in respiratory processes, including electron transfer and oxidation of a range of substrates. It is an essential trace element for normal development and growth, but is toxic to the organism when present in larger amounts.

Volume twelve begins with a general discussion of the coordination chemistry of copper(I), -(II), and -(III), the redox properties, the general stereochemistry, and the spectroscopic properties, including electronic spectra and the electron spin resonance behaviour of copper(II) (R.F. Jameson). Chapter two concerns copper(II) as a probe in substituted metalloproteins (I. Bertini and A. Scozzafava). Chapter three describes the chemistry of copper(III) and shows that it is an acceptable and accessible oxidation state, particularly when stabilised by peptide coordination (D.W. Margerum and G.D. Owens). A discussion is included of copper(III) intermediates in organic reactions and of the factors influencing the redox behaviour of peptide complexes.

Copper-catalysed oxidation and oxygenation is surveyed critically in chapter four (H. Gamp and A.D. Zuberbühler). Firstly, reactions are discussed where dioxygen is reduced but without incorporation into the organic substrate. This is followed by a discussion of copper-catalysed mono-oxygenation and then di-oxygenation. The chapter concludes with a thoughtful discussion of the philosophy of model studies. Chapters three and four contain material of direct interest to organometallic chemists.

Chapter five discusses the role of copper in the oxidation of haemoglobins (J.M. Rifkind). Studies of the binding of copper(II) to the protein and the subsequent mechanism of electron transfer are described. The transport of copper through the gastrointestinal tract, in blood, across membranes, and in excretion are described in chapter six (B. Sarkar). The carrier molecules involved are described together with the identification of a transport site on albumin. A discussion of pathological conditions resulting from aberrations in copper levels and the proposed drug therapy concludes this chapter. The final chapter discusses the role of low molecular weight copper complexes in the control of rheumatoid arthritis (P.M. May and D.R. Williams) and the way in which copper concentrations may be manipulated in vivo.