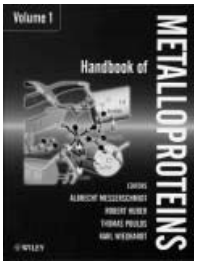
Handy Books

Handbook of Metalloproteins. Vols. 1 and 2. Edited by *Albrecht Messerschmidt, Robert Huber, T. Poulos* and *K. Wieghardt*. John Wiley & Sons Inc., New York 2001. 1472 pp., hardcover £ 545.00.—ISBN 0-417-62743-7

Research on metalloproteins has attracted scientists from a wide variety of disciplines including inorganic chemistry, biochemistry, biophysics, molecular biology, microbiology, molecular medicine, protein crystallography, and various areas of spectroscopy. Because of the interdisciplinary character of this field and the fast pace of developments, there is certainly a need for a specialist handbook. This two-volume work is very well suited to satisfying that need. In preparing it the editors decided to limit the treatment to metalloproteins for which three-dimensional structures have been determined. That ensures a solid foundation for examining the functional and other properties of these proteins. Furthermore, the treatment is initially being limited to metalloproteins of the redox-active metals iron, nickel, manganese, cobalt, molybdenum, tungsten, copper, and vanadium. Those of redox-inactive metals such as zinc, sodium, potassium, magnesium, and calcium, and of heavy metals such as mercury and silver will be covered in future volumes. Lastly, the editors mention that a few proteins that would have qualified for inclusion here were not considered; these will be included in a future electronic version of the handbook, together with metalloproteins whose structures have recently been determined.



The work begins with iron-containing proteins, in accordance with their special importance, and follows the usual convention of dividing them into heme and non-heme systems. The heme proteins are further subdivided according to their functions, with chapters on oxygen transport and storage, cytochromes, cytochrome peroxidases, cytochrome P-450, and oxido-reductases. Under non-heme proteins there are chapters on iron–sulfur clusters, mononuclear and (in Volume 2) binuclear proteins, and on the storage and transport of iron. Volume 2 includes descriptions of nickel, manganese, cobalt, and molybdenum/tungsten proteins. Copper proteins are divided into Type 1 (blue), Type 2, and Type 3 (binuclear) species, followed by chapters on Cu_A centers, proteins with more than two copper centers, and the storage and transport of copper.

For each protein the presentation follows a uniform style, with the three-dimensional structure shown on the first page, followed by sections on the functional class, occurrence, and biological function. The information about amino acid sequences includes detailed references to literature and data banks. Further sections deal with the isolation and purification of the proteins, molecular characterization, metal content, cofactors, and results from activity tests. Spectroscopic properties are followed by discussions about structural and functional aspects, with detailed information about crystal structure, crystallization, the structure of the protein as a whole, and the structure of the active center. This includes a diagram showing the coordination of the metal at the active center, and data on metal–ligand bond lengths. The discussion of functional aspects covers the role of the protein moiety, redox properties, and enzyme kinetics and mechanisms. Depending on the nature of the protein, there may also be information about functional derivatives (reduced, oxidized, inhibitor-bound, metal-free, or metal-substituted forms) and about mutants or special intermediates. In some cases a separate section is devoted to the catalytic mechanism. PDB codes are given for all the structures, and the codes are also collected together at the end of Volume 2.

The work is intended for scientists working in the area and for students. It will certainly serve as an up-to-date, reliable, and detailed source of information for those groups of users. All the articles have been written by well-known researchers with important publications on the relevant proteins to their credit. The well thought out scheme of the work and the consistent system of presentation ensure that the information is clear and easily accessible. As expected, the individual chapters reflect the special interests of their authors. For example, the level of presentation of spectroscopic aspects varies considerably. However, the main emphasis throughout is on structural aspects, and the volumes are extremely valuable as a reference source. But they are more than that, as it is a pleasure just to read this handsome and carefully produced work, and to let oneself be carried along by the beauty and fascination of the subject. Therefore, potential readers with an interest in this field are certainly recommended to buy the handbook.

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