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Book review

Methods for Determining Metal Ion Environments in Proteins:
Structure and Function of Metalloproteins. Editors,
D.W. Darnall and R.G. Wilkins, Elsevier/North-Holland,
New York, Amsterdam, Oxford, 1980, pp. xii + 324. Price £29.50

This is the second title in the Advances in Inorganic Biochemistry series under the general editorship of G.L. Eichhorn and L.G. Marzilli. It is based on lectures delivered at a Conference on Methods for Determining Metal Ion Environments in Proteins, which was held in Las Cruces, New Mexico, on January 10-12, 1979.

It has been known for a very long time that healthy organic growth is dependent, amongst other things, on the presence of certain metal ions, often in no more than trace quantities. With the development of sophisticated separation and analytical techniques important enzymes whose function or even existence is dependent on metal ions are now being isolated and their metal content noted. The metal ions are often at the centre of enzymic activity and their environments and mode of bonding become an important question in relation to the functioning enzyme. It is not easily answered by the classical methods of structure determination. Resort must often be made to indirect spectroscopic methods, using as its basis the data obtained from the study of coordination compounds over the past thirty years. Thus inorganic and more particularly coordination chemistry are merging with biochemistry and becoming important sciences in the understanding of life's processes.

This book presents a unique series of reviews by experts directing their attention to the determination of metal environments in metalloproteins. There are chapters on the application of electron absorption spectroscopy (H.B. Gray), circular dichroism and magnetic circular dichroism (B.L. Vallee and B. Holmquist), metal ions as donors and acceptors of fluorescence (B. Holmquist), infra-red spectroscopy (W.S. Caughey), raman spectroscopy (D.F. Shriver), electron paramagnetic resonance (G. Palmer), high resolution NMR (L. Lee and B.D. Sykes), nuclear relaxation rates (A.S. Mildvan, J. Granot, G.M. Smith and M.N. Liebman), the kinetic approach (G.G. Hammes), X-ray diffraction (W.N. Lipscomb), and the resolution of metal-ligand distances in metalloproteins by EXAFS (B.M. Kincaid and R.C. Shulman). The book has a useful index of about 13 pages in length.

The authors have attempted to give a succinct account of their particular methods in application to determining metal environments in proteins. Obviously some have achieved their objective better than others, but in general they have succeeded.

The book is an important addition to the chemical literature and serves also a useful source book for references into the more detailed reviews and texts on the individual methods.

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