BOOKS section



BIOELECTROCHEMISTRY-I: BIOLOGICAL REDOX REACTIONS

Editors: G Milazzo and M Blank

Ettore Majorana International Science Series Life Sciences; Vol.II. Plenum Press, New York, 1983; xi + 348 pp, Numerous tables and figures. 26 cm x 17 cm.

This book is the Proceedings of the first course on bioelectrochemistry, and this was the XI International School of Biophysics held at the E. Majorana Center during Nov 29-Dec 5, 1981 in Erice, Sicily, Italy. As a basic phenomenon of life, redox reactions have been chosen as the subject of this first school. After the opening address by Antonio Borsellino, a chapter on "Bioelectrochemistry and bioenergetics: An interdisciplinary Survey" is written by Giulio Milazzo.

IN the chapter " General criteria for the fulfilment of redox reactions", Rene Buvet discusses in detail (i) the mass and charge balances of biochemical redox reactions, (ii) energy balances of redox reactions, (iii) chemical storage of energy by photosynthesis, (iv) kinetic criteria for the fulfilment of redox reactions, and (v) oxygen reduction in aqueous media.

THE most interesting chapter is that of Helmut Metzner on photosynthesis. The historical development of this branch of science is traced in a most interesting and lucid manner. He developes this chapter to current problems of biotechnological importance, viz. (i) bioproduction of hydrogen, (ii) a simple rechargeable battery having a chloroplast suspension electrolyte, and (iii) the possibility of reducing carbon dioxide to formic acid, maldehyde and finally to methanol.

BRUNO Andrea Melandri presents in detail the energetics of biological redox reactions. He discusses (i) the compartmentation and coupling of biological redox reactions (ii) thermodynamic characterization of enzymatic redox systems in biological membranes, (iii) coupling redox events and proton translocation, and (iv) charge separation and proton binding.

IN the chapter "Kinetics in Bioelectrochemistry: Photoredox reactions at elctrodes and in solution" Herrman Berg discusses photo polarographic method. After explaining the photoredox reactions of sensitizers at electrodes and in solutions, Berg indicates their applications in microbiological and medical fields.

HANS Wolfgang Nurnberg's chapter on " Application of advanced voltammetric methods in bioelectrochemistry" is an excellent review of advanced voltammetric techniques applicable to biology. He points out the large potentialities these methods have in understanding bioelectrochemical changes in living systems. The scope for spectroscopic method is also emphasized.

MARTIN Blank discusses trans-membrane potential and redox reactions from a physiological point of view. He describes natural membranes, electrical double layers, association of multi-subunit proteins and membrane potentials.

IN the chapter "The mitochondrial respiratory chain", David F. Wilson describes the experimental techniques which have been used in studying the said phenomenon and in understanding the electrochemical behaviour of oxidative phosphorylation.

IN his chapter on "Electrochemical methodologies in biomedical application", J Raghavendra Rao depicts the state of art and the scope of electrochemical methodologies. He gives examples of biogalvanic cells and biofuel cells. He describes sensor electrodes, and dwells upon the transfer of electrical signals and electrosimulation in detail. He points out at length the possibilities of exploiting electrochemical principles and properties in clinical and biomedical practice

the end of each chapter, relevant references e cited to enable the interested research worker gain, not only general information, but also a re detailed and deeper insight in that rticular topic.

IS book has been written and edited with utmost clarity. The subjects included are in a sequence which have a certain sense of logical development. This book may be rightly considered as the starting point for a treatise on bioelectrochemistry.

K S A GNANASEKHARAN CECRI Karaikudi

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1. N. Schwarz, M. Gresh and S. Karlik, J. Electrochem. Soc., 108-8, (1967) 7. [Volume - number (year) page]

2. H.H. Uhlig, Corrosion and Corrosion Control, (2nd Ed) (1971), Wiley-Interscience, New York, p.147.

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