

Contents

<i>Dedication</i>	v
<i>Contributors</i>	xiii
<i>Preface</i>	xix
<i>Acknowledgments</i>	xxi

I Photosystem II Reaction Center: Structure and Photochemistry

Prompt and Delayed Fluorescence from Photosystem II	3
<i>Louis N. M. Duysens</i>	
Photochemical Properties of the Pheophytin Primary Electron Acceptor in Photosystem II	15
<i>Bacon Ke</i>	
Photosystem II Reaction Center Complex Purified from Higher Plants	27
<i>Kimiyuki Satoh</i>	
Fluorescence Emission Spectra of Photosystem II Reaction Center Complexes and Chlorophyll-Binding Subunits at Low Temperature	39
<i>Akihiko Yamagishi and Sakae Katoh</i>	
Correlation of the Low Temperature 695-nm Fluorescence Emission with the Reaction Center of PSII (CP47)	49
<i>H. Y. Nakatani</i>	
Properties of the Electron Acceptor Complex of Photosystem II	55
<i>M. C. W. Evans and Y. E. Atkinson</i>	
Low Temperature EPR Measurements of the PSII Reaction Center: New Developments	63
<i>A. W. Rutherford</i>	

II Donor Side Electron Transport: Role of Essential Factors

- Studies on the Mechanism of Photosynthetic Oxygen Formation **73**
Gernot Renger, Hann-Jörg Eckert, and Wolfgang Weiss
- Spectrophotometric Methods of Probing the Donor Side
of Photosystem II **83**
Bruno Velthuys
- Structure and Inhibition of Components on the Oxidizing Side
of Photosystem II **91**
D. F. Ghanotakis, P. J. O'Malley, G. T. Babcock, and C. F. Yocum
- Effect of Ferricyanide on EPR Signal II in Oxygen-Evolving PSII
Membranes **103**
Mitsuyoshi Yuasa, Hiroyuki Koike, and Yorinao Inoue
- Possible Role of Cytochrome b_{559} in Photosystem II **113**
Warren L. Butler and Hideyuki Matsuda
- Biochemical Properties of the Enigmatic Chloroplast Cytochrome b_{559} :
Partial Amino Acid Sequence of a Purified b_{559} Polypeptide and Studies
on the Identity of the $M_r = 9,000$ Phosphoprotein **123**
*W. R. Widger, W. A. Cramer, M. Hermodson, M. Gullifor, D. Meyer,
J. Farchaus, and B. Liedtke*
- Studies of Oxygen Evolution Using Water Analogs and Mass
Spectrometry **135**
Richard Radmer
- EPR Evidence for the Involvement of a Discrete Manganese Cluster
in Oxygen Evolution **145**
*G. Charles Dismukes, Daniel A. Abramowicz, Kim F. Ferris,
Pavan Mathur, Yona Siderer, Bala Upadrashta, and Paula Watnick*
- Properties of the S_2 State Associated with Oxygen Evolution **159**
Gary W. Brudvig, John L. Casey, and Kenneth Sauer
- Molecular Orbital Study on the Role of Manganese in Photosynthetic Water
Oxidation: A Model for the Molecular Mechanism **165**
Masami Kusunoki

III**Structure of the Oxygen-Evolving System:
Polypeptide Composition and Functional Reconstitution**

- Identification of Photosystem II-Thylakoid Proteins through Mutational Analysis with *Chlamydomonas* and *Scenedesmus* Phenotypes **177**
Norman I. Bishop
- Electron Transport Activity and Polypeptide Composition of the Isolated Photosystem II Complex **189**
Peter O. Sandusky, Cathy L. Selvius DeRoo, David B. Hicks, Charles F. Yocum, Demetrios F. Ghanotakis, and Gerald T. Babcock
- Polypeptides Involved in Photosynthetic Oxygen Evolution with Special Emphasis on a 23-Kilodalton Protein **201**
Hans-Erik Åkerlund
- On the Functional Role of a 23-Kilodalton Polypeptide for Photosynthetic Water Oxidation **209**
Gernot Renger and Hans-Erik Åkerlund
- Organization of the Photosynthetic Oxygen Evolution System **213**
Norio Murata, Mitsue Miyao, and Tomohiko Kuwabara
- Characterization of 33-Kilodalton, 24-Kilodalton, and 18-Kilodalton Proteins in the Photosynthetic Oxygen Evolution System of Spinach Chloroplasts **223**
Tomohiko Kuwabara and Norio Murata
- Organization of the Oxygen-Evolution Enzyme Complex in a Highly Active Oxygen-Evolving Photosystem II Preparation **229**
Yasusi Yamamoto and Mitsuo Nishimura
- Proteins Essential for Recovering Oxygen Evolution in Cholate-Treated Thylakoids **239**
Yoshinori Toyoshima, Kozo Akabori, Eitaro Fukutaka, and Akiko Imaoka
- Isolation of a Manganese Protein from Cyanobacterium Thylakoids and Its Participation in Dehydrogenation of Water **245**
Kozi Asada and Shunya Okada
- Preparation of Oxygen-Evolving Photosystem II Particles from a Thermophilic Blue-Green Alga **257**
Hiroyuki Koike and Yorinao Inoue

The Use of Lauroyl Choline Chloride to Probe Photosystem II Function:
Water Splitting, Photosystem II Photochemistry, and Polypeptide
Composition **265**

T. Wydrzynski and B. J. Huggins

Heterogeneity of Photosystem II in Spinach Thylakoids **273** ✓

Jan M. Anderson and Anastasios Melis

IV

Specific Inactivation and Reactivation of Photosystem II Electron Transport

Interactions of Protons with Photosystem II **283**

Peter H. Homann, James D. Johnson, and Valerie R. Pfister

Chloride Ion-Sensitive Inactivation of Oxygen Evolving Centers **293**

S. Izawa, A. Muallem, and N. K. Ramaswamy

Comments on the Possible Roles of Bicarbonate and Chloride Ions
in Photosystem II **303**

Govindjee, I. C. Baianu, C. Critchley, and H. S. Gutowsky

Effect of Bicarbonate on Electron Transfer between Plastoquinones
in Photosystem II **317**

J. Farineau and P. Mathis

Factors Required for Photoreactivation of Tris-Inactivated Grana
Preparations **327**

Takashi Yamashita and Akira Ashizawa

Factors Required for Photoactivation of the Latent Oxygen-Evolving System:
Some New Findings Derived from Intact Chloroplast System **337**

Taka-aki Ono and Yorinao Inoue

The Mechanism of Photoactivation of Oxygen Evolution in Dark-Grown
Coniferous Leaves **345**

Tatsuo Oku

Effect of Usnic Acid on Photosystem II Electron Transport **351**

Hiroshi Inoué, Munenori Noguchi, and Kazumi Kubo

V Acceptor Side Electron Transport: Role of Quinones and Related Phenomena

- Electron Transfer on the Acceptor Side of Photosystem II **359**
Pierre Joliot and Anne Joliot
- Kinetics of the Reaction of the Two-Electron Gate of Photosystem II:
Studies of the Competition between Plastoquinone and Inhibitors **369**
Shin-ichi Taoka, Howard H. Robinson, and Antony R. Crofts
- Bacterial Reaction Centers as a Model for Photosystem II: Turnover
of the Secondary Acceptor Quinone **383**
C. A. Wraight and R. R. Stein
- Studies on Quinones in Green Leaves **393**
Shigeki Okayama
- Assignment of Function to Polypeptides of 32–34 Kilodaltons
in Thylakoids **401**
D. J. Kyle, I. Ohad, R. Guy, and C. J. Arntzen
- Inhibitor and Plastoquinone Binding to Photosystem II **411**
Walter Oettmeier and Achim Trebst
- Regulation of Membrane Reactions by Surface Potential **421**
Shigeru Itoh, Noriaki Tamura, Ken Hashimoto, and Mitsuo Nishimura
- Induction of Millisecond Delayed Luminescence in the Thermophilic Blue-Green
Alga *Synechococcus lividus* **431**
Kazuhiko Satoh and David C. Fork
- Recent Advances in the Studies of Thermoluminescence
of Photosystem II **439**
Yorinao Inoue
- Index* 451