

## **LIST OF PUBLICATIONS STENBJÖRN STYRING (March 2014)**

- R. *Review paper.*  
 B. *Book chapter*  
 T. *Thesis.*  
 P. *Paper presented in conference proceedings or similar.*  
 L. *Letter/commentary*
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Danielsson, R., Suorsa, M., Paakkarinen, V., Albertsson, P.-Å., Aro, E.-M., Styring, S. and Mamedov, F. (2013) The protein composition of Photosystem II varies in different domains of the thylakoid membrane.

*J. Biol. Chem., in preparation*

Thapper, A., Mamedov, F. and Styring, S. () Wavelength dependent photoinhibition of Photosystem II.

*Biochim Biophys Acta, in preparation*

Karnahl, Michael; Rau, Sven; Vos, Johannes; Styring, Stenbjörn and Huang, Ping () A Time-resolved EPR study of the light driven generation of H<sub>2</sub> using a Ru-tpphz-Pd complex as the photocatalyst

*In preparation*

Sjöholm, J., Chen, G., Ho, F., Mamedov, F., and Styring, S. (2013) Methanol allows the induction of a pH independent split EPR signal at 5 K from the S<sub>2</sub> state of the oxygen evolving complex.

*Biochemistry, submitted*

Mamedov, F. and Styring, S. (2013) EPR signals from Photosystem II, an overview from different species.

*Photosynthesis Research, in preparation*

Han G., Mamedov F. and Styring S. S-state transitions in Photosystem II at different flash frequencies and temperatures. (2013)

*In preparation*

Mokvist, F., Thapper, A., Mamedov, F. and Styring, S. (2014) Temperature dependence of the far-red photochemistry in Photosystem II.

*In preparation*

Koroidov, S., Anderlund, M.F., Styring, S., Thapper, A. and Messinger, J. (2014) Mechanism of water oxidation catalyzed by Co/M2P-oxides studied by isotope-ratio membrane inlet mass spectrometry

*In preparation*

Mokvist, F., Mamedov, F. and Styring, S. (2014) Defining the far red limit of Photosystem I. The primary charge separation is functional up to 840 nm

*Submitted to J Biol Chem.*

Karonen, M., Mattila, H., Huang, P., Mamedov, F., Styring, S. and Tyystjärvi, E. (2014) A tandem mass spectrometric method for the singlet oxygen measurement.

*Submitted to Photochem. Photobiol.*

Mokvist, F., Mamedov, F. and Styring, S. (2014) The photochemistry in Photosystem II is different in visible and far-red light.

*Submitted to Biochemistry*

Mamedov, F. and Styring, S (2013) Recombination reactions in Photosystem II as a probe for the S<sub>2</sub> and S<sub>3</sub> states of the water oxidizing complex

*Frontiers of Bioscience submitted*

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- 255 Suorsa, M., Rantala, M., Danielsson, R., Järvi, S., Paakkari, V., Schröder, V.P., Styring, S., Mamedov, F., Aro, E.M., (2014) Dark-adapted spinach thylakoid protein heterogeneity offers insights into the photosystem II repair cycle. *BBA - Bioenergetics, in press*.
- 254 Shevchenko, D., Anderlund, M.F., Styring, S., Dau, H., Zaharieva, I., and Thapper, A., (2013) Water oxidation by manganese oxides formed from tetranuclear precursor complexes and the influence of phosphate on structure and activity. (2013) *Phys. Chem. Chem. Phys., In press*
- 253 Wang, H.-Y., Liu, J., Zhu, J., Styring, S., Ott, S., and Thapper, A. (2014) A Ru-Co hybrid material based on a molecular photosensitizer and a heterogenous catalyst for light-driven water oxidation. *Phys. Chem. Chem. Phys., 16, 3661-3669*
- 252 Raleiras, P., Kellers, P., Lindblad, P., Styring, S. and Magnuson, S. (2013) Isolation and characterization of the small subunit of the uptake hydrogenase from the cyanobacterium *Nostoc Punctiforme* *J Biol Chem., 288, 18345-18352*
- 251 Sjöholm, J., Chen, G., Ho, F.M., Mamedov, F. and Styring, S. (2013) Split EPR signal induction in photosystem II suggests two binding sites in the S<sub>2</sub> state for the substrate analogue methanol *Biochemistry, 52, 3669-3677*
- 250 Volgusheva, A., Styring, S. and Mamedov, F. (2013) Increased Photosystem II stability promotes the H<sub>2</sub> production in S-deprived *Chlamydomonas reinhardtii*. *Proc Natl acad of USA, 110, 7223-7228*
- 249 Feyziyev, Y., Deak, Z., Styring, S. and Bernat, G. (2013) Electron transfer from Cyt *b*<sub>559</sub> and tyrosine-D to the S<sub>2</sub> and S<sub>3</sub> states of the water oxidizing complex in photosystem II at cryogenic temperatures. *J Bioenerg Biomembr 45, 111-120*
- 248 Thapper, T., Styring, S., Saracco, G., Rutherford, A.W., Robert, B., Magnuson, A., Lubitz, W., Llobet, A., Kurz, P., Holzwarth, A., Fiechter, S., de Groot, H., Campagna, S., Braun, A., Bercegol, H. and Artero, V. (2013) Artificial Photosynthesis for Solar Fuels – an Evolving Research Field within AMPEA, a Joint Programme of the European Energy Research Alliance *Green, 3, 43-57*
- 247 Faunce T.A., Lubitz W., Rutherford A.W., MacFarlane, D., Moore, G.F., Yang P., Nocera D.G, Moore, T.A., Gregory D.H., Fukuzumi S., Yoon K.B., Armstrong F.A., Wasielewski M.R. and Styring, S.. (2013)

Energy and Environment Policy Case for a Global Project on Artificial Photosynthesis.  
*Energy and Environmental Science*, **6**, 695-698

- 246 Faunce, T., Styring, S., Wasielewski, M.R., Brudvig, G.W., Rutherford, A.W., Messinger, J., Lee, A.F., Hill, C.L., deGroot, H., Fontecave, M., MacFarlane, D.R., Hankamer, B., Nocera, D.G., Tiede, D.M., Dau, H., Hillier, W., Wang, L., and Amal, R., (2013) Artificial photosynthesis as a frontier technology for energy sustainability  
*Energy and Environmental Science*, **6**, 1074-1076
- 245 Shevchenko, D., Huang, P., Bon, V.V., Thapper, A., Anderlund, M.F., Kokozay, V. N. and Styring, S., (2013) Synthesis, crystal structure, mass spectrometry, electrochemistry, and magnetism of a MnIII-substituted trilacunary Keggin tungstosilicate  
*Dalton Trans.*, **42**, 5130-5139
- 244 Magnuson, A. and Styring, S. (2012) Molecular Chemistry for Solar Fuels: From Natural to Artificial Photosynthesis.  
*Australian J Chem.* **65**, 564-572
- 243 S. Styring, J. Sjöholm, and F. Mamedov (2012) Two tyrosines that changed the world: Interfacing the oxidizing power of photochemistry to water splitting in photosystem II.  
*Biochimica et Biophysica Acta - Bioenergetics* **1817**, 76-87.
- 242 S. Styring (2012) Solar Fuels: Vision and Concepts  
*Ambio* **41**, 156-162.
- 241 S. Styring (2012) Artificial photosynthesis for solar fuels  
*Faraday Discuss.* **155**, 357-376.
- 240 J. Sjöholm, S. Styring, K.G.V. Havelius, and F.M. Ho (2012) Visible light induction of an electron paramagnetic resonance split signal in photosystem II in the S<sub>2</sub> state reveals the importance of charges in the oxygen-evolving center during catalysis: A unifying model  
*Biochemistry* **51**, 2054-2064.
239. M. Risch, D. Shevchenko, M.F. Anderlund, S. Styring, J. Heidkamp, K.M. Lange, A. Thapper, and I. Zaharieva (2012) Atomic structure of cobalt-oxide nanoparticles active in light-driven catalysis of water oxidation  
*Int. J. Hydrogen Energ* **37**, 8878-8888.
238. G. Han, F. Mamedov, and S. Styring (2012) Misses during water oxidation in photosystem II are S state-dependent  
*J. Biol. Chem.* **287**, 13422-13429.
237. G. Berggren, M.F. Anderlund, S. Styring, and A. Thapper (2012) FTIR study of manganese dimers with carboxylate donors as model complexes for the water oxidation complex in Photosystem II  
*Inorg. Chem.* **51**, 2332-2337
236. Thapper, A., Lomoth, R. and Styring, S. (2011) Artificial photosynthesis  
*Encyclopedia for electrochemistry*, **in press**
- 235 Chen, G., Han, G., Göransson, E., Mamedov, F. and Styring, S. (2011) Stability of the S<sub>3</sub> and S<sub>2</sub> state intermediates in Photosystem II directly probed by EPR spectroscopy

*Biochemistry*, **51**, 138-148

- 234 Planas, N., Vigara, L., Cady, C., Miró, P., Huang, P., Hammarström, L., Styring, S., Leidel, N., Dau, H., Haumann, M., Gagliardi, L., Cramer, C.J. and Llobet, A. (2011) Electronic Structure of Oxidized Complexes Derived from  $\text{cis-}[\text{Ru}^{\text{II}}(\text{bpy})_2(\text{H}_2\text{O})_2]^{2+}$  and its Photoisomerization Mechanism. *Inorganic Chemistry*, **50**, 11134-11142
- 233 Hammarström, L., Winkler, J. R., Gray, H.B. and Styring, S. (2011) Shedding Light on Solar Fuel Efficiencies. Letter in *Science* **333**, 288
- 232 Grasse, N., Mamedov, F., Becker, K., Styring, S., Rögner, M. and Nowaczyk, M.M. (2011) The role of a novel dimeric Photosystem II-Psb27 complex in PSII repair. *J Biol Chem*, **286**, 29548-29555.
- 231 Styring, S and Hammarström, L (2011) Proton-coupled electron transfer of tyrosines in Photosystem II and model systems for artificial photosynthesis: The role of a redox-active link between catalyst and photosensitizer. *Energy & Environmental Science* **4**, 2379–2388
230. Magnuson, A., Krassen, H., Stensjö, K., Ho, F.M. and Styring, S. (2011) Modelling Photosystem I with the Alternative Reaction Center Protein PsaB2 in the Nitrogen Fixing Cyanobacterium *Nostoc punctiforme*. *Biochim Biophys Acta*, **1807**, 1152-1161
229. Garcia-Bosch, I., Company, A., Cady C.W., Styring, S., Browne, W.R., Ribas, X. and Costas, M. (2011) Evidence for a Precursor Complex in C-H Hydrogen Atom Transfer Reactions Mediated by a Manganese (IV)-Oxo Complex *Angewandte Chemie*, **50**, 5647-5652
- 228 Berggren, G., Thapper, A., Huang, P., Eriksson, L., Styring, S., and Anderlund M. F. (2011) Mechanistic studies on the water oxidizing reaction of homogeneous Mn-based catalysts; isolation and characterization of a suggested catalytic intermediate. *Inorg. Chem.* **50**, 3425-3430
- 227 Chen, G., Allahverdiyeva, Y., Aro, E.-M., Styring, S. and Mamedov, F. (2011) Electron paramagnetic resonance study of the electron transfer reactions in photosystem II membrane preparations from *Arabidopsis thaliana* *Biochim Biophys Acta* **1807**, 205-215
- 226 Shevchenko, D., Anderlund, M. F., Thapper, A. and Styring, S. (2011) Photochemical water oxidation with visible light using a cobalt containing catalyst *Energy and Environmental Science*, **4**, 1284-1287
- 225 Havelius, K.G.V., Su, J-H., Han, G., Mamedov, F., Ho, F.M., and Styring, S. (2011) The formation of the split EPR signal from the  $\text{S}_3$  state of photosystem II does not involve primary charge separation. *Biochim. Biophys. Acta* **1807**, 11-21.
- 224 Berggren, G., Huang, P., Eriksson, L., Styring, S. Anderlund, M.F. and Thapper, A. (2010) Synthesis and characterisation of low valent Mn-complexes as models for Mn-catalases *Dalton Transactions* **39**, 11035-11044

- 223 Sjöholm, J., Havelius, K.G.V., Mamedov, F., and Styring, S. (2010) Effects of pH on the S<sub>3</sub> state of the oxygen evolving complex in photosystem II probed by EPR split signal induction. *Biochemistry* **49**, 9800-9808.
- 222 Ott, S., Styring, S., Hammarström, L., and Johansson, O. (2010) Towards Solar Fuels using a biomimetic Approach. Progress in the Swedish Consortium for Artificial Photosynthesis  
In “*Energy production and storage*”; Inorganic Chemical Strategies for a Warming World, edited by Robert Crabtree, Chichester, UK: John Wiley & Sons, Ltd, pp 199-227
- 221 Semenaka, V.V., Nesterova, O.V., Kokozay, V.N., Zybalyuk, R.I., Shishkin, O.V., Boča, R., Shevchenko, D.V., Huang, P. and Styring, S. (2010) Direct Synthesis of Heterometallic {Mn<sup>II</sup><sub>3</sub>Cr<sup>III</sup><sub>4</sub>} Wheel by Destruction of Reineckes Salt. *Dalton Trans.*, **39**, 2344-2349.
- 220 Editorial comment  
Hammarström, L. and Styring, S. (2009) Splitting with a difference  
*Nature Chemistry* **1**, 185-186
- 219R Magnuson, A., Anderlund, M., Johansson, O., Lindblad, P., Lomoth, R., Polivka, T., Ott, S., Stensjö, K., Styring, S., Sundström, V. and Hammarström L. (2009) Biomimetic and Microbial Approaches to Solar Fuel Generation. *Accounts Chemical Res.*, **42**, 1899-1909
218. Berggren, G., Thapper, A., Huang, P., Kurz, P., Eriksson, L., Styring, S. and Anderlund, M.F. (2009) Two tetra-nuclear Mn-complexes as biomimetic models of the oxygen evolving complex in Photosystem II. A synthesis, characterisation and reactivity study.  
*Dalton Trans*, 10044-10054
217. Sjöholm J., Havelius K.G.V., Mamedov F. and Styring S. The S<sub>0</sub> state of the water oxidizing complex in photosystem II: pH dependence of the EPR Split signal induction and mechanistic implications. (2009)  
*Biochemistry* **48**, 9393-9404.
- 216R Havelius K.G.V., Sjöholm J., Ho F.M., Mamedov F. and Styring S. Metalloradical EPR signals from the Y<sub>Z</sub><sup>•</sup>S-state intermediates in photosystem II. (2010)  
*Appl. Magnetic Resonance* **37**, 151-176.
215. Cox, N., Ho, F.M., Penwin, N., Steffen, R., Smith, P.J., Havelius, K.G.V., Hughes, J.L., Debono, L., Styring, S., Krausz, E. and Pace R.J. (2009) The S<sub>1</sub> Split Signal of Photosystem II; a tyrosine-manganese coupled interaction.  
*Biochim Biophys Acta* **1787**, 882-889
214. Thapper A., Mamedov F., Mokvist, F., Hammarström L. and Styring S. The far red limit of photosystem II in higher plants. (2009), *Plant Cell* **21**, 2391-2401
213. Allahverdiyeva Y., Mamedov F., Holmström M., Nurmi M., Lundin B., Styring S., Spetea C. and Aro E-M. Comparison of the electron transport properties of the *psbo1* and *psbo2* mutants of *Arabidopsis thaliana*. (2009)  
*Biochim. Biophys. Acta* **1787**, 1230-1237.

212. Sicora, C.I., Ho, F.M., Salminen, T., Styring, S. and Aro, E.M. (2009) Transcription of a "silent" cyanobacterial *psbA* gene is induced by microaerobic conditions  
*Biochim Biophys Acta* **1787**, 105-112
211. Beckmann, K., Uchtenhagen, H., Berggren, G., Anderlund, M.F., Thapper, A., Messinger, J., Styring, S. and Kurz, P. (2008) Formation of stoichiometrically  $^{18}\text{O}$ -labelled oxygen from the oxidation of  $^{18}\text{O}$ -enriched water mediated by a dinuclear manganese complex—a mass spectrometry and EPR study.  
*Energy and Envir Sci* **1**, 668-676
210. Kurz, P., Anderlund, M.F., Shaikh, N., Styring, S. and Huang, P. (2008) Redox reactions of a dinuclear manganese complex - the influence of water.  
*European J Inorg. Chem.* **5**, 762-770
- 209 P. Magnuson, A., Lomoth, R., Falkenström, M., Eilers, G., Johansson, O., Anderlund, M., Styring, S. and Hammarström, L. (2008) Charge separation and charge compensation in artificial photosynthetic complexes.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 1268-1272
- 208 P. Ho, F.M. and Styring, S. (2008) Access channels and methanol binding site to the  $\text{CaMn}_4$  cluster in photosystem II based on solvent accessibility simulations, with implications for substrate water access.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 431-435
- 207 P. Mamedov, F., Havelius, K.G.V. and Styring, S. (2008) ESEEM study of the light-induced split  $\text{S}_1$  EPR signal from photosystem II.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 445-449
- 206 P. Cardona, T., Styring, S., Lindblad, P. and Magnusson, A. (2008) Purified heterocysts from *Nostoc punctiforme* studied by laser scanning confocal microscopy.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 755-758
- 205 P. Han, G., Morvaridi, S.F., Ho, F., Mamedov, F. and Styring, S. (2008) S-state dependence of misses in the OEC probed by EPR spectroscopy of individual S-states.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 419-422
- 204 P. Havelius, K.G.V., Su, J.-H., Ho, F., Mamedov, F., and Styring, S. (2008) The mechanism(s) behind the formation of the "split  $\text{S}_3$  EPR signal" in photosystem II induced by visible or near infrared light.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 423-426

- 203 P. Thapper, A., Mamedov, F. and Styring, S. (2008) IR-induced photochemistry in photosystem II.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 522-524
- 202 P. Styring, S., Beckman, K., Berggren, G., Uchtenhagen, H., Anderlund, M., Thapper, A., Messinger, J. and Kurz, P. (2008) Oxygen evolving reactions by synthetic manganese complexes.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 1282-1284
- 201 P. Sjöholm, J., Havelius, K.G.V., and Styring, S. (2008) pH dependence of the S<sub>0</sub> split EPR signal in photosystem II.  
In *Photosynthesis. Energy from the Sun: 14<sup>th</sup> International Congress on Photosynthesis* (eds J.F. Allen, E. Gantt, J.H. Goldbeck and B. Osmond) Springer, Heidelberg, pp. 499-502
- 200 Han, G., Ho, F.M., Havelius, K.G.V., Morvaridi, S.F., Mamedov, F. and Styring, S. (2008) Direct quantification of the four individual S-states in Photosystem II using EPR spectroscopy  
*Biochim Biophys Acta* **1777**, 496-503
- 199 Mamedov F., Danielsson R., Gadjieva R., Albertsson P.-Å. and Styring S. (2008) EPR Characterization of Photosystem II from different domains of the thylakoid membrane.  
*Biochemistry* **47**, 3883-3891
- 198 Tikkanen, M., Nurmi, M., Soursa, M., Danielsson, R., Mamedov, F., Styring, S. and Aro, E.-M. (2008) Phosphorylation-Dependent Regulation of Excitation Energy Distribution between the Two Photosystems in Higher Plants  
*Biochim Biophys Acta* **1777**, 425-432
- 197 Hammarström, L. and Styring, S. (2008) Coupled Electron Transfers in Artificial Photosynthesis.  
*Phil. Trans. Royal. Soc. B* **363**, 1283-1291
- 196 Ho, F. and Styring, S. (2008) Access channels and methanol binding site to the CaMn<sub>4</sub> cluster in Photosystem II based on solvent accessibility simulations, with implications for substrate water access  
*Biochim Biophys Acta* **1777**, 140-153
- 195 Cardona, T., Battchikova, N., Agervald, Å., Zhang, P., Nagel, E., Aro, E.-M., Styring, S., Lindblad, P., Magnuson, A., (2007) Isolation and characterization of thylakoid membranes from the filamentous cyanobacterium *Nostoc punctiformae*  
*Physiologia Plantarum* **131**, 622-634
- 194 Kurz, P., Berggren, G., Anderlund, M. and Styring S. (2007) Oxygen evolving reactions catalysed by synthetic manganese complexes: A systematic screening.  
*Dalton Trans*, 4258-4261
- 193 Havelius, K.G.V. and Styring, S. (2007) pH dependent competition between Y<sub>Z</sub> and

- $Y_D$  in photosystem II probed by illumination at 5 K  
*Biochemistry*, **46**, 7865-7874
192. Huang, P., Kurz, P. and Styring, S. (2007) EPR investigations of synthetic manganese complexes as bio-mimics of the water oxidation complex in Photosystem II.  
*Appl. Magn. Res.* **31**, 301-320
191. Allahverdieva, Y., Mamedov, F., Soursa, M., Styring, S., Vass, I. and Aro, E.-M. (2007) Insights into the function of the PsbR protein in *Arabidopsis thaliana*.  
*Biochim. Biophys. Acta* **1767**, 677-685.
190. Mamedov, F., Gadjieva, R. and Styring, S. (2007) Oxygen induced changes in the redox state of the Cytochrome  $b_{559}$  in Photosystem II depend on the integrity of the Mn cluster  
*Physiol. Plantarum* **131**, 41-49
189. Veerman, J., McConnel, M.D., Vasilev, S., Mamedov, F., Styring, S. and Bruce, D. (2007) Functional heterogeneity of Photosystem II in specific regions of the thylakoid membrane of Spinach (*Spinacia oleracea* L.)  
*Biochemistry* **46**, 3443-3453
188. Mamedov, F., Nowaczyk, M., Thapper, A., Rögner, M. and Styring, S. (2007) Functional characterization of monomeric Photosystem II core preparations from *Thermosynechococcus elongatus*.  
*Biochemistry* **46**, 5542-5551
187. Su, J.-H., Havelius, K.G.V., Ho, F.M., Mamedov, F. and Styring, S. (2007) Formation Spectra of the Split EPR Signals in Photosystem II Induced by Monochromatic Light at 5 K.  
*Biochemistry* **46**, 10703-10712
186. Sirijovski, N., Mamedov, F., Olsson, U., Styring, S. and Hansson, M. (2007) *Rhodobacter capsulatus* magnesium chelatase subunit BchH contains an oxygen sensitive iron-sulfur cluster.  
*Arch of Microbiology* **188**, 599-608
185. Ho, F.M., Morvaridi, S.F., Mamedov, F., and Styring, S. (2007) Enhancement of  $Y_D^{\bullet}$  spin relaxation by the  $CaMn_4$  cluster in Photosystem II detected at room temperature: A new probe for the S-cycle  
*Biochim. Biophys. Acta* **1767** 5-14
184. Havelius, K.G.V; Su, J.-H.; Feyzyiev, Y., Mamedov, F. and Styring, S. (2006) Spectral Resolution of the Split EPR Signals Induced by Illumination at 5K from the  $S_1$ -,  $S_3$ - and  $S_0$ -states in Photosystem II.  
*Biochemistry* **45**, 9279-9290
183. Anderlund, M.F., Höglblom, J., Shi, W., Huang, P., Eriksson, L., Weihe, H., Styring, S., Åkermark, B., Lomoth, R. and Magnuson, A. (2006) Redox Chemistry of a Dimanganese(II,III) Complex with an Unsymmetric Ligand. Water binding, deprotonation and accumulative light-induced oxidation.  
*Eur J Inorg Chem* **2006** 5033-5047
182. Su, J.-H., Havelius, K.G.V., Mamedov, F., Ho, F.M. and Styring, S. (2006). Split EPR



- signals from Photosystem II are modified by methanol, reflecting S-state dependent binding and alterations in the magnetic coupling in the CaMn<sub>4</sub> cluster.  
*Biochemistry* **45**, 7617-7627
181. Danielsson R., Suorsa M., Paakkarinen V., Albertsson P.-Å., Styring S., Aro E.-M. and Mamedov F. (2006), Dimeric and monomeric organization of photosystem II: distribution of five distinct complexes in the different domains of the thylakoid membrane.  
*J Biol. Chem.* **281**, 14241-14249
180. R. Lomoth, R., Magnuson, A., Sjödin, M., Huang, P., Styring, S., Hammarström, L. (2006) Mimicking the Electron Donor side of Photosystem II in artificial Photosynthesis.  
*Photosynthesis Res* **87**, 25-40
179. Huang, P., Shaikh, N., Anderlund, M.F., Styring, S. and Hammarström, L. (2006) Consistent simulation of X- and Q-band EPR spectra of an unsymmetric dinuclear Mn<sub>2</sub><sup>II,III</sup> complex.  
*J of Inorganic Biochemistry* **100** 1139-1146
178. Shi, W.; Liu, Y.; Liu, B.; Song, Y.-G.; Xu, Y.-K.; Wang, H.-M.; Sha, Y.-L.; Xu, G.-Z.; Styring, S.; Huang, P.; (2006) "Synthesis and characterisation of a six-coordinated monomeric Mn(III) complex with SOD-like activity",  
*Journal of Coordination Chemistry*, **59**, 119-130
177. Suorsa, M., Sirpiö, S., Allahverdiyeva, Y., Paakkarinen, V., Mamedov, F., Styring, S. and Aro, E.-M. (2006) PsbR – a missing link in the assembly of the oxygen evolving complex of plant photosystem II.  
*J. Biol. Chem.*, **281**, 145 – 150
176. Xu, Y.-H., Eilers, G., Borgström, M., Pan, J.-X., Abrahamsson, M., Magnuson, A., Lomoth, R., Bergquist, J., Polivka, T., Sun, L.-C., Sundström, V., Styring, S., Hammarström, L., and Åkermark, B. (2005) Synthesis and characterization of dinuclear ruthenium complexes covalently linked to Ru-II tris-bipyridine: An approach to mimics of the donor side of photosystem II.  
*Chem. Eur. J.* **11**, 7305-7314
175. B. Magnuson, A., Hammarström, L. and Styring, S. (2005) Artificial Understanding Photosystem II function by Artificial Photosynthesis. In "Photosystem II: the light-driven water/plastoquinone oxidoreductase" (eds T. Wydrzynski and K. Satoh) Springer. Pp 753-775
174. Magnus Borgström,<sup>a</sup> Nizamuddin Shaikh,<sup>b</sup> Olof Johansson,<sup>d\*</sup> Magnus F. Anderlund,<sup>c</sup> Stenbjörn Styring,<sup>b,c</sup> Björn Åkermark,<sup>c</sup> Ann Magnuson,<sup>b\*</sup> Leif Hammarström<sup>a\*</sup> (2005) Light Induced Manganese Oxidation and Long-lived Charge Separation in a Mn<sub>2</sub><sup>II,II</sup>-Ru<sup>II</sup>-acceptor Triad.  
*J Am Chem Soc* **127**, 17504-17515.
173. P Ann Magnuson, Magnus F. Anderlund, Joakim Höglblom, Wei Shi, Reiner Lomoth, Licheng Sun, Stenbjörn Styring and Björn Åkermark (2005) A New Unsymmetric di-Manganese Complex supports Five Different Oxidation States; progress towards artificial photosynthesis. In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 1077-1079

172. P Åsa Nossed, Erik Nagel, Peter Lindblad, Stenbjörn Styring and Ann Magnuson (2005) An oxygen evolving thylakoid preparation from *Nostoc Punctiforme* strain pcc73102 In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 784-786
171. P Susan Fatemeh Morvaridi, Yashar Feyziyev and Stenbjörn Styring (2005) Effect of temperature on the miss-factor in the S-cycle determined by EPR. In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 359-361
170. P Fikret Mamedov, Ravi Danielsson, Marjaana Suorsa, Virpi Paakkarinen, Eva-Mari Aro, Stenbjörn Styring (2005) Super-complex organisation of Photosystem II in the different domains of the thylakoid membrane. In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 255-256
169. P Martin Sjödin, Stenbjörn Styring, Björn Åkermark, Licheng Sun, Leif Hammarström (2005) Switching the mechanism of bi-directional proton coupled electron transfer from tyrosine and tryptophan. In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 1090-1092
168. P Sigfridsson, K.G.V., Su, J.H., Feyziyev, Y., Mamedov, F., Styring S. (2005) Quantification of the light induced  $Y^z$ -split EPR-signals from Photosystem II in the  $S_0$ - and  $S_1$ -states and the pH-dependence of "Split  $S_1$ " In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 1071-1073
167. P Sigfridsson, K.G.V., Su, J.H., Feyziyev, Y. and Styring S (2005) The spectral resolution of the "Split  $S_1$ " and "Split  $S_0$ " EPR-signals from Photosystem II induced by illumination at 5K. In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 386-388
166. P Nizamuddin Shaikh, Olof Johansson, Magnus Borgström, Magnus Anderlund, Ping Huang; Ann Magnuson; Licheng Sun, Leif Hammarström; Stenbjörn Styring (2005) Photoinduced intramolecular electron transfer in a  $Mn_2^{II,II}-Ru^{II}-(NDI)_2$  triad leading to a long-lived charge-separated state – mimicking the electron transfer chain in Photosystem II. In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 1092-1092
165. P Su J.H., Sigfridsson, K.G.V., Feyziyev, Y. Mamedov, F. and Styring S (2005) Flash-number dependent oscillation of split EPR signals from the OEC in PSII induced by illumination at 5 K. In *Photosynthesis: Fundamental Aspects to Global Perspectives* (eds A. van der Est and D. Bruce) 404-406
164. Sjödin M, Styring S, Wolpher H, Xu Y, Sun L and Hammarström L. (2005) Switching the Redox Mechanism: Models for Proton-Coupled Electron Transfer from Tyrosine and Tryptophan. *J. Am. Chem. Soc.* 127, 3855-3863.
163. Wolpher, H., Huang, P, Borgström, M., Bergquist, J., Styring, S., Sun, L. and Åkermark, B. (2004) Synthesis of a  $Ru(bpy)_3$ -type complex linked to a free terpyridine ligand and its use for preparation of polynuclear bimetallic complexes. *Catalysis today*, 98, 529-536
162. Sigfridsson, K.G.V., Bernat, G., Mamedov, F. and Styring, S. (2004) Molecular

- interference of  $\text{Cd}^{2+}$  with Photosystem II.  
*Biochim. Biophys. Acta*, 1659, 19-31
161. Mamedov, F., Smith, P.J., Styring, S. and Pace, R.J. (2004) Relaxation behaviour of the tyrosine  $\text{Y}_D$  radical in Photosystem II – evidence for strong dipolar interaction with paramagnetic centers in the  $\text{S}_1$  and  $\text{S}_2$  states.  
*Physical Chemistry Chemical Physics*, 6, 4890-4896
160. Sjödin, M., Ghanem, R., Polivka, T., Pan, J., Styring, S., Sun, L., Sundström, V., and Hammarström, L. (2004) Tuning proton coupled electron transfer from tyrosine: A competition between concerted and step-wise mechanisms.  
*Physical Chemistry Chemical Physics*, 6, 4851-4858.
159. Pan, J., Xu, Y., Benkö, G., Feyziyev, Y., Styring, S., Sun, L., Åkermark, B., Polivka, T. and Sundström, V. (2004) Stepwise charge separation from a Ruthenium-Tyrosine complex to a nanocrystalline  $\text{TiO}_2$  film.  
*J. Phys. Chem. B*. 108, 12904-12910
158. Huang, P., Höglblom, J., Anderlund, M., Sun, L., Magnuson, A. and Styring, S. (2004) Light-induced multistep oxidation of dinuclear manganese complexes for artificial photosynthesis.  
*J Inorg. Biochem.* 98, 733-745.
157. Danielsson, R., Albertsson, P.-Å., Mamedov, F. and Styring, S. (2004) Quantification of Photosystem I and II in Different Parts of the Thylakoid Membrane from Spinach.  
*Biochim. Biophys Acta*, 1608, 53-61
- 156.B. Sun, L., Åkermark, B., Hammarström, L. and Styring, S. (2003). Towards Solar Energy Conversion Into Fuels – Design and Synthesis of Ruthenium-Manganese Supramolecular Complexes to Mimic the Function of Photosystem II.  
*In Utilization of Greenhouse Gases (eds Liu, C.-J., Mallinson, R.G. and Aresta, M.) Amer. Chem. Soc. Books Dept., Symposium Series no 852. Washington, USA.219-244*
155. Sun, L., Tran, A., Xu, Y., Lomoth, R., Huang-Kenez, P., Magnuson-Styring, A., Åkermark, B., Hammarström, L. and Styring, S. (2002) Synthesis and EPR study of Ru-Mn dimer complexes as catalysts for light driven water oxidation.  
*In Preprints from Symposium American Chemical Society Div. for Fuel Chemistry*, 47, 300-303
154. Kropacheva, T.N., Feikema, W.O., Mamedov, F., Feyziyev, Y., Styring, S. and Hoff, A. (2003) Spin conversion of cytochrome  $b_{559}$  in Photosystem II induced by exogenous high potential quinone.  
*Chem. Phys*, 294, 471-482
153. Johansson, A., Abrahamsson, M., Magnuson, A., Huang, P., Mårtensson, J., Styring, S., Hammarström, L., Sun, L., and Åkermark, B. (2003) Synthesis and Photophysics of one mononuclear Mn(III) and one dinuclear Mn(III,III) complex covalently linked to a ruthenium (II) tri(bipyridyl) complex  
*Inorganic Chem.*, 42, 7502-7511
152. Feyziyev, Y., van Rotterdam, B., Bernat G. and Styring, S. (2003) Electron transfer from cytochrome  $b_{559}$  and tyrosine $_D$  to the  $\text{S}_2$  and  $\text{S}_3$  states of the water oxidizing complex in Photosystem II.

*Chem Phys* 294, 415-431

151. Wolpher, H., Borgström, M., Hammarström, L., Bergquist, J., Sundström, V., Styring, S., Sun, L. and Åkermark, B. (2003) Synthesis and Properties of an Iron Hydrogenase Active Site Model Linked to a Ruthenium tris-Bipyridine Photosensitizer.  
*Inorg. Chem. Commun.* 6, 989-991
150. Zhang, C. and Styring, S (2003) Formation of split Electron Paramagnetic Resonance signals in Photosystem II suggests that Tyrosine<sub>Z</sub> can be photooxidized at 5K in the S<sub>0</sub> and S<sub>1</sub> states of the oxygen evolving complex.  
*Biochemistry*, 42, 8066-8076
149. Styring, S., Feyziyev, Y., Mamedov, F., Babcock, G.T. and Hillier, W. (2003) pH dependence of the donor side reactions in Ca<sup>2+</sup> depleted Photosystem II.  
*Biochemistry*, 42, 6185-6192
148. Mamedov, F. and Styring, S. (2003) Logistics in the life cycle of Photosystem II – lateral movement in the thylakoid membrane and activation of the electron transfer.  
*Physiologia Plantarum* 119, 1-9
147. Peterson, S., Åhrling, K.A., Höglblom, J. and Styring, S. (2003) Flash induced relaxation changes of the EPR signals from the manganese cluster and Y<sub>D</sub> reveal a light-adaptation process of Photosystem II  
*Biochemistry* 42, 2748-2758
146. Sjödin, M., Styring, S., Åkermark, B., Sun, L. and Hammarström, L. (2002) The mechanism for Proton Coupled Electron Transfer from Tyrosine in a Model Complex and Comparisons with Tyrosine<sub>Z</sub> Oxidation in Photosystem II.  
*Phil. Trans. R. Soc. Lond. B* 357, 1471-1479
145. Lomoth, R., Huang, P., Zheng, J., Sun, L., Hammarström, L., Åkermark, B. and Styring, S. (2002) Synthesis and characterization of a dinuclear Manganese (III,III) complex with three phenolate ligands.  
*Eur. J. Inorg. Chem.* 2965-2974
144. Ghanem, R., Xu, Y., Pan, J., Hoffman, T., Andersson, J., Polívka, T., Pascher, T., Styring, S., Sun, L. and Sundström, V. (2002) Light-Driven Tyrosine Radical Formation in a Ruthenium-Tyrosine Complex Anchored to Nanoparticle TiO<sub>2</sub>.  
*Inorg. Chem.* 41, 6258-6266
143. Mamedov, F., Rintamäki, E., Aro, E.-M., Andersson, B., and Styring, S. (2002) Influence of protein phosphorylation on the electron transport properties of Photosystem II.  
*Photosynthesis Research*, 74, 61-72.
142. P Smith, P.J., Krausz, E., Masters, V.M., Wydrzynski, T., Peterson, S., Styring, S., and Pace, R.J. (2002) Low temperature optical – MCD and EPR studies on a fully active plant PS II complex conating 32 Chl per reaction centre. In *Proc of the 11<sup>th</sup> Photosynthesis conference in Brisbane 2002*. Ed Critchley, C. and Osmond, B.
141. P Magnuson Styring, A., Huang-KenéZ, P., Lomoth, R., Tran, A., Fryxelius, J., Abrahamsson, M., Schmidt, H., Tamm, M., Zheng, J., Höglblom, J., van Rotterdam, B., Park, J., Berglund Baudin, H., Åkermark, B., Styring, S., Hammarström, L and Sun, L.

- (2002) High-valent Ruthenium-Manganese complexes for solar energy production. In *Proc of the 11<sup>th</sup> Photosynthesis conference in Brisbane 2002*. Ed Critchley, C. and Osmond, B.
140. P Peterson, S., Åhrling, K.A., Höglblom, J., and Styring, S. (2002) EPR studies of the oxygen evolving complex reveal a light-adaptation process in Photosystem II. In *Proc of the 11<sup>th</sup> Photosynthesis conference in Brisbane 2002*. Ed Critchley, C. and Osmond, B.
139. P Bernat, G., Morvaridi, F., Feyzyev, Y. and Styring, S. (2002) pH-dependence of the four steps in the S-cycle in Photosystem II. In *Proc of the 11<sup>th</sup> Photosynthesis conference in Brisbane 2002*. Ed Critchley, C. and Osmond, B.
138. P Styring, S., Feyzyev, Y., Mamedov, F., Babcock, G.t. and Hillier, W. (2002) The pH-dependence of the donor side reactions in  $\text{Ca}^{2+}$ -depleted Photosystem II: A role for  $\text{Ca}^{2+}$  in the proton expulsion pathway. In *Proc of the 11<sup>th</sup> Photosynthesis conference in Brisbane 2002*. Ed Critchley, C. and Osmond, B.
137. P Morvaridi, F., Feyziyev, Y., Bernat, G., Geijer, P., Mamedov, F. and Styring, S. (2002) pH-dependent oxidation of Cytochrome  $b_{559}$  is different in the different S-states. In *Proc of the 11<sup>th</sup> Photosynthesis conference in Brisbane 2002*. Ed Critchley, C. and Osmond, B.
136. P Zhang, C. and Styring, S. (2002) His 190 might directly bridge  $Y_Z$  and the Mn-cluster: Mechanistic consequences for water oxidation deduced from DFT calculation. In *Proc of the 11<sup>th</sup> Photosynthesis conference in Brisbane 2002*. Ed Critchley, C. and Osmond, B.
135. Smith, P.J., Peterson, S., Masters, V.M., Wydrzynski, T., Styring, S., Krausz, E. and Pace, R. (2002) Magneto optical measurements of the pigments in fully active Photosystem II core complexes from plants. *Biochemistry* **41**, 1981-1989
134. Bernat, G., Morvaridi, F., Feyziyev, Y. and Styring, S. (2002) pH-dependence of the four individual transitions in the catalytic S-cycle during photosynthetic oxygen evolution. *Biochemistry* **41**, 5830-5843
133. Abrahamsson, M.A., Berglund Baudin, H., Tran, A., Philouze, C., Berg, K. E., Raymond-Johansson, M., K., Sun, L., Åkermark, B., Styring, S. and Hammarström, L. (2002) Ruthenium-Manganese Complexes for Artificial Photosynthesis: Factors Controlling Intramolecular Electron Transfer and Excited State Quenching Reactions. *Inorganic Chemistry* **41**, 1534-1544
132. Huang, Ping., Magnuson, A., Lomoth, R., Abrahamsson, M., Tamm, M., Sun L., van Rotterdam, B., Park, J., Hammarström, L., Åkermark, B. and Styring, S. (2002) Photo-induced oxidation of a dinuclear  $\text{Mn}^{\text{II,II}}$  complex to the  $\text{Mn}^{\text{III,IV}}$  state by inter- and intramolecular electron transfer to  $\text{Ru}^{\text{III}}$  tris-bipyridine. *J Inorganic Biochemistry* **91**, 159-172
131. P Styring, S. och Magnuson-Styring, A. (2001) Artificiell fotosyntes. Att härma växterna för framtida energiförsörjning. 8 sidor i *Rapport från Energitinget, Statens Energimyndighet. Eskilstuna, Sweden.*

130. **R** Hammarström, L., Sun, L., Åkermark, B., and Styring, S. (2001) A biomimetic approach to artificial photosynthesis: Ru(II)-polypyridine photosensitisers linked to tyrosine and manganese electron donors  
*Spectrochimica and Spectrophysica Acta* **57**, 2145-2160
129. P. Geijer, F. Morvaridi and S. Styring. (2001) The S<sub>3</sub> state of the oxygen evolving system in Photosystem II is converted to the S<sub>2</sub>Y<sub>Z</sub><sup>•</sup> state at alkaline pH.  
*Biochemistry* **40**, 10881-10891.
128. Berg, K.E., Tran, A., Raymond, M.K., Abrahamsson, M., Wolny, J., Redon, S., Andersson, M., Sun, L., Styring, S., Hammarström, L., Toftlund, H., and Åkermark, B. (2001) Covalently linked Ruthenium(II) – Manganese (II) Complexes: Distance Dependence of Quenching and Electron Transfer  
*Eur. J. Chem*, **2001**, 1019-1029
127. Hammarström, L., Sun, L., Åkermark, B., and Styring, S. (2000) Mimicking Photosystem II Reactions in Artificial Photosynthesis: Ru(II)-polypyridine photosensitisers linked to tyrosine and manganese electron donors.  
*Catalysis Today* **58**, 57-69
126. **R P.** Geijer, S. Peterson, K. A. Åhrling, Z. Deak and S. Styring. (2001)  
Comparative studies of the S<sub>0</sub> and S<sub>2</sub> multiline EPR signals from the manganese cluster in Photosystem II.  
*Biochim. Biophys Acta* **1503**, 83-95
125. **R.** Sun, L., Hammarström, L., Åkermark, B. and Styring, S. (2001) Towards Artificial Photosynthesis; Ruthenium - Manganese Chemistry for Energy Production.  
*Chemical Society Reviews* **30**, 36-49
124. Geijer, P., Deak, Z. and Styring, S. (2000) Proton equilibria in the manganese cluster of Photosystem II control the intensities of the S<sub>0</sub> and S<sub>2</sub>-state g=2 EPR signals.  
*Biochemistry*, **39**, 6763-6772
123. Sjödin, M., Styring, S., Åkermark, B., Sun, L. and Hammarström, L. (2000) Proton Coupled Electron Transfer from Tyrosine in a Tyrosine-Ruthenium-tris-Bipyridine Complex: Comparison with Tyrosine<sub>Z</sub> Oxidation in Photosystem II.  
*J. Amer. Chem. Soc.* **122**, 3932-3936
122. Mamedov, F., Stefansson, H., Albertsson, P.-Å. and Styring, S (2000) Photosystem II in different parts of the thylakoid membrane: A functional Comparison between different domains.  
*Biochemistry*. **39**, 10478-10486
121. **B** Åhrling, K.A. and Styring, S. (1999) The Manganese Cluster in Photosystem II Investigated by EPR Spectroscopy  
In *Probing Photosynthesis* (eds Yunus, Mohanty and Pathre) Taylor and Frances Ltd, London, Chapter 7, 148-163
120. **R.** Sun, L., Åkermark, B., Hammarström, L. and Styring, S. (1999) Intramolecular electron transfer from manganese to photogenerated Ru(bpy)<sub>3</sub><sup>3+</sup>. A functional mimic of the photoevents on the donor side of Photosystem II.  
*Trends in Inorganic Chemistry* **6**, 151-155

119. P. Hammarström, L., Sun, L., Magnusson, A., Frapart, Y., Berglund-Baudin, H., Åkermark, B., and Styring, S. (1999) Mimicking Photosystem II Reactions in Artificial Photosynthesis. Proceedings from IPS-12, Berlin August 1998. *Zeitschrift Phys Chem.* **213**, 157-163.
118. Sun, L., Raymond, M.-K., Magnuson, A., LeGourrierec, D., Tamm, M., Abrahamsson, M., Huang Kenez, P., Mårtensson, J., Stenhagen, G., Hammarström, L., Styring, S., and Åkermark, B. (2000) Towards an Artificial Model for Photosystem II: A Manganese(II,II) Dimer Covalently Linked to Ruthenium(II) *tris*-Bipyridine via a Tyrosine Derivative. *J. Inorg. Biochemistry* **78**, 15-22
117. Gadjieva, R., Mamedov, F., Renger, G. and Styring, S. (1999) Interconversion of Low and High-Potential Forms of Cytochrome  $b_{559}$  in Tris-Washed Photosystem II Membranes under Aerobic and Anaerobic Conditions *Biochemistry* **38**, 10578-10584
116. Deak, Z., Peterson, S., Geijer, P., Åhring, K. and Styring, S. (1999) Methanol Modification of the Electron Paramagnetic Signals from the  $S_0$  and  $S_2$  States of the Water Oxidizing Complex of Photosystem II. *Biochim Biophys Acta*, **1412**, 240-249
115. Peterson, S., Åhring, K.A. and Styring, S. (1999) The EPR Signals from the  $S_0$  and  $S_2$  States of the Mn Cluster in Photosystem II Relax Differently *Biochemistry* , **38**, 15223-15230
114. Magnuson, A., Rova, F., Mamedov, F., Fredriksson, P.-O. and Styring, S. (1999) The role of Cytochrome  $b_{559}$  and Tyrosine-D in Protection Against Photoinhibition During *in Vivo* Photoactivation of Photosystem II *Biochim. Biophys. Acta* **1411**, 180-191
113. Sun, L., Burkitt, M., Tamm, M., Raymond, M.K., Abrahamsson, M., LeGourrierec, D., M., Frapart, Y., Magnuson, A., Huang-Kenez, P., Brandt, P., Tran, A., Hammarström, L., Styring, S. and Åkermark, B. (1999) Hydrogen-Bond Promoted Intramolecular Electron Transfer to Photogenerated Ru(III): A Functional Mimic of Tyrosine<sub>Z</sub> and Histidine 190 in Photosystem II *J. Amer. Chem. Soc.* **121**, 6834-6842
112. P Magnuson, A., Rova, M., Mamedov, F. and Styring, S. (1998) Changes in the Oxidation State of Cytochrome  $b_{559}$  and Tyrosine D During *in vivo* Photoactivation In Garab, G. (ed.) *Photosynthesis: Mechanisms and Effect*; Kluwer Acad. Publ. Netherlands vol II, 1097-1100
111. P Yu, S.-G., Björn, L.O., Mamedov, F., Styring, S. and Albertsson, P.-Å (1998) Chloroplasts Largely Devoid of Grana Stacks Have Full Photosynthetic Capability Garab, G. (ed.) *Photosynthesis: Mechanisms and Effect*; Kluwer Acad. Publ. Netherlands vol III, 1847-1850
110. P Burkitt, M.J., Frapart, Y., Huang Kenez, P., Sun, L., Tamm, M., Magnuson, A., Åkermark, B. and Styring, S. (1998) Light-Induced Electron Transfer Between a Substituted Tyrosine and Ru *tris*bipyridine Garab, G. (ed.) *Photosynthesis: Mechanisms and Effect*; Kluwer Acad. Publ.

*Netherlands* vol V, 4217-4230

109. **P** Gadjieva, R., Mamedov, F., Renger, G. and Styring, S. (1998) Conversion of the low potential form of cytochrome b559 into the high potential form of Photosystem II under anaerobic and reducing conditions.  
In *Garab, G. (ed.) Photosynthesis: Mechanisms and Effect; Kluwer Acad. Publ. Netherlands* vol II, 1101-1104
108. **P** Deak, Z., Geijer, P., Peterson, S., Åhrling, K.A. and Styring, S. (1998) Effects of methanol on the EPR signals from the S<sub>0</sub> and S<sub>2</sub> states of the water oxidizing complex of PSII.  
In *Garab, G. (ed.) Photosynthesis: Mechanisms and Effect; Kluwer Acad. Publ. Netherlands* vol II, 1295-1298
107. **P** Åhrling, K.A., Peterson, S., and Styring, S. (1999) The S<sub>0</sub> state EPR signal from the Mn cluster arises from an isolated ground state.  
In *Garab, G. (ed.) Photosynthesis: Mechanisms and Effect; Kluwer Acad. Publ. Netherlands* vol II, 1291-1294
106. **P** Peterson, S., Åhrling, K.A., Frapart, Y.-M. and Styring, S. (1999) Pulsed and CW EPR relaxation studies of the S<sub>0</sub> signal from Photosystem II.  
In *Garab, G. (ed.) Photosynthesis: Mechanisms and Effect; Kluwer Acad. Publ. Netherlands* vol II, 1287-1290
105. **P** Babcock, G.T., Di Valentin, M., Dorlet, P., Hoganson, C., McCracken, J., Styring, S., Tommos, C. and Westphal, K. (1999) The proton environment about YZ as a function of metal content in Photosystem II.  
In *Garab, G. (ed.) Photosynthesis: Mechanisms and Effect; Kluwer Acad. Publ. Netherlands* vol II, 1351-1355
104. **P**. Styring, S., Svensson, B., Sayre, R.T. and Mamedov, F. (1999) Structural assignments around Tyrosine-Z in Photosystem II using site-directed mutagenesis and structural modelling.  
In *Garab, G. (ed.) Photosynthesis: Mechanisms and Effect; Kluwer Acad. Publ. Netherlands* vol II, 1267-1272
103. **P** Rova, M., Mamedov, F., Magnuson, A., Fredrikson, P.-O. and Styring, S. (1999) Coupled modification of the acceptor side of Photosystem II during photoactivation of the oxygen evolving complex  
In *Garab, G. (ed.) Photosynthesis: Mechanisms and Effect; Kluwer Acad. Publ. Netherlands* vol II, 1471-1474
102. **P**. Geijer, P., Deak, Z. and Styring, S. (1999) pH dependence of the S<sub>0</sub>-state multiline EPR signal from Photosystem II.  
In *Garab, G. (ed.) Photosynthesis: Mechanisms and Effect; Kluwer Acad. Publ. Netherlands* vol II, 1283-1286
101. Geijer, P., Peterson, S., Härndahl, U., Styring, S. and Sundby, C. (1998) Simultaneous detection of spin-coupled and decoupled Q<sub>A</sub><sup>-</sup> EPR signals in Photosystem II complexes isolated with isoelectric focusing.  
*Photosynthesis research* **58**, 231-243



100. Magnuson, A., Frapart, Y., Horner, O., Åkermark, B., Sun, L., Girerd, J.-J. and Styring, S. (1999) A Biomimetic Model System for the Water Oxidizing Triad in Photosystem II.  
*J. Amer. Chem. Soc.* **121**, 89-96
99. Tommos, C., McCracken, J.M., Styring, S. and Babcock, G.T. (1998) Stepwise Disintegration of the Photosynthetic Oxygen-Evolving Complex  
*J. Amer. Chem. Soc.* **120**, 10441-10452
98. Berglund-Baudin, H., Sun, L., Davydov, R., Sundahl, M., Styring, S., Åkermark, B., Almgren, M. and Hammarström, L. (1998) Intramolecular Electron Transfer from Manganese (II) Coordinatively Linked to a Photogenerated Ru(III)-Polypyridine Complex: A Kinetic Analysis  
*J. Phys. Chem. A*, **102**, 2512-2518
97. Åhrling, K.A., Peterson, S. and Styring, S. (1998) The  $S_0$  state from the Mn cluster in Photosystem II arises from an isolated  $S=1/2$  ground state.  
*Biochemistry*, **37**, 8115-8120
96. L. Hammarström, Sun, L., Åkermark, B. and Styring, S. (1998) Artificial Photosynthesis: Towards Functional Mimics of Photosystem II  
*Biochim. Biophys. Acta* **1365**, 193-199
95. Rova, M., Mamedov, F., Magnuson, A., Fredriksson, P.-O. and Styring, S. (1998) Coupled Activation of the Donor and the Acceptor Side of Photosystem II during Photoactivation of the Oxygen Evolving Cluster. *Biochemistry*, **37**, 11039-11045
94. Mamedov, F., Sayre, R.T. and Styring, S. (1998) Involvement of Histidine 190 on the D1 protein in Electron/Proton Transfer Reactions on the Donor Side of Photosystem II. *Biochemistry* **37**, 14245-14256
93. Åhrling, K.A., Peterson, S. and Styring, S. (1997) An Oscillating Manganese Electron Paramagnetic Resonance Signal from the  $S_0$  State of the Oxygen Evolving Complex in Photosystem II.  
*Accelerated Publication in Biochemistry* **36**, 13148-13152
92. Magnuson, A., Berglund, H., Korall, P., Hammarström, L., Åkermark, B., Styring, S. and Sun, L. (1997) Mimicking electron transfer reactions in Photosystem II: Synthesis and Photochemical Characterization of a Ruthenium(II) Tris-Bipyridyl Complex with a Covalently Linked Tyrosine  
*J. Amer. Chem. Soc.* **119**, 10720-10725
91. Sun, L., Berglund, H., Davydov, R., Norrby, T., Hammarström, L., Korall, P., Börje, A., Philouze, C., Berg, K., Tran, A., Andersson, M., Stenhagen, G., Mårtensson, J., Almgren, M., Styring, S. and Åkermark, B. (1997) Binuclear Ruthenium-Manganese Complexes as Simple Artificial Models for Photosystem II (PSII) in Green Plants  
*J. Am. Chem. Soc.* **119**, 6996-7004.
90. Blondin, G., Davydov, R., Philouze, C., Charlot, M.-F., Styring, S., Åkermark, B., Girerd, J.-J. and Boussac, A. (1997) Electron Paramagnetic Resonance Study of the  $S=1/2$  Ground State of a Radiolysis Generated Manganese(III)-Manganese(IV)<sub>3</sub> Form

- of  $[\text{Mn}^{\text{IV}}_4\text{O}_6(\text{bipy})_6]^{4+}$  (bipy=2,2'-bipyridine). Comparison with the Photosynthetic Oxygen Evolving Complex.  
*J Chem Soc, Dalton Trans.* 4069-4074
89. Blomberg, M.R.A., Siegbahn, P.E.M., Styring, S., Babcock, G.T., Åkermark, B. and Korall, P. (1997) A Quantum Chemical Study of Hydrogen Abstraction from Coordinated Water by a Tyrosyl Radical: a Model for Water Oxidation in Photosystem II.  
*J Am. Chem. Soc.* **119**, 8285-8292
88. Nivorozhkin, A. L., Anxolabéhère-Mallart, E., Mialane, P., Davydov, R., Guilhem, J., Cesario, M., Schussler, L., Audière, J.-P., Girerd, J.-J., Styring, S. Schussler, L. and Seris, J.-L. (1997) Structure and Electrochemical Studies of  $[(\text{trispicMeen})\text{ClFe(III)OFe(III)Cl}(\text{trispicMeen})]^{2+}$ . Spectroscopic Characterization of the Mixed-Valence Fe(III)OFe(II) Form. Relevance to the Active Site of Dinuclear Iron-Oxo Proteins.  
*Inorg .Chem..* **36**, 846-853
87. Sun, L., Hammarström, L., Norrby, T., Berglund, H., Davydov, R., Andersson, M., Börje, A., Korall, P., Philouze, C., Almgren, M., Styring, S. and Åkermark, B. (1997) Intramolecular electron transfer from coordinated manganese(II) to photo-generated ruthenium(III)  
*Chem. Commun*, 607-608
86. Styring, S., Sun, L., Hammarström, L., Davydov, R., Almgren, M., Berglund, H., Börje, A., Korall, P., Norrby, T., Philouze and Åkermark, B. (1997) Towards, Artificial Photosynthesis - Light-Induced Intramolecular Electron Transfer from Manganese(II) to Ruthenium (II) in a Binuclear Complex.  
*Proc. Indian Acad Sci (Chem. Sci)*, **109**, 389-396
85. Babcock, G.T., Espe, M., Hoganson, C., Lydakis-Simantiris, N., McCracken, J, Shi, W., Styring, S., Tommos, C. and Warncke, K. (1997) Tyrosyl Radicals in Enzyme Catalysis: Some Properties and a Focus on Photosynthetic Water Oxidation.  
*Acta Chemica Scandinavica* **51**, 533-540
84. Svensson, B., Etchebest, C., Tuffery, P., van Kan, P. Smith, J. and Styring, S. (1996) A model for the photosystem II reaction centre core including the structure of the primary donor P680.  
*Biochemistry* **35**, 14486-14502
83. Rova, M., MacEwen, B., Fredriksson, P.O. and Styring, S. (1996) Photoactivation and Photoinhibition are competing in a mutant of *Chlamydomonas reinhardtii* lacking the 23kDa subunit of Photosystem II.  
*J. Biological Chemistry*, **271**, 28918-28924
82. Jegerschöld, C. and Styring, S. (1996) Spectroscopic characterization of intermediate steps involved in donor-side photoinhibition of Photosystem II.  
*Biochemistry*, **35**, 7794-7801
81. P van Kan, P.J.M., van Stokkum, I.H.M. and Styring, S. (1995) Time-resolved EPR spectroscopy of the triplet state of the primary electron donor P680 in PSII. ; in *From Light to Biosphere* (Paul Mathis ed.) Kluwer Academic Publishers, the Netherlands,

Vol. I, 543-546

80. **P** Keren, N., van Kan, P.J.M., Berg, A., Gong, H., Shochat, S., Levanon, H., Styring, S., Andersson, B., and Andersson, B. (1995) On the mechanism of the low-light induced degradation of the D1 protein: involvement of back electron transfer in Photosystem II; in *From Light to Biosphere* (Paul Mathis ed.) Kluwer Academic Publishers, the Netherlands, Vol. IV, 299-302
79. **P** Kullander, C., Fredriksson, P.-O., Sayre, R.T., Minagawa, J., Crofts, A.R. and Styring, S. (1995) Electron donation from exogenous donors to Photosystem II studied in *Chlamydomonas reinhardtii* mutants. ; in *From Light to Biosphere* (Paul Mathis ed.) Kluwer Academic Publishers, the Netherlands, Vol. II, 321-324
78. **P** Tommos, C. and Styring, S. (1995) YZ as a hydrogen-atom abstractor in the water-oxidizing chemistry of Photosystem II. ; in *From Light to Biosphere* (Paul Mathis ed.) Kluwer Academic Publishers, the Netherlands, Vol. II, 475-478
77. **P** Svensson, B. and Styring, S. (1995) The structural environment of the tyrosyl radicals in Photosystem II. ; in *From Light to Biosphere* (Paul Mathis ed.) Kluwer Academic Publishers, the Netherlands, Vol. I, 647-650
76. **P** Jegerschöld, C., Arellano, J.B., Schröder, W.P., Barón, M., van Kan, P.J.M. and Styring, S. (1995) Cu<sup>2+</sup> inhibits electron transport through Photosystem II. An EPR study. ; in *From Light to Biosphere* (Paul Mathis ed.) Kluwer Academic Publishers, the Netherlands, Vol. I, 519-522
75. **P** Svensson, B., van Kan, P.J.M. and Styring, S. (1995) A proposal for the structure of the P680 pigments in Photosystem II. ; in *From Light to Biosphere* (Paul Mathis ed.) Kluwer Academic Publishers, the Netherlands, Vol. I, 425-430
74. **P** Rova, M., Mc Ewen, B., Fredriksson, P.O. and Styring, S. (1995) Balance between photoactivation and photoinhibition of Photosystem II in *Chlamydomonas reinhardtii* lacking the 23kDa extrinsic subunit. ; in *From Light to Biosphere* (Paul Mathis ed.) Kluwer Academic Publishers, the Netherlands, Vol. II, 291-294
73. Hoganson, C.W., Lydakis-Simantiris, N., Tang, X.-S., Tommos, C., Warncke, K., Babcock, G. T., Diner, B. A., McCracken, J. and Styring, S. (1995) A Hydrogen-Atom Abstraction Model for the Function of YZ in Photosynthetic Oxygen Evolution. *Photosynth. Res.* **46**, 177-184
72. **B** Styring, S. (1996) Principer för Naturens Fotosyntes - Vad kan vi Lära? i *Kan kunskap ersätta naturresurser* (K. Lindahl Kiessling redaktör) en antologi sammanställd av Kungliga Vetenskaps Akademin. Natur och Kultur
71. Tommos, C., Tang, X.-S., Warncke, K., Hoganson, C. W., Styring, S., McCracken, J., Diner, B. A. and Babcock, G.T., (1995) Spin-density distribution, conformation, and hydrogen bonding of the redox-active Tyrosine YZ in Photosystem II from multiple electron magnetic-resonance spectroscopies: Implications for photosynthetic oxygen evolution. *J Amer Chem Soc*, **117**, 10325-10335
70. Andréasson, L.-E., Vass, I. and Styring, S. (1995) Ca<sup>2+</sup> depletion modifies the electron

- transfer on both the donor and acceptor side of Photosystem II from spinach.  
*Biochim. Biophys Acta* **1230**, 155-164
69. Jegerschöld, C., Arrellano, J.B., Schröder, W. P, van Kan, P.J.M., Baron, M. and Styring, S. (1995) Cu(II) inhibition of the electron transfer through Photosystem II studied by EPR spectroscopy.  
*Biochemistry*, **34**, 12747-12754
  68. van Wijk, K.J., Nilsson, L. and Styring, S. (1994) Synthesis of reaction centre proteins and reactivation of redox components during repair of Photosystem II after light-induced inactivation,  
*J Biol Chem.* **269**, 28382-28392
  67. Tommos, C., Madsen, C., Vermaas, W. and Styring, S. (1994) Point-mutations affecting the properties of Tyrosine-D in Photosystem II. Characterization by isotopic labeling and spectral simulation.  
*Biochemistry* **33**, 11805-11813
  - 66.R Styring, S. and Jegerschöld, C. (1994) Light induced reactions impairing the electron transfer through photosystem II, in *Photoinhibition of Photosynthesis* (Eds N.R. Baker and J.R. Bowyer) pps 51-73
  65. Vermaas, W., Shen, G. and Styring, S. (1994) Electrons generated by Photosystem II are utilized by an oxidase in the absence of photosystem I in the cyanobacterium *Synechocystis* sp. PCC 6803,  
*FEBS Lett*, **337**, 103-108
  64. Vermaas, W., Vass, I., Eggers, B. and Styring, S. (1994) Mutation of a putative ligand to the non-heme iron in Photosystem II: implications for Q<sub>A</sub> reduction, electron transfer and herbicide binding.  
*Biochim. Biophys. Acta* . **1184**, 263-272
  63. Z. Deak, I. Vass and S. Styring (1994) Redox interaction of Tyrosine-D with the S-states of the water oxidizing complex in intact and chloride depleted photosystem II.  
*Biochim. Biophys. Acta*, **1185**, 65-74
  62. Roffey, R., van Wijk, K.-J., Sayre, R. and Styring, S. (1994) Spectroscopic characterization of Tyrosine-Z in histidine 190 mutants of the D1 protein in photosystem II in *Chlamydomonas reinhardtii*. Implications for the structural model of the donor side of PSII.  
*J Biol Chem*, **269**, 5115-5121
  61. Rova, M., Franzén, L.-G., Fredriksson, P.-O. and Styring, S. (1993) Photosystem II in a mutant of *Chlamydomonas reinhardtii* I lacking the 23 kDa psbP protein is sensitive to photoinhibition in the absence of chloride.  
*Photosynthesis research*, **39**, 75-83
  - 60.R Vermaas, W.F.J., Styring, S., Schröder, W. and Andersson, B. (1993) Photosynthetic water oxidation: the protein framework.  
*Photosynthesis research*, **38**, 249-263
  59. Koivuniemi, A., Swiezewska, E., Aro, E.-M. , Styring, S. and Andersson, B. (1993) Reduced content of the quinone acceptor Q<sub>A</sub> in photosystem II complexes isolated

- from thylakoid membranes after prolonged photoinhibition under anaerobic conditions. *FEBS Lett*, **327**, 343-346
58. Tommos, C., Davidsson, L., Svensson, B., Madsen, C., Vermaas, W. and Styring, S. (1993) Modified EPR spectra of the TyrosineD radical in photosystem II in site-directed mutants of *Synechocystis* sp. PCC 6803. Identification of side chains in the immediate vicinity of TyrD on the D2 protein *Biochemistry* **32**, 5436-5441
- 57.P Styring, S., Davidsson, L., Tommos, C., Vermaas, W. and Svensson, B. (1993) Structure of redox components in photosystem II studied with computer modelling, site-directed mutagenesis and EPR spectroscopy. *Photosynthetica* **28**, 225-241
56. Vass, I. and Styring, S. (1993) Characterization of chlorophyll triplet promoting states in Photosystem II sequentially induced during photoinhibition. *Biochemistry*, **32**, 3334-3341
55. P Vass, I. and Styring, S. (1992) Sequential reduction and protonation of the first quinone acceptor promotes chlorophyll triplet formation in photosystem II during photoinhibition. in "*Research in photosynthesis*" (ed. N. Murata), Vol IV, 411-418, Kluwer Academic Publishers, Dordrecht, The Netherlands.
54. P Fredriksson, P.-O., Franzén, L.-G. and Styring, S. (1992) Photoinhibition studied in a mutant of *Chlamydomonas reinhardtii* lacking the 23kDa extrinsic subunit of photosystem II. in "*Research in photosynthesis*" (ed. N. Murata), Vol IV, 491-494, Kluwer Academic Publishers, Dordrecht, The Netherlands.
53. P Styring, S., Davidsson, L., Tommos, C., Vermaas, W. and Svensson, B. (1992) EPR studies of the accessory electron donor tyrosine-D in photosystem II in mutants of *Synechocystis* 6803. in "*Research in photosynthesis*" (ed. N. Murata), Vol II, 251-254, Kluwer Academic Publishers, Dordrecht, The Netherlands.
52. P Svensson, B., Etchebest, C., Tuffery, P., Smith, J. and Styring, S. (1992) A structural model derived using molecular mechanics for the core of the photosystem II reaction centre including the redox components. in "*Research in photosynthesis*" (ed. N. Murata), Vol II, 147-150 Kluwer Academic Publishers, Dordrecht, The Netherlands.
51. P Koivuniemi, A., Swiezewska, E., Styring, S., E.-M. Aro and Andersson, B. (1992) Biochemical evidence for loss of QA from photosystem II reaction centres during photoinhibition. in "*Research in photosynthesis*" (ed. N. Murata), Vol IV, 479-482, Kluwer Academic Publishers, Dordrecht, The Netherlands.
50. P Jegerschöld, C., Ågren, H. and Styring, S. (1992) Sequential inactivation of redox-components in photosystem II during donor-side induced photoinhibition studied by EPR spectroscopy. in "*Research in photosynthesis*" (ed. N. Murata), Vol II, 421-424, Kluwer Academic Publishers, Dordrecht, The Netherlands.
49. P Virgin, I., Salter, H., Hagman, Å., Vass, I., Styring, S. and Andersson, B. (1992) Molecular mechanisms behind light-induced inhibition of photosystem II electron transport and degradation of reaction centre polypeptides. *Biochim. Biophys. Acta* **1101**, 139-142

48. van Wijk, K.-J., Andersson, B. and Styring, S. (1992) Spectroscopic characterization of photoinhibited photosystem II and kinetic resolution of the triggering of the D1 reaction center protein for degradation.  
*Biochim. Biophys. Acta* **1100**, 207-215
47. **R** Andersson, B., Salter, H., Virgin, I., Vass, I. and Styring, S. (1992) Photodamages to the photosystem II reaction centre - primary and secondary events  
*J. Photochem. Photobiol. B: Biol.*, **15**, 15-31
46. F. Nilsson, K. Gounaris, S. Styring and B. Andersson (1992) Isolation and characterization of oxygen evolving photosystem II membranes from the cyanobacterium *Synechocystis* 6803.  
*Biochim. Biophys. Acta* . **1100**, 251-258
45. I. Vass and S. Styring (1992) Spectroscopic characterization of triplet forming states in Photosystem II.  
*Biochemistry*. **31**, 5957-5963
44. I. Vass, S. Styring, T. Hundal, A. Koivuniemi, E.-M. Aro and B. Andersson (1992) Reversible and irreversible intermediates during photoinhibition of photosystem II. Stable reduced QA species promote chlorophyll triplet formation.  
*Proc. Natl. Acad. Sci. USA*, **89**, 1408-1412
43. M.K. Bosch, R.G. Evelo, S. Styring, A.W. Rutherford and A.J. Hoff (1991) ESE relaxation measurements in Photosystem II. T1 oscillations in Signal II (D+) originate from the oxidation state of the Mn-cluster.  
*FEBS Lett.* **292**, 279-283
42. C. Jegerschöld and S. Styring (1991) Photoinhibition of Cl-depleted thylakoid membranes. Effects of illumination under anaerobic conditions. in *Trends in photosynthesis research* (J. Barber, H. Medrane and M.G. Guerrero eds) Intercept Ltd, Andover, Book chapter
41. C. Jegerschöld and S. Styring (1991) Fast oxygen-independent degradation of the D1 reaction center protein in Photosystem II.  
*FEBS Lett.*, **280**, 87-90
40. B. Svensson, Vass, I. and Styring, S. (1991) Sequence analysis of the D1 and D2 reaction center proteins of Photosystem II.  
*Zeits. Naturforsch.*, **46c**, 62-73
39. **R** Andersson, B. and Styring, S. (1991) Photosystem II-molecular organization, function and acclimation. In *Current Topics in Bioenergetics* , (ed. C.P. Lee) vol **16**, 1-81.
38. Vass, I. and Styring, S. (1991) pH-dependent charge-equilibria between tyrosine D and the S-states in photosystem II. Estimation of relative midpoint potentials.  
*Biochemistry*, **30**, 830-839
37. Svensson, B., Cedergren, E., Vass, I. and Styring, S. (1990) Structure of donor-side components in photosystem II predicted by computer modelling.  
*EMBO J.* **9**, 2051-2059
36. Vass, I., Deak, Zs., Jegerschöld, C. and Styring, S. (1990) The accessory electron

- donor tyrosine-D of photosystem II is slowly reduced in the dark during low-temperature storage of isolated thylakoids.  
*Biochim. Biophys. Acta* **1018**, 41-46
35. Jegerschöld, C., Virgin, I. and Styring, S. (1990) Light-dependent degradation of the D1 protein in photosystem II is accelerated after inhibition of the water splitting reaction.  
*Biochemistry* **29**, 6179-6186.
- 34 P Virgin, I., Hundal, T., Styring, S. and Andersson, B. (1990) Consequences of light induced D1-protein degradation on thylakoid membrane organization. In *Current Research in Photosynthesis* (ed. M. Baltscheffsky), vol. II, 423-426. Kluwer Academic Publishers.
- 33 P Styring, S., Jegerschöld, C., Virgin, I., Ehrenberg, A. and Andersson, B. (1990) On the mechanisms for the photoinhibition of the electron transfer and the light induced degradation of the D1 protein in photosystem II. In *Current research in Photosynthesis* (ed. M. Baltscheffsky), vol II, 349-356. Kluwer Academic Publishers.
- 32 P Jegerschöld, C. and Styring, S. (1990) Studies of the mechanism for photoinhibition of the electron transport through photosystem II. In *Current Research in Photosynthesis* (ed. M. Baltscheffsky), vol II, 405-408. Kluwer Academic Publishers.
31. Hundal, T., Virgin, I., Styring, S. and Andersson, B. (1990) Changes in the organization of photosystem II following photoinhibition and D1 protein degradation.  
*Biochim. Biophys. Acta* **1017**, 235-241
30. Boussac, A., Rutherford, A.W. and Styring, S. (1990) Interaction of ammonia with the water splitting enzyme of photosystem II.  
*Biochemistry* **29**, 24-32
29. Styring, S., Virgin, I., Ehrenberg, A. and Andersson, B. (1990) Strong light photoinhibition of electron transport in photosystem II. Impairment of the function of the first quinone acceptor Q<sub>A</sub>.  
*Biochim. Biophys. Acta* **1015**, 269-278
- 28 P Andersson, B., Virgin, I. and Styring, S. (1989) Protein composition and organization of Photosystem II. In *High-lights in Modern Biochemistry* (ed. A. Kotyk, J. Skoda, V. Paces and V. Kostka), pp. 923-932. VSP International Science Publishers, Zeist.
27. Aasa, R., Andreasson, L.-E., Styring, S. and Vänngård, T. (1989) The nature of the Fe<sup>3+</sup> EPR signal from the acceptor-side iron in photosystem II.  
*FEBS Lett.* **243**, 156-160.
- 26 P Virgin, I., Hundal, T., Styring, S. and Andersson, B. (1988) Disassembly of photosystem II following photoinhibition. In *Techniques and new developments in photosynthesis* (J. Barber and R. Malkin, eds.) NATO ASI Series, Plenum Publ., pp. 535-538.
- 25 P Andersson, B., Virgin, I., Jansson, C. and Styring, S. (1988) On the organization and function of photosystem II. *Proc. of the 5th European Bioenergetics Conference*,

- Aberystwyth, Wales, 25, pp. 17a-17b.
24. Virgin, I., Styring, S. and Andersson, B. (1988) Photosystem II disorganization and manganese release after photoinhibition of isolated spinach thylakoid membranes. *FEBS Lett.* **233**, 408-412.
  23. Evelo, R.G., Styring, S., Rutherford, A.W. and Hoff, A.J. (1988) EPR relaxation measurements of photosystem II reaction centers: Influence of S-state oxidation and temperature. *Biochim. Biophys. Acta* **973**, 428-442.
  22. Styring, S. and Rutherford, A.W. (1988) Deactivation kinetics and temperature dependence of the S-state transitions in the oxygen evolving system of photosystem II measured by EPR spectroscopy. *Biochem. Biophys. Acta* **933**, 378-387.
  21. Styring, S. and Rutherford, A.W. (1988) The microwave power saturation of signal II<sub>slow</sub> varies with the redox state of the oxygen evolving complex in photosystem II. *Biochemistry* **27**, 4915-4923.
  20. Takahashi, Y. and Styring, S. (1987) A comparative study of the reduction of EPR signal II<sub>slow</sub> by iodide and the iodo-labeling of the D2-protein in photosystem II. *FEBS Lett.* **223**, 371-375.
  - 19 **P** Hoff, A.J., Evelo, R., Styring, S. and Rutherford, A.W. (1987) Electron spin echo studies of metal complexes in photosynthetic reaction centers. In Proc. of the 3rd Int. Conf. in Bioinorganic Chem. *Recueil des Travaux Chimiques des Pays-Bas*, **100/6-7**, p. 215.
  18. **P** Rutherford, A.W. and Styring, S. (1987) EPR signal II in photosystem II: redox and paramagnetic interactions with the O<sub>2</sub>-evolving enzyme. In "Cytochrome systems: molecular biology and bioenergetics" (Ed. Papa, S.) Plenum Press, pp. 541-547.
  17. Styring, S. and Rutherford, A.W. (1987) In the oxygen-evolving complex of photosystem II the S<sub>0</sub>-state is oxidized to the S<sub>1</sub>-state by D<sup>+</sup> (Signal II<sub>slow</sub>). *Accelerated publication in Biochemistry* **26**, 2401-2405.
  16. Styring, S., Miyao, M. and Rutherford, A.W. (1987) Formation and flash-dependent oscillation of the S<sub>2</sub>-state multiline EPR signal in an oxygen-evolving photosystem II preparation lacking three extrinsic proteins in the oxygen-evolving system. *Biochim. Biophys. Acta* **890**, 32-38.
  - 15 **P** Styring, S., Vernotte, C. and Etienne, A.-L. (1987) Oxidation reduction properties of the iron (Q<sub>400</sub>) in PSII in the cyanobacterium *Synechocystis* 6714. In *Progress in photosynthesis research* (ed. Biggins, J.) Vol. II, 133-136. Martinus Nijhoff Publishers, Dordrecht, The Netherlands.
  14. Franzén, L.-G., Styring, S., Etienne, A.-L., Hansson, Ö. and Vernotte, C. (1986) Spectroscopic and functional characterization of a highly oxygen evolving photosystem II reaction center complex from spinach. *Photobiology and Photobiophysics* **13**, 15-28.



13. Astier, C., Styring, S., Maison-Peteri, B. and Etienne, A.-L. (1986) Preparation and characterization of thylakoid membranes and photosystem II particles from the facultative phototrophic cyanobacterium *Synechocystis* 6714. *Photobiochemistry and Photobiophysics* **11**, 37-47.
12. T Styring, S. (1985) Catalytic function of the metal ion in ribulose-1,5-bisphosphate carboxylase/oxygenase. Spectroscopic studies of the enzyme activated with Cu(II) or Co(II). *Ph.D. Thesis*, University of Göteborg and Chalmers University of Technology, Sweden.
11. Styring, S. and Brändén, R. (1985) Identification of ligands to the metal ion in copper(II)-activated ribulose -1,5-bisphosphate carboxylase/oxygenase by the use of electron paramagnetic resonance spectroscopy and  $^{17}\text{O}$ -labeled ligands. *Biochemistry* **24**, 6011-6019.
10. Styring, S. and Brändén, R. (1985)  $\text{Co}^{2+}$ - and  $\text{Cu}^{2+}$ -incubated ribulose-1,5-bisphosphate carboxylase/oxygenase from *Rhodospirillum rubrum* studied with electron paramagnetic resonance spectroscopy. *Biochim. Biophys. Acta* **832**, 113-118.
- 9 P Styring, S., Brändén, R. and Nilsson, T. (1984) Ribulose-1,5-bisphosphate carboxylase/-oxygenase activated with  $\text{Cu}^{2+}$  and studied by electron paramagnetic resonance. In: *Advances in photosynthesis research* (ed. Sybesma, C.) Vol. III, 763-766. Martinus Nijhoff/Dr. W. Junk Publ. The Hague, Netherlands.
8. Nilsson, T., Brändén, R. and Styring, S. (1984) Distorsion of the activator metal coordination during the turnover of cobalt-activated ribulose-1,5-bisphosphate carboxylase/oxygenase. *Biochim. Biophys. Acta* **788**, 274-280.
7. Brändén, R., Nilsson, T. and Styring, S. (1984) An intermediate formed by the  $\text{Cu}^{2+}$  - activated ribulose-1,5-bisphosphate carboxylase/oxygenase in the presence of ribulose-1,5-bisphosphate and  $\text{O}_2$ . *Biochemistry* **23**, 4378-4382.
6. Brändén, R., Nilsson, T. and Styring, S. (1984) Ribulose-1,5-bisphosphate carboxylase/-oxygenase incubated with  $\text{Cu}^{2+}$  and studied by EPR spectroscopy. *Biochemistry* **23**, 4373-4374.
5. P Styring, S., Brändén, R. and Nilsson, T. (1983) EPR-studies of ribulose-1,5-bisphosphate carboxylase/oxygenase activated with  $\text{Cu}^{2+}$ . *Inorg. Chim. Acta* **79**, 158-159.
- 4 P Brändén, R., Nilsson, T. and Styring, S. (1981)  $\text{CO}_2$  and  $\text{H}^+$  regulate the portion of L-3-PGA that is formed in the RuBP-carboxylase reaction: A proposed relation to photorespiration. In: *Photosynthesis IV. Regulation of carbon metabolism* (ed. G. Akoyunoglou) 57-61, Balaban Int. Sci. Services Phil. Pa, USA.
3. Brändén, R., Nilsson, T., Styring, S. and Ångström, J. (1980) L-3-phosphoglyceric acid, formed by ribulose-1,5-bisphosphate carboxylase, is the primary substrate for photorespiration.

- Biochem. Biophys. Res. Commun.* **12**, 1306-1312.
2. Brändén, R., Nilsson, T. and Styring, S. (1980) The formation of L-3-phosphoglyceric acid by ribulose-1,5-bisphosphate carboxylase.  
*Biochem. Biophys. Res. Commun.* **92**, 1297-1305.
  1. Brändén, R. and Styring, S. (1979) Inhibition of glycollate oxidase from parsley leaves by  $\text{HCO}_3^-$ .  
*Biochem. Biophys. Res. Commun.* **89**, 607-611.