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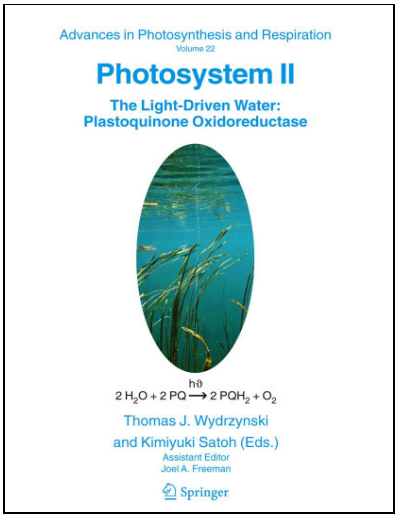

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Photosystem II

The Light-Driven Water:Plastoquinone Oxidoreductase

The most mysterious part of photosynthesis yet, the most important for all aerobic life on Earth (including ourselves), is how green plants, algae and cyanobacteria make atmospheric oxygen from water. This thermodynamically difficult process is only achieved in Nature by the unique pigment-protein complex known as Photosystem II, using sunlight to power the reaction. The present volume contains 34 comprehensive chapters authored by 75 scientific experts from around the world. It gives an up-to-date account on all what is currently known about the molecular biology, biochemistry, biophysics and physiology of Photosystem II. The book is divided into several parts detailing the protein constituents, functional sites, tertiary structure, molecular dynamics, and mechanisms of homeostasis. The book ends with a comparison of Photosystem II with other related enzymes and bio-mimetic systems. Since the unique water-splitting chemistry, catalyzed by Photosystem II, leads to the production of pure oxygen gas and has the potential for making hydrogen gas, a primary goal of this book is to provide a molecular guide to future protein engineers and bio-mimetic chemists in the development of biocatalysts for the generation of clean, renewable energy from sunlight and water.

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