

SOLAR WATER SPLITTING BY PHOTOSYSTEM II

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Photosystem II (PSII) uses light energy to split water into protons, electrons and oxygen. In this reaction, Nature has solved the difficult chemical problem of efficient four electron oxidation of water to yield oxygen without significant side reactions. In order to use Nature's solution for the design of materials that split water for solar fuel production, it is important to understand the mechanism of the reaction. The X-ray crystal structures of cyanobacterial PSII provide information on the structure of the Mn and Ca ions, the redox-active tyrosine called tyrosine-Z, and the surrounding amino acids that comprise the oxygen evolving complex (OEC). The structure of the OEC and the water oxidation chemistry of PSII will be discussed in the light of biophysical and computational studies, inorganic chemistry and X-ray crystallographic information.