IMPORTANT REDOX ENZYMES IN NATURE

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The mechanisms for the two most important enzymes in nature are presented. Nitrogenase is the only enzyme in nature that can transform nitrogen in the air to products that can be used making amino acids, for example. It has a complicated cofactor consisting of seven irons and one molybdenum linked by sulfides. It is known that catalysis goes through a process of four steps before nitrogen can be activated. It is here shown that an additional four steps are needed before the catalytic cycling. The second enzyme discussed here is Photosystem II, which can form oxygen molecules from water by using sunlight. Catalysis goes through four S-states, where O_2 is formed in S_4 . The mechanism for O_2 formation has been shown to proceed by forming an oxygen radical (oxyl) which attacks a bridging oxo group in the manganese cluster, in the so called oxyl-oxo mechanism. Examples from other redox enzymes are also shown.