Functional Models of Oxidases: Catalytic Activity of Mn(IV)-Monoradical, Cu(II)-Diradical and Tetracopper(II)-Tetraradical Complexes

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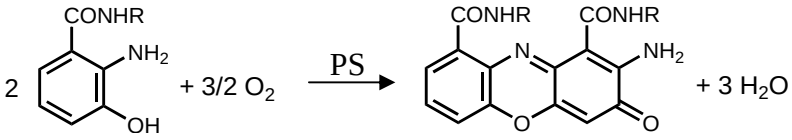
Copper-containing metalloenzymes Galactose Oxidase (GO), Amine Oxidases (AO) and Phenoxazinone Synthase (PS) catalyze the following biochemical reactions in vivo.

$$RCH_2OH + O_2 \xrightarrow{GO} RCHO + H_2O_2$$

$$RCH_2NH_2 + O_2 + H_2O \xrightarrow{AO} RCHO + NH_3 + H_2O_2$$



The Mn(IV)-monoradical complex (figure) characterized by X-ray crystallography (100 K) and magnetic susceptibility measurements (2-290 K) catalyzes efficiently the aerial oxidation of primary alcohols, amines and 2-aminophenol, thus mimicking the function of the corresponding metalloenzymes. Catalytic activities of some Cu(II)-diradical and tetracopper(II)-tetraradical complexes will also be described.