

# Preparation and Characterization of Diiron(III) Complexes with Schiff Bases and Their Reactions with Hydrogen Peroxide

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Recently, dinuclear iron(III) complexes have been intensively investigated as model complexes for diiron enzymes such as MMO(methane monooxygenase) and RNR(ribonucleotide reductase). In this study, novel dinuclear iron(III) complexes have been prepared and characterized, and their reactions with hydrogen peroxide( $\text{H}_2\text{O}_2$ ) examined.

$\text{Fe}^{\text{III}}_2(\text{N-Y-PhO-X-sal})_3$  shown in Fig.1 were obtained by the reaction of tridentate Schiff base ligands, *N*-Y-2-hydroxyphenyl-X-salicylideneamine, *N*-Y-PhOH-X-salH [ $\text{X}(\text{Y}) = \text{H}(\text{H})$ ,  $\text{H}(4\text{-Me})$ ,  $5\text{-MeO}(\text{H})$ ,  $5\text{-MeO}(4\text{-Me})$ ,  $3\text{-MeO}(\text{H})$ ,  $5\text{-NO}_2(\text{H})$ ,  $5,6\text{-Benzo}(\text{H})$ ] with  $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$  in ethanol. The reactivities of these complexes toward  $\text{H}_2\text{O}_2$  were monitored by volumetric measurements of evolved dioxygen, UV-vis spectra and cyclic voltammograms.

The changes in the UV-vis spectra and the cyclic voltammograms of the iron(III) complexes caused by the addition of  $\text{H}_2\text{O}_2$  in DMF indicate that  $\text{H}_2\text{O}_2$  has been found to be decomposed with evolving dioxygen. Amounts of evolved dioxygen(%) during the reaction of the complex( $1 \times 10^{-4}\text{M}$ ) with  $\text{H}_2\text{O}_2(1 \times 10^{-2}\text{M})$  in DMF were measured volumetrically at room temperature. The amounts have been found to depend strongly on the substituents and to increase in the order of  $5\text{-MeO}(4\text{-Me})(\text{ca.}50\%) > 5\text{-NO}_2(\text{H}) > \text{H}(4\text{-Me}) > 3\text{-MeO}(\text{H}) > 5,6\text{-Benzo}(\text{H}) > 5\text{-MeO}(\text{H}) > \text{H}(\text{H})(\text{ca.}3\%)$ . This feature suggests that both steric hindrance and redox potentials of the complexes affect on their reactivities toward  $\text{H}_2\text{O}_2$ .

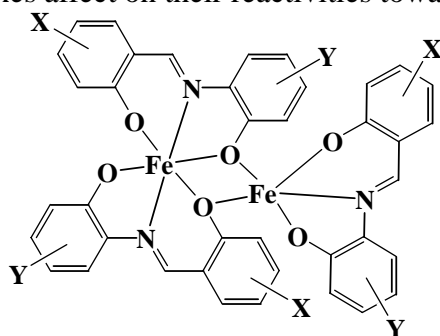


Fig. 1.  $\text{Fe}_2(\text{N-Y-PhO-X-sal})_3$