

PE8

Redox Chemistry of Water-Soluble Cobaltporphyrin and  
It Catalyzes the Electroreduction of Dioxygen

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산소 전극환원에의 응용

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Electrochemical reduction and oxidation of water-soluble cobaltporphyrin hydrate  $[\text{Co}(\text{TTFP})(\text{Y})_2 \{ \text{Y} = \text{H}_2\text{O} \text{ or } \text{HO}^- \}]$  have been investigated in aqueous solutions as a function of pH. With an increase in pH, the proton dissociation of the ligated water of  $\text{Co}(\text{TTFP})(\text{H}_2\text{O})_2$  provides  $\text{Co}(\text{TTFP})(\text{OH})(\text{H}_2\text{O})$  and then  $\text{Co}(\text{TTFP})(\text{OH})_2$ .  $\text{Co}(\text{TTFP})(\text{Y})_2$  as a catalyst for the electrocatalytic reduction of dioxygen is studied using cyclic voltammetry, spectroelectrochemistry, hydrodynamic voltammetry at a glassy carbon electrode in aqueous solutions. Electrocatalytic reduction of dioxygen by  $\text{Co}^{\text{II}}(\text{TTFP})(\text{Y})_2$  establishes a pathway of  $2e^-$  reduction to form hydrogen peroxide, and then the generated hydrogen peroxide is reduced to water by  $\text{Co}^{\text{I}}(\text{TTFP})(\text{Y})_2$  at more negative potential.