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Electrochemical Properties and Synthesis of the Cu(II)-thiourea-polyethyleneglycolporphyrin

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The synthesis step and electrochemical characterization are described for a new class of metallo-porphyrins Cu-tetra[poly(ethleneglycol200-thiourea) phenylporphyrin] in which four oligomeric ethyleneglycol chains are attached to each porphyrin structure. Diffusion coefficient(D_0) and heterogeneous electro transfer rate constant(k_0) of the compound were determined by cyclic voltammetry and chronoamperometry. It was also investigated that the effects of solvent, concentration and scan rate, etc, on the diffusion coefficient and the temperature effect on the rate constant. The peak currents and diffusion coefficients were decreased as increasing the viscosity of solvent. Diffusion coefficient of $\text{Cu}^{2+/3+}$ was $11.82 \times 10^{-6} \text{ cm}^2/\text{sec}$ and that of $\text{Cu}^{1+/2+}$ was $14.92 \times 10^{-6} \text{ cm}^2/\text{sec}$. The thermodynamic parameters such as ΔG^\ddagger , ΔH^\ddagger , and ΔS^\ddagger were calculated from data of the reaction rate constant versus the solution temperatures.