



Influence of the mixed micelles on the electron transfer reaction [Co(NH₃)₅Cl]²⁺ + [Fe(CN)₆]⁴⁻

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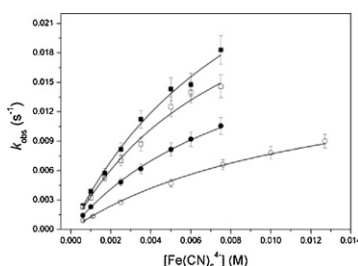
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HIGHLIGHTS

- ▶ Kinetics of [Fe(CN)₆]⁴⁻ + [CoCl(NH₃)₅]²⁺ in SDS/TX-100 mixed micelle media was studied.
- ▶ A pseudophase equilibrium model was used to interpret the experimental results.
- ▶ Pseudophase equilibrium constants and kinetic parameters were determined.
- ▶ Dependence of the kinetics on the micellar composition was investigated.

GRAPHICAL ABSTRACT



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ABSTRACT

Electron transfer reaction between chloropentaamminecobalt (III) and hexacyanoferrate (II) has been studied in the mixed surfactant aqueous solutions of sodium dodecyl sulfate (SDS) and octylphenol (ethylene oxide)_{9.5} ether (TX-100). The observed rate constants k_{obs} have been determined for various micellar media with different compositions. A pseudophase model together with an outer-sphere electron transfer reaction mechanism has been used to analyze the experimental results to obtain the precursor complex formation equilibrium constant K_{ip} , the electron transfer rate constant k_{et} , and the pseudophase equilibrium constant K . The dependence of those parameters on the micellar concentration has been discussed.

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1. Introduction

Recently there has been a growing interest in the study of electron transfer reactions under restricted geometry conditions [1–16], where one or more of the reactants are forced to remain at the surface of micelles [5,6,10], or in the cavity of cyclodextrins [7]

and related compounds, or at the surface of DNA [8,9], etc. These studies are of interest because (i) the local concentrations of the reactants can be changed to allow the tuning of the reaction rates, and (ii) the properties of local media can be adjusted to modify the reactivity [3].

An outer-sphere electron transfer reaction can be expressed as follows [13,17]:



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