

Oxidation Reaction Behavior Diethylstilbestrol (DES) and Related Compounds in Aqueous Polyaniline / O₂ System

Nahoko Saito; Satoshi Kawabata and Kiyoshi Saito

Department of Functional Materials Science and Technology, Faculty of Engineering,

Toin University of Yokohama, Japan.

Introduction

In recent years, the effect of the chemical substance on the environment has been discussed in various fields. The workers in this laboratory have previously found that polyaniline (PAN) react with oxygen to generate superoxide¹⁾, and have examined continuous generation of active oxygen in aqueous systems in the process of electrochemical reduction of PAN, along with the application of this system to organic reaction. As a result, we have found that when benzoic acid and its derivatives having aromatic ring moiety are used as the substrate, under the presence of iron chloride, ring opened compounds such as hydroxy acid were obtained in high yields²⁾. The purpose of the present study is to examine the oxidation reaction behavior of DES and related compounds in this system.

Methods

Active oxygen was generated by immersing the polyaniline electrode (as the WE) and a Ti plate surrounded by a diaphragm (as the CE) in the electrolyte (physiological saline) and applying a fixed potential of -0.35 V vs SCE. Oxidation reactions of DES (**1**) and isoeugenol (**2**) were carried out at 25 °C by adding a catalytic amount of iron. After reaction, UV spectra of the reaction mixture in water were measured.

Results and Discussion

It was proved that the absorbance of *E*₂ and *B* band from aromatic ring of **1** and **2** remarkably decreased (Figure). This fact shows that the cleavages of aromatic rings proceed. Generally, the cleavages of aromatic rings dose not become a main reaction in the Fentone reaction. On the other hand the system of in this study contains superoxide and hydroxyl radical as active oxygen species. Consequently, from these results, it is suggested that the similar aromatic ring opening reaction take place in the presence of superoxide, hydroxyl radical and ferrous ion *in vivo*.

References

- 1) S.Otsuka, K.Saito and K.Morita, *Chem.Lett.*, **1996**, 615.
- 2) K.Saito et al., *Environ. Sci.* **8**, 304 (2001).

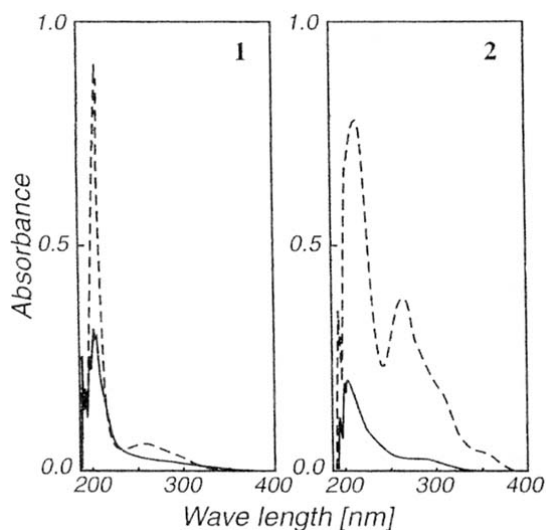


Figure. UV spectra of diethylstilbestrol (**1**) and isoeugenol (**2**) (----), after oxidation 20h existence of FeCl₃ (—).