

# Sample Level 1 editing

Biosensors and Bioelectronics (National Chiao Tung University 交通大學)

- A native-speaker of English who has studied chemistry edited the English.
- Another native-speaker of English who has studied physics then proofread the manuscript.

## Improvement of the Electrochemical Properties ~~Improvement of~~ Screen-printed Carbon Paste Electrodes ~~by using~~ Nonionic Surfactants

### Abstract

Nonionic surfactants, such as TX100 and TW20, were shown in this study to improve the electrochemical catalytic activity of screen-printed carbon paste electrodes (SPCE). The electrochemical response of SPCE to hydrogen peroxide increased 8~11-fold with the modification of nonionic surfactants. A pre-concentration effect of the nonionic surfactant layer on SPCE was postulated to explain the increase of its electrochemical catalytic activity. Interestingly, the nonionic surfactant-modified SPCE (NS/SPCE) exhibited an opposite effect to ascorbate, a common electroactive agent ~~causing which~~ ~~causes~~ interference during clinical diagnosis. The anodic current of ascorbate on NS/SPCE is lower than that on the ~~bare-unmodified~~ SPCE. The differential responses of NS/SPCE to H<sub>2</sub>O<sub>2</sub> and ascorbate suggest its potential in the development of biosensors for clinical diagnosis. Moreover, NS/SPCE exhibits ~~a~~ good reproducibility (RSD ≤ 5%) in the measurement of H<sub>2</sub>O<sub>2</sub> and ~~the~~ ~~feasibility~~ for the fabrication of biosensors. These results suggest that nonionic surfactants have a great

#### Comment [WC1]: IDEA:

Perhaps use the full names of these surfactants in the abstract, unless they are widely known surfactants. This is because the abstract is essentially a summary of the paper, and a reader should be able to understand it without reading the whole paper.

#### Comment [WC2]: SAMPLE

TUTOR: word choice  
Okay: 'bare'  
Better: 'unmodified'  
Reason: 'bare' is somewhat colloquial whereas unmodified is more scientific and relevant to the context.

#### Comment [WC3]: CHECK: Do

you mean economic viability? If so suggest replacing because 'feasibility' is somewhat ambiguous in this context.

potential ~~in~~for improving the electrochemical properties of SPCE for the fabrication of a portable sensing system.

## 1. Introduction

Surfactants are usually amphipathic organic compounds that contain both a hydrophilic (water-loving) head and a hydrophobic (water-hating) tail. ~~With~~Due to this amphipathic ~~character~~property, surfactants have been used in the development of electrochemical sensors (Dang et al., 2004; Hua et al., 2002; Huang, 2005; Vittal and Gomathi, 2002; Zhang et al., 2002). The modification of electrode surfaces by surfactants has been shown to affect ~~the~~electrochemical properties, such as sensitivity, dynamic range of detection, and ~~the~~ reproducibility of an electrode (Dang et al., 2004; Hua et al., 2002; Huang, 2005; Vittal and Gomathi, 2002; Zhang et al., 2002). ~~The~~ detection of estrogens on the glassy carbon electrode and bisphenol A on the carbon paste electrode ~~could~~can be ~~marked~~significantly enhanced by ~~the~~modifications ~~of using~~ the cationic surfactant cetyltrimethylammonium bromide (CTAB) (Hua et al., 2002; Huang, 2005). Interestingly, the presence of CTAB markedly increases the detection limit of ~~adriamycin~~Adriamycin at a carbon paste electrode by ~~two~~ 2-orders of magnitude (Zhang et al., 2002). ~~Presumably,~~ a surfactant changes the electrochemical properties of ~~the~~an electrode ~~is~~presumably by its ability to absorb and concentrate the reactants near the electrode or by blocking the passage of electrons to the electrode (Rusling, 1997). ~~The~~ nature of the electrochemical process at the interface of an electrode and a solution ~~was~~is also altered by the presence of surfactants (Ghaemia et al., 2006; Quintela et al., 1988; Plavsic et al., 1994; Wen et al., 2006;). The dimerization of

**Comment [WC4]:** SAMPLE TUTOR: word choice  
Okay: 'character'  
Better: 'property'  
Reason: 'character' usually refers to human traits and thus is not suitable for use here, whereas 'property' is a more scientific term.

**Comment [WC5]:** IDEA: This is the underlying theory behind using surfactants in electrochemical sensors, particularly as biosensors, so perhaps elaborate some more on why the amphipathic property of surfactants allows them to be used in biosensors. A small paragraph would suffice.

**Comment [WC6]:** IDEA: How does this relate to your study? Perhaps include another line linking the two because the relevance of this other study is unclear. E.g. how do estrogens and bisphenol A compare to the analytes you used in this study?

**Comment [WC7]:** CHECK: I'm unsure as to what you mean here. Do you mean that the presence of CTAB increases the detection limit of adriamycin on a carbon paste electrode by a factor of 2? (i.e. double the detection limit)  
Please review.

**Comment [WC8]:** IDEA: Perhaps elaborate on this process because 'altering the nature of the process' is quite vague. An extra sentence clarifying this process would suffice.

methylviologen was observed in a reaction solution containing anionic surfactants, such as sodium dodecyl sulfate (SDS) and sodium decyl sulfate (SdecS) (Quintela et al., 1988). The extent of dimerization depends on the concentration of SDS or SdecS. A significant enhancement in [the](#) electrodeposition of 2-thiouracil on silver electrodes by cationic gemini surfactants ~~was~~ [has](#) also [been](#) observed (Wen et al., 2006).