

Um novo sensor baseado em Carbono Printex 6L e CuO para a detecção de Propilparabeno

A new carbon-based sensor of Printex 6L and CuO for detection of Propylparaben

L. A. Goulart ^(1,*), T. T. Guaraldo⁽¹⁾, M. R. V. Lanza⁽¹⁾

¹ Universidade de São Paulo (USP), Instituto de Química de São Carlos (IQSC), São Carlos-SP - Brasil

Abstract: Propylparaben (PP) is a synthetic compound of the paraben group used as a preservative in cosmetic products. The amount of parabens in cosmetics has been discussed since its detection in human breast tumors and their ability of endocrine interference [1]. In this way, it is important to monitor parabens quickly and effectively. Different sensors based on nanostructured materials have been developed for the detection of parabens. The carbon Printex 6L (CP6L) has high surface area and good catalytic properties, which is interesting in the manufacture of sensors. Moreover, copper oxide (CuO) nanoparticles have excellent catalytic activity and are easy to be obtained. Thus, the aim of this work was to develop a glassy carbon electrode (GCE) modified with CP6L and CuO as electrochemical sensor for detection of PP. CP6L was dispersed in dimethylformamide to obtain CP6L/GCE. CuO was electrodeposited by applying -0.4 V in CuCl₂ and KCl solution [2]. Then the potential was cycled 20 times (-0.5 to 0.3 V, 0.1 mol L⁻¹ of NaOH, 100 mV s⁻¹) to obtain CuO-CP6L/GCE. The deposition time and concentration of the CuCl₂ solution were also studied. Under optimal conditions, a narrower and more intense PP oxidation peak was obtained in the cyclic voltammetry (CV) with CuO-CP6L/GCE compared to CP6L/GCE and GCE, Figure 1. The morphological characterization of the electrodes was done by scanning electronic microscopy and the electrochemical behavior was studied by CV in the presence of K_4 [Fe(CN)₆] and PP. High linear range of 3.5 to 110 µmol L⁻¹ and detection limit of 6.4 µmol L⁻¹ were obtained for the detection of PP. The electrode presented great performance in the determination of PP, excellent reproducibility and stability. Therefore, the obtained results suggest CuO-CP6L can be a promising material in the manufacture of sensors for the detection of parabens.



Fig. 1. CV of bare GCE (a), CP6L/GCE (b) and (c) CuO-CP6L/GCE for 1.0x10⁻⁴ M of PP in 0.1 M PBS.

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* main author e-mail: lorenaathie@hotmail.com