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F. Laghrib, S. Lahrich, A. Farahi, M. Bakasse, M.A. El
Mhammedi



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Impregnation of silver in graphite carbon using solid reaction:**Electrocatalysis and detection of 4-nitroaniline**F. Laghrib¹, S. Lahrich¹, A. Farahi², M. Bakasse³, M.A. El Mhammedi^{1,*}

¹Univ. Hassan 1^{er}, Laboratoire de Chimie et Modélisation Mathématique, Faculté Polydisciplinaire, 25 000 Khouribga, Morocco.

²Univ. Ibn Zohr, Equipe de Catalyse et Environnement, Faculté de Sciences, BP 8106 Cité Dakhla, Agadir, Morocco.

³Laboratoire de Chimie Organique Bioorganique et Environnement, Faculté de Sciences, Université Chouaib Doukkali, Morocco

Abstract

In the present study, the proposed sensor was prepared by silver microparticles-impregnated carbon paste electrode (Ag-CPE) and used for electrocatalytic reduction of 4-nitroaniline (4-NA). The effect of the amount of silver into carbon paste on the peak potential shift was investigated. Electrochemical impedance spectroscopy (EIS) analyses were realized in the presence of $[\text{Fe}(\text{CN})_6]^{3-/4-}$ and KCl as a redox probe. The cell-electrolyte resistance (R_s), charge transfer resistance (R_{et}), and electron-transfer rate constant (k_{app}) were calculated for different modified electrode. The electrocatalysis of 4-nitroaniline by silver microparticles as a redox was studied in aqueous media at the surface of a carbon paste electrode using cyclic voltammetry (CV) and chronoamperometry methods. In addition to that, the Ag-CPE exhibits excellent electrocatalytic activity indicating that the modification with silver can greatly accelerate the electron transfer. The catalytic rate constant and diffusion coefficient for 4-nitroaniline were found to be $1.36 \times 10^{-2} \text{ mol}^{-1} \text{ L s}^{-1}$ and $3.35 \times 10^{-6} \text{ cm}^2 \text{ s}^{-1}$ respectively.

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