Área: ELE

A rotating disk voltammetric study of the anodic oxidation of nitrite at a Pt-TRP (Tetraruthenated Cobalt (II) Porphyrazine) modified electrode

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Highlights

Rotating disk voltammetric experiments were performed to understand the kinetics of the nitrite anodic oxidation at a Pt electrode modified with a film of Cobalt (II)–tetra(3,4-pyridyl)-porphyrazine (TRP).

Abstract

The nitrite ion (NO_2^-) is a common chemical in our routine, recurrently found on cured meat, human saliva, and urine. In 2015, the International Agency for Research on Cancer (IARC) classified NO_2^- as “probably carcinogenic to humans”. Hence, strategies to easily, quickly, and inexpensively monitor such compound are welcome. This can be achieved by using electrochemical sensors and providing mediators capable of facilitating the electron transfer step is an issue of continuous research. This work shows our efforts to modify platinum surfaces with a film of Cobalt (II)–tetra(3,4-pyridyl)-porphyrazine (TRP), which has already been reported as a good electrocatalyst[1]. In a previous study, we demonstrated that the anodic oxidation of nitrite on a modified Pt-TRP microelectrode takes place at less positive potentials than the bare Pt microelectrode [2]. In the present study, the kinetics of the reaction involving nitrite and immobilized TRP was investigated using rotating disk electrode (RDE) voltammetry. Hence, sensors with better performance can be rationally designed. The influence of the rotation rate and nitrite concentration indicated that the rate of the cross-chemical reaction between cobalt porphyrazine centers immobilized into the film and nitrite controls the overall process.

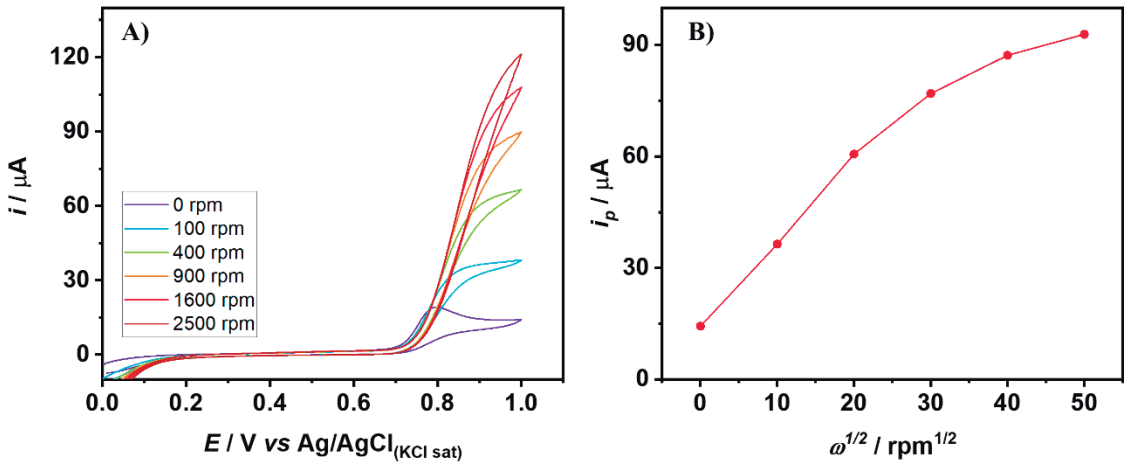

***Figure 1** – A) Cyclic voltammograms recorded in PBS (pH = 7) containing 1mM NO_2^- using a Pt-TRP rotating disk electrode at varying rotation rates (scan rate = 10 mV s^{-1}). B) Peak current (i_p) values (at 0.9 V) as a function of the square root of the rotation rate.*

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