Voltammetric Behavior of Trimetazidine Hydrochloride at Pre-anodized Carbon Paste Electrode and Its Determination in Pharmaceutical Formulations

Sen Fan¹, Lei Ji², Guoliang Mao², Huan Wang², Yongkui Fang², Jiguo Duan², Yuanhai Zhu^{2,*} and Hua Song²

¹ College of Petroleum Engineering, Northeast Petroleum University, Daqing 163318, P.R. China

² College of Chemistry and Chemical Engineering, Northeast Petroleum University, Daqing 163318, P.R. China

*E-mail: yuanhaizhu@163.com

doi: 10.20964/2021.02.32

Received: 23 October 2020 / Accepted: 4 December 2020 / Published: 31 December 2020

A functional pre-anodized carbon paste electrode (PACPE) was prepared by 35 successive cycles of scans between 1.0V-1.8V in 0.2 mol L⁻¹ NaOH solution. The electrode reaction mechanism of trimetazidine hydrochloride (TMZ) was carefully studied by CV method and was determined as a two-electron/two-proton process, which is put forward for the first time. Experiment showed that the electrostatic attraction between the protonated TMZ and the negatively charged PACPE surface, both were affected by pH, was the dominant factor influencing the adsorption and the peak current. The PACPE exhibited excellent electrocatalytic effects towards the oxidation of TMZ. In the optimum conditions, the oxidation peak current was linear with TMZ concentration in the range of 5.0×10^{-7} — 5.0×10^{-5} M ($r=0.998$), and the detection limit was estimated to be about 1.5×10^{-7} M. This method can be successfully applied to the determination of TMZ in pharmaceutical formulation.

Keywords: Trimetazidine hydrochloride; pre-anodized carbon paste electrode; cyclic voltammetry; pharmaceutical analysis

[FULL TEXT](#)

© 2021 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).