Quasireversible Maximum under Conditions of Novel Electrochemical Techniques

Zuzanna Zwierzak * and Dariusz Guziejewski

Department of Inorganic and Analytical Chemistry, Faculty of Chemistry, University of Lodz, Pomorska 163, 92-236 Lodz, Poland

* Correspondence: zuzanna.zwierzak@edu.uni.lodz.pl (Z.Z.); dariusz.guziejewski@chemia.uni.lodz.pl (D.G.)

Abstract: Information on the kinetics and mechanisms of electrode processes is most often obtained using conventional electrochemical techniques. The high quality of the obtained data and good sensitivity are guaranteed by techniques that minimize the impact of capacitive current. Among pulse techniques, we can distinguish square wave voltammetry, which, unfortunately, due to the complexity of the results, causes difficulties in data interpretation. In order to simplify electrokinetic and mechanistic studies, the potential modulation applied to the working electrode under SWV conditions was modified. The underlying staircase potential, which is typical for SWV, is replaced with constant mid-potential[1]. Any subsequent changes involve the modification of the basic parameters i.e. amplitude and frequency. The resulting emergence of three novel electrochemical techniques enable receive of information on the rate of reaction in an alternative, simple and fast procedures. These techniques are based on the measurement of the characteristic dependence of the current as a function of the applied frequency or amplitude in a form of so-called quasireversible maximum based either on amplitude or frequency[2,3]. The position of the quasireversible maximum provides important data on electrode reaction kinetics because it enables estimation of the standard rate constant. The proposed novel electrochemical techniques were applied in real electrochemical systems to assess the possible recording of a quasireversible maximum in the case of simple electrode mechanisms.

Keywords: quasireversible maximum; electrode processes; electrochemistry

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