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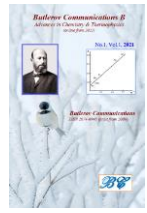

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The role of electrode material in electrochemistry

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Abstract

In electrochemical processes the electrode is not only a necessary element, but also a full-fledged participant in the redox process, a kind of universal reagent that replaces many chemical reducing agents and oxidants. The nature of the electrode material is an important factor determining the properties of this reagent. To reveal the role of this factor in the article in a short generalized form a critical analysis of the accumulated extensive information on the role of the electrode material in electrochemical processes is carried out. Particular attention is paid to the influence of the electrode material on the process of electron transfer through the adsorption of components of the redox system and the structure of the double electric layer. It is concluded that the influence accepted in the literature through the difference in the $E_{z.c.}$, ψ_1-potentials is not so obvious. Due to the difference in these values, the electrode material does not affect the electrochemical characteristics of the Faraday process. The key factor determining the effect of the electrode material in the electrochemical reaction of electron transfer in polar media is the adsorption of the components of the redox system and other components of the solution on the electrode. In the absence of adsorption of the components of the redox system, the electrode material will not affect the electrode process. The different influence of the electrode material on electrode processes is based on their different adsorbing ability. The main adsorbed particles are neutral compounds, amphiphiles and neutral radicals. The nature of the electrode will have a particularly strong effect on the potential and kinetics of electron transfer in processes involving simple radical particles, in which an unpaired electron is localized at a certain place of the particle. With an increase in the delocalization chain of an unpaired electron in a radical, the probability of radical adsorption decreases. The probability of adsorption of radical ions is low. Simple mono- and multiply charged ions in the generally accepted understanding of adsorption on electrodes are not adsorbed.

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