

EFFECT OF SOLUTION ULTRAVIOLET RADIATION ON THE PROCESS OF HYDROGEN ELECTROOXIDATION OF ELECTROLYTIC RESIDUE WITH PALLADIUM

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Solid solution is a homogeneous system in which one component's atoms are arranged in a crystal lattice of another component. Hydrogen-palladium solid solution is a specific system. It is connected with the ability of palladium to dissolve a huge amount of hydrogen (palladium is able to absorb 734 times the volume of hydrogen at 30 °C) [1].

UV radiation of solutions with a wavelength of 200–300 nm has been used for the voltammetry methods of the analysis to deactivate oxygen in the solutions in the process of electrolytic process. The goal of this research was to study the effect of UV radiation on the process of electrooxidation of hydrogen absorbed by palladium in the process of electroconcentration of palladium and forming a solid solution with it.

Fig. 1 shows the voltammetric curves of electrooxidation of hydrogen-palladium residue.

This hydrogen-palladium residue is precipitated out of 1 M HCl solution on the surface of the graphite electrode at a potential of electrolytic process of $-0,8$ V.

In the field of potentials from $-0,1$ to $-0,2$ V electrooxidation of molecular hydrogen adsorbed on the palladium residues occurs; in the field of potentials from $0,3$ to $0,4$ V joint electrooxidation of palladium and hydrogen absorbed by palladium occurs [2].

With increasing content of palladium in the electrolytic residue the current of anodic peak of molecular hydrogen electrooxidation adsorbed by palladium and the current of anodic peak of palladium electrooxidation and atomic hydrogen from electrolytic palladium-hydrogen residue increase.

At the same time the potential of uniform electrooxidation peak of palladium and hydrogen from palladium-hydrogen solid solution is displaced to the cathodic area of the potentials.

Absorption of hydrogen by palladium changes

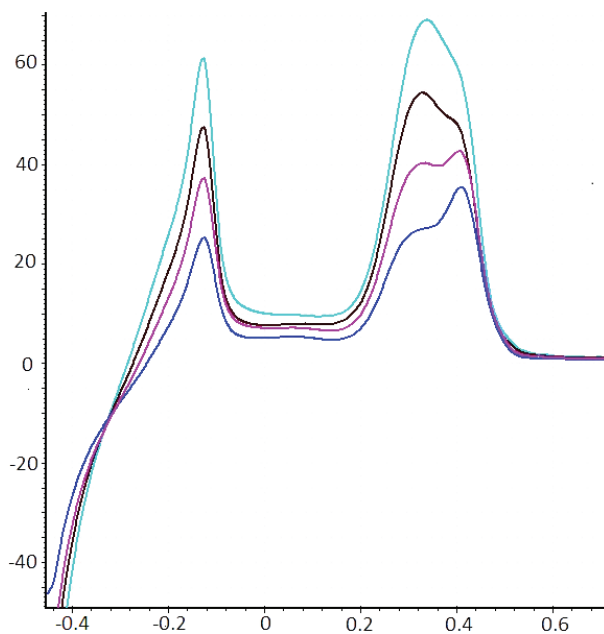


Fig. 1. The voltammetric curves of the palladium-hydrogen residue electrooxidation on the surface of carbon-containing electrode

Media 1 M HCl, $E_e = -0.8$ V, $t_e = 60$ s, $V = 0.06$ V/s, C_{pd} : 1–0.4 mg/l, 2–0.6 mg/l, 3–0.8 mg/l, 4–1 mg/l

the peak of palladium electrooxidation and increases the error of palladium determination with the stripping voltammetry method.

It has been established that in the process of ultraviolet radiation of solution hydrogen leaves the palladium crystal lattice and goes into the solution and therefore it doesn't prevent determination of palladium.

Inclusion of UV radiation in the process of palladium electroconcentration allows decreasing the error of palladium determination in the standard samples of copper-nickel ores with the stripping voltammetry method from 30 % to 10 %.

References

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REACTIONS OF AROMATIC IODINE COMPOUNDS TOWARDS ALKALI AND ALKALINE EARTH METAL TETRAFLUOROBROMATES

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Introduction. According to sustainable development strategy, the main goal of investigators is to find, create and implement environmentally friendly processes and materials. The organic chemistry of hypervalent iodine compounds is a big possibility to make greener the processes in chemical technology. Hypervalent iodine reagents are used extensively in organic synthesis as efficient and environmentally benign oxidizing reagents whose chemical properties in many aspects are similar to the derivatives of heavy metals [1]. In this paper we consider on (difluoroiodo)arenes. (Difluoroiodo)arenes, ArIF_2 , can be prepared by two general approaches:

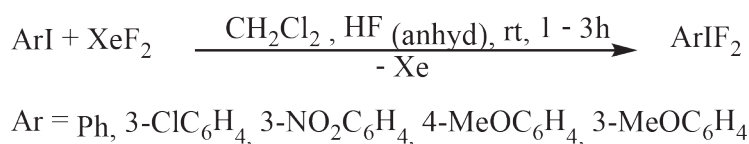
- oxidative addition of fluorine to iodoarenes using powerful fluorinating reagents
- ligand exchange in iodine (III) compounds, such as ArIO or ArICl_2 , using HF or SF_4 as a source of fluoride anions [2].

Various fluorinating reagents have been used for the fluorination of iodoarenes. A very clean and selective, although relatively expensive, procedure for the preparation of (difluoroiodo)arenes is based on the fluorination of iodoarenes with xenon difluoride in dichloromethane in the presence of anhydrous hydrogen fluoride (Scheme 1) [3, 4].

This method works well for the fluorination of iodoarenes with electron-donating or electron-withdrawing substituents; the latter, however, require longer reaction times. (Difluoroiodo)arenes are hygroscopic and highly hydrolyzable compounds, which makes their separation and crystallization extremely difficult [2].

The current work carries out the possibility of safer and more convenient fluorination method de-

velopment, based on reactions of aromatic iodine compounds with alkali and alkaline earth metal tetrafluorobromates. Sobolev V.I, Filimonov V.D. and coworkers described chemical properties of known fluorobromates: KBrF_4 , CsBrF_4 , RbBrF_4 and the recently described $\text{Ba}(\text{BrF}_4)_2$ in reactions with aromatic compounds and pyridine. They found out strong and selective bromination abilities towards aromatic compounds [5]. However, there is no sys-



Scheme 1. Fluorination of iodoarenes with xenon difluoride

Table 1. Reaction of $\text{Ba}(\text{BrF}_4)_2$ with hypervalent aromatic compounds

Entry	Substrate	Product
1		
2		
3		
4		
5		
6		