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**DEVELOPMENT OF MODIFICATION TECHNIQUE OF GCE**

**WITH METAL-ORGANIC FRAMEWORKS FOR THE ELECTROCHEMICAL DETECTION OF DOPAMINE**

Dopamine (DA) is an important neurotransmitter for the central and peripheral nervous system. Impaired dopamine secretion leads to severe diseases such as schizophrenia and Parkinson's disease[1]. On-time detection of dopamine secretion disorders by analysis of biological fluids is essential for monitoring the patient's condition and prescribing therapy. Availability and expressiveness with high accuracy of analysis can be achieved by creating an electrochemical sensor for detecting microconcentrations of dopamine in the presence of a number of interfering agents, for example, paracetamol.

It is promising to apply metal-organic frameworks (MOF) as a modifier of sensor[2]. MOF are coordinated polymers of metal ions and polydentant organic ligands. MOF’s metal centers can be capable of catalyzing electrochemical reactions, which makes it possible to provide analytical selectivity by kinetic separation of the analytical signals[3]. The physicochemical properties of the resulting compound, such as crystallite size, can determine the sensitivity of the sensor.

In this work was studied the sensory properties of MOF synthesized from the system copper nitrate - terephthalic acid - dimethylformamide (MOF-2(Cu)), depending on the crystallite size of this compound. The synthesis was solvothermal[4], the crystallite size was changed by adjusting the synthesis time (Fig. 1a). To modify electrodes we used the drop casting technique.

It was found that with growth the crystallite size increases the available surface area (Fig. 1b) and the number of available metal centers for electrocatalysis (Fig. 1c). However, the number of available adsorption centers for dopamine adsorption passes through a maximum with increasing crystallite size that has maximum sensitivity to dopamine (Fig. 2). This maximum corresponds to a crystallite size of 87 nm and a synthesis time of 36 hours. At these values, the maximum peak current for the dopamine oxidation reaction is observed. Metrological characteristics were obtained for this compound in voltammetric analysis of dopamine: linear range of 1-100 μM, LOD = 2.3 μM.



Fig.1 (a) - dependence of crystallite size on synthesis time; (b) - cyclic voltammetry diagrams in ferrocyanide showing the number of available catalytic metal centers; (c) - dependence of the capacity of the near-electrode layer, proportional to the surface area, on synthesis time.



Fig. 2. Cyclic voltammetry with MOF-modified electrodes with different crystallite sizes in DA 300 μM and PA 600 μM solutions.

**Key words**: Metal-organic frameworks; Dopamine sensor; Electrocatalysis

Acknowledgements: Authors acknowledge Russian Science Foundation (grant 20-79-10075). The authors would like to thank the SPbSU Nanotechnology Interdisciplinary Centre, Centre for Optical and Laser Materials Research and Centre for X-ray Diffraction Studies.

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