**“Nanostructured surfaces”**

**Obtaining of CO2 conversion catalytic activity electrodes Cu/AuNPs by galvanic replacement**

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Electrochemical reduction of CO2 is one of the directions of its utilization and efficient synthesis of CO, CH4, НСООН, CH3OH, etc. The cathodic conversion in aqueous solutions is the most studied. This doesn't ensure proper selectivity of the target products and their formation rate. In the last decade, much attention has been paid to non-aqueous solutions in which the synthesis of specified substances with high yields can be realized [1].

Reduction of CO2 is carried out on catalytically active electrodes, including copper cathodes (Cu/MNPs) modified with high-efficiency metal nanoparticles (Ag, Au, Pt, Pd). One of the methods of their controlled preparation is a galvanic replacement in non-aqueous solutions [2].

The results of AuNPs deposition studies on a copper surface by galvanic replacement in organic aprotic solvents (DMSO, DMF, AN) is present in this work. The dependence of the deposited nanoparticles geometry and their distribution on the copper surface on the nature of the solution, the concentration of Au precursor (HAuCl4), the duration of the process, as well as the action of the ultrasonic field was studied. It is shown that the main factors of the controlled formation of gold nanostructures are the concentration of HAuCl4 and the duration of galvanic replacement. Ultrasonic is mainly a factor in speeding up the process.

The dependence of the catalytic activity of the obtained Cu/AuNPs cathodes for CO2 reduction in acetonitrile solutions on the size of AuNPs and the density of their filling of the copper surface is shown. Based on them, conditions are established that ensure high speed and efficiency of electrochemical reduction of CO2.

1. *Maniam K.K., Paul S.* Ionic Liquids and Deep Eutectic Solvents for CO2 Conversion Technologies – A Review // Materials. – 2021. – **14**(**16**). – 4519.
2. *Kuntyi O.I., Zozulya G.I., Shepida M.V.* Nanoscale galvanic replacement in non-aqueous media: a mini-review // Voprosy Khim Khim Tekhnol. – 2020. – N **4**. – P. 5-15.