THE DOMAIN STRUCTURE'S INFLUENCE OF FERROMAGNETIC ELECTRODE ON THE SPATIAL DISTRIBUTION OF ELECTRIC POTENTIAL OF ELECTRIC DOUBLE LAYER AT THE ELECTRODE-ELECTROLYTE INTERFACE

Yu.I. Gorobets[1], O.Yu. Gorobets[2], V.V. Lizunov[2], I.O. Bondar[2]

[1] Institute of Magnetism at the National Academy of Sciences of Ukraine
[2] National Technical University of Ukraine "Kyiv Polytechnic Institute"

Magnetoelectrolysis is perspective direction processing of surfaces, which must have given nanostructural parameters. It is known that the magnetic field considerably influences both on macro- and nanostructure of the cathode precipitation of metal layers from solutions of the electrolytes. However data in relation to the magnetic field's influence on speed of etching processes and corrosion of ferromagnetic materials are less systematic and in a number of cases contradictory. Besides, the magnetic field is one of possible control factors of the nonlinear dynamics reaction-migration systems, which are in the state distant from thermodynamics equilibrium and substantially nonlinear. The similar systems have the interesting characteristic properties, in particular, is extraordinarily sensible in relation to initial conditions and other external factors of influence, one of which is the magnetic field. Thus, appearance of the nanostructured objects can be programmed by initial conditions (initial distribution of reagent concentrations) and other factors which influence on mass transfer in the reaction-migration systems. Consequently similar systems are perspective both for fundamental researches of nanoscale self-organization and for practical applications in nanotechnology.

In work the influence of the nonuniform magnetic field which was created by the stripe domain structure of ferromagnetic sample on the spatial distribution of electric potential of electric double layer at the electrode-electrolyte interface is investigated. The presence of the external magnetic field results in appearance of diffusive overvoltage of electrode and influences on electric potential of electric double layer which in same queue influences on mass transfer at corrosion of ferromagnetic plate. The influence of the nonuniform distribution of electrolyte concentration on electric potential of electric double layer is estimated.