NOVEL INORGANIC-ORGANIC HYBRID COMPOUNDS AND NON-TRADITIONAL MATERIALS BASED ON THEM

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Novel inorganic-organic hybrid bioactive composites and antibiocorrosive coatings based on them have been obtained and studied. As a polymeric matrix some heterochain polymers – polyurethanes and polyepoxedes, modified by siliconorganic polyfunctional oligomers and various bioactive arsenic, antimony, d-metals containing novel coordination compounds (3-5 %) have been used.

It was established, that the dynamical friction of antibiocorrosive coatings based on poly-urethanes and polyepoxedes mainly depends on the composition of obtained composites, structure of polymer matrix, nature of modifications and on experiment conditions of their obtaining. By the analysis of curves of friction coefficient variation of non-modifier and modifier polyurethanes and antibiocorrosive coatings based on them were established that the coefficient of dynamical friction is high for composites based on non-modified polyurethane matrices. This coefficient has minimum value for antibiocorrosive coatings based on sulphur-containing polyester urethane modified by α,ω-dihydroxymethylvinyloligo-organosiloxane comparatively to other antibiocorrosive coatings. By the doping of bioactive coordination compounds into polyester urethane matrix based on 4,4-dimethylmethanediisocyanate and oligobuthyl-englycoleadipinate the value of the coefficient of dynamical friction is increased. This fact could be explained by influence of their spatial structure.

It was shown that the modification of polyester urethanes and organic polyepoxides by polyfunctional siliconorganic oligomers the coefficient of dynamical friction was reduced, what how it appears is conditioned by high plasticized ability of flexible siloxane oligomers. The obtained results are confirmed by study of surface morphology of obtained coatings seen in scanning electron microscopy. The water absorption ability of obtained antibiocorrosive coatings by gravimetric method was determined. Experimentally was established, that during three months their water absorption ability not exceed 0.01 %. By study of influence of isothermal aging, the stability under complex action towards O_2, CO_2 and moisture and photochemical stability (stability towards ultra-violet and visible light) was established that during the long period the initial appearance (state), color, optical transparency and mechanical properties (surface homogeneity without of splits formation) of antibiocorrosive coatings was not deteriorated.

The preliminary investigations confirmed that the obtained composites may be recommended as: a) protective covers with multivectorial application (film materials and impregnating compositions) stable to biocorrosion; b) materials with antimycotic properties for prophylaxis and treatment of mycosis; c) for protection of museum exhibits; and d) for human protection during its contact with microorganisms on various surfaces.

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