Creation and Testing of Direct-acting Novel Multifunctional Antibiocorrosive Covers

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At present the intensive development of technique and industry makes actual the creation of composite materials with complex properties by various purposes. In this regard a significant interest have hetero-chain polymers and obtaining of antibiocorrosive coatings based on them for purpose of protection of various products based on natural, synthetic and artificial material from action of aggressive microorganisms and funguses.

Novel inorganic-organic hybrid bioactive composites and antibiocorrosive coatings based on them have been obtained and studied. Some hetero-chain polymers – polyurethanes and polyepoxedes, modified by silicon organic polyfunctional oligomers have been used as a matrix; as bioactive compounds were choose heterometal coordination compounds of some transition metals and ligands containing ferrocene and polyfunctional spatial asymmetric fragment simultaneously. The optimal ratio of polymers, modifiers and bioactive components has been determined. The main physical-mechanical and operational characteristics of the obtained composites have been studied. It was established, that penetration depths of modified polymeric matrix are lower comparatively with non-modified matrix. Mainly is decreased also residual depth, and viscoelastic recovery is in the range of 80-90%. It was shown that the modification of basic organic polymers with silicon organic oligomer significantly reduces the coefficient of dynamical friction. The study of surface morphology of obtained composites (SEM Nicon Eclipse ME 600) confirmed that by modification wear resistance of antibiocorrosive coatings is increased. It was shown that the change of coefficient of dynamical friction of obtained coatings depends on the spatial structure of bioactive compounds.

Based on researches it was established, that analogous modification type by silicon organic oligomer may be successfully used for improvement of mechanical and tribological properties of corresponding coatings.

The rusting, thermo rusting, thermal and photochemical stability, isothermal aging, water absorption ability of obtained inorganic-organic hybrid materials have been studied. By preliminary investigation it was established, that the obtained multifunctional inorganic-organic hybrid materials may be used for effective protection of cultural heritage and museum exhibits from the action of various detrimental microorganisms what at the same time will provide improving of ecologically and epidemiologically dangerous situation in the environment provoked by the growth and settling of detrimental microorganisms on surfaces of various materials.

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