

Modified epoxy coatings with aminoimide-containing oligomers

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Epoxy materials have superior performance properties, so they have been used to produce high quality coatings. Coating materials based on epoxy oligomers are used to prepare responsible coatings for various purposes, chemical-resistant, water-resistant, heat-resistant and insulating coatings. They are characterized by high adhesion to metallic and non-metallic surfaces, resistance to water, alkalis, acids, ionizing radiation, low porosity, small moisture absorbability and high dielectric properties. However, there are a number of outstanding issues to improve the barrier properties of paints based on epoxy resins, which limit their wider use in aeronautical engineering as well as in engineering and shipbuilding. Chemical structure of epoxy resins provides opportunities to control their properties by introducing modifying additives, to achieve maximum compliance with the requirements of the resulting material.

The aim of this study was to investigate the effect of reactive aminoimide-containing oligomeric modifiers on the physicochemical and protective properties of coatings formed on the basis of epoxy varnishes. The choice of aminoimide containing oligomeric modifiers was determined by the presence of reactive maleimide and amino groups in their structure and the bulky structure of macromolecules.

The object of the study was commercially produced epoxy resin E-41 in solution (E-41 r) (TU 6-10-607-78), which is a solution of the resin E-41 with a mass fraction (66 ± 2) % in xylene (GOST 9410-78, GOST 9949-76) with acetone (GOST 2768-84) at a ratio of 4 : 3 by weight. Resin solution E-41 in a mixture of xylene and acetone (resin E-41 r) is used for the manufacture of paints for various purposes. Paint application is one of the most common and reliable ways to protect metal surfaces from corrosion and give a decorative surface finish. It is known that the testing of protective properties of the coating in an operational environment takes a lot of time, that does not comply with any developers or manufacturers. Rapid tests provide information about the resistance of the coating under its compulsory destruction simulating natural mechanism of aging in a short time. Electrochemical methods are used as these accelerated test methods. Chemical structure of epoxy resins provides opportunities to control their properties by introducing modifying additives, to achieve maximum compliance with the requirements of the resulting material (inhibits the process of underfilm corrosion of the substrate and increases the protective effect of the anticorrosive coating).