

Investigation of the Properties of Epoxy Modified Binders Based on Epoxy Oligomer with Improved Deformation and Strength Properties

Authors : Hlaing Zaw Oo, N. Kostromina, V. Osipchik, T. Kravchenko, K. Yakovleva

Abstract : The process of modification of ED-20 epoxy resin synthesized by vinyl-containing compounds is considered. It is shown that the introduction of vinyl-containing compounds into the composition based on epoxy resin ED-20 allows adjusting the technological and operational characteristics of the binder. For improvement of the properties of epoxy resin, following modifiers were selected: polyvinylformalethyl, polyvinyl butyral and composition of linear and aromatic amines (Aramine) as a hardener. Now the big range of hardeners of epoxy resins exists that allows varying technological properties of compositions, and also thermophysical and strength indicators. The nature of the aramin type hardener has a significant impact on the spatial parameters of the mesh, glass transition temperature, and strength characteristics. Epoxy composite materials based on ED-20 modified with polyvinyl butyral were obtained and investigated. It is shown that the composition of resins based on derivatives of polyvinyl butyral and ED-20 allows obtaining composite materials with a higher complex of deformation-strength, adhesion and thermal properties, better water resistance, frost resistance, chemical resistance, and impact strength. The magnitude of the effect depends on the chemical structure, temperature and curing time. In the area of concentrations, where the effect of composite synergy is appearing, the values of strength and stiffness significantly exceed the similar parameters of the individual components of the mixture. The polymer-polymer compositions form their class of materials with diverse specific properties that ensure their competitive application. Coatings with high performance under cyclic loading have been obtained based on epoxy oligomers modified with vinyl-containing compounds.

Keywords : epoxy resins, modification, vinyl-containing compounds, deformation, strength properties

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