

**PROPERTIES OF POLYMERS BASED ON THE PRODUCT OF CHEMICAL  
MODIFICATION OF EPOXY RESIN WITH DIBROMIDE DIBUTYL TIN  
USING POLYSULPHIDE RUBBER**

*Nosova A. M., Sukhyy K. M.*

Ukrainian State University of Chemical Technology,  
Gagarin Avenue, 8, Dnipro, Ukraine, 49005  
ikichemisty@gmail.com

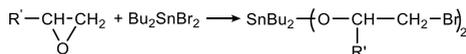
The operation of materials and structures in real conditions is characterized by the presence of corrosion damage not only under the influence of environmental factors, but also by living organisms. Humanity loses almost 3–5 % of manufactured materials and products due to biodamages.

Epoxy coatings are known to act as a barrier film that protects and insulates the base of metallic offshore structures from the corrosive effects of not only oxygen and ions on metals, but also microbiological contamination known as induced microbial corrosion.

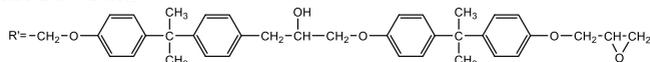
Organotin halides (OTH) are effective biocides, which, due to the presence of tin atoms, have antimicrobial and antifungal properties, and the presence of halogen atoms makes it possible to increase the fire resistance of paints and varnishes. Unlike metal oxides, the addition of OTH to polymeric materials does not cause secondary corrosive effects.

Currently, to increase the impact resistance and adhesive characteristics, thiokols, which are polysulphide rubbers, are introduced into the formulation of epoxy composites. The purpose of this work is to study the effect of polysulphide rubber additives on the deformation-strength and adhesive properties of composite materials based on the product of the interaction of epoxy resin with organotin halide.

Epoxy resin of the Epikote-834 brand with a mass fraction of epoxy groups of 17.3 % and a molecular weight of 495 and the product of its interaction with OTH, which was used as dibutyltin dibromide, were selected as objects of research. The interaction took place according to the following scheme:



where Bu – C<sub>4</sub>H<sub>12</sub>



During the reaction, dibutyltin dibromide was added in such an amount that free oxirane rings were retained. The result was a product with a molecular weight of 1350 and a content of epoxy groups of 10.7 %.

A comparative study of the effect of polysulphide rubber on the deformation-strength and adhesive properties of composites based on the original Epikote-834 epoxy resin and the product of its modification with dibutyltin dibromide was carried out. It is shown that the addition of polysulphide rubber to the modified resin leads to a deterioration in the cohesive characteristics of composites based on it (in particular, the tensile strength and elastic modulus). This fundamentally distinguishes them from the original resin, for which the introduction of thiokol leads to a significant increase in cohesive strength and deformation capacity.

The prospects of using polysulphide rubber for improving the adhesive characteristics of composite materials based on epoxy resin containing dibutyltin dibromide in the molecular chain have been revealed. It is proposed to use them in the form of two layers to improve the performance of the coatings.

The studied polymers are promising for obtaining biocidal anticorrosive coatings.