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Polymer Coatings that Protect Metal Structures from Heat Exposure and their Properties

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Abstract: the main content of this article is provided for the creation and application of flame retardant polymer composites to protect structures from thermal impact from Industrial Safety, large-scale scientific research work on the formation of Coke under the influence of thermal temperature, technology to protect compounds from its development, to increase thermal and corrosion tolerance of structures.

Keywords: corrosion, heat and corrosion of metal structures, iron and steel products, temperature, coatings.

Introduction Large-scale scientific research is being carried out on the creation and application of flame retardant polymer composites to protect the structures of buildings and structures from the effects of heat. As effective composites in this direction, special attention is paid to the development of resurstejamkor, environmentally friendly compositions of polymer binders, antipyrenes, convex chemical additives and fillers, the formation of coating of polymer composite materials on the surface of metal structures, as well as the implementation of thermal stabilization, determining the connection between fireproof convex polymer composites and metal structures, taking into account their thinning.

Currently, due to the various possibilities and advantages of applying metal structures, the demand for more steel structures is increasing in our life. For example, the demand for the use of high-rise buildings-structures, stadiums, industrial buildings-structures and metal structures in the extraction and processing of oil and gas on land is increasing from year to year. For this reason, special attention is paid to the safety of objects built by humans on the basis of metal structures. Although the metal structure is non-combustible, its thermal conductivity is very good, and its mechanical properties directly depend on the temperature [1].

Analyzes and Results In the event of a fire, excessively high temperatures can lead to a sharp decrease in load-bearing capacity and deformation of the steel structure, which increases the risk of collapse of the construction structure. According to some studies, when the temperature reaches 500°C, the strength of the structure decreases by about 40-50%, which does not meet the required strength level of the building. At a temperature of 600°C, the steel structure completely loses its strength. In the event of a severe fire, the building collapses at a interval of only 15 minutes, which poses a great threat to human life and leads to economic losses.

Polymer microspheres have been obtained using a malein anhydride (MAH)-based sopolimerization reaction with 10 g olefin (S9) in per-C9-MAH brand anti-pyrenes based on

pentaeritrite and malein anhydride, and are named as follows, (C9-MAH) C9-MAH and 20 g pentaeritrite (PER) dissolved in 120 ml ethanol in a three-mouth flask, as a catalyst (1-hydroxypyrrolidine-2,5-dion (NHS) and 1-(3-dimethylaminopropyl)-3-ethyl-carbodiimide hydrochloride (EDC) is added. At room temperature, the mixture is heated to 70°C for 6 hours after stirring for 1 hour. Then, the product is washed several times with distilled water and filtered under vacuum. Results, after 24 hours of drying at 60°C, the per-C9-MAH final product is obtained (Figure 1)[2,3]

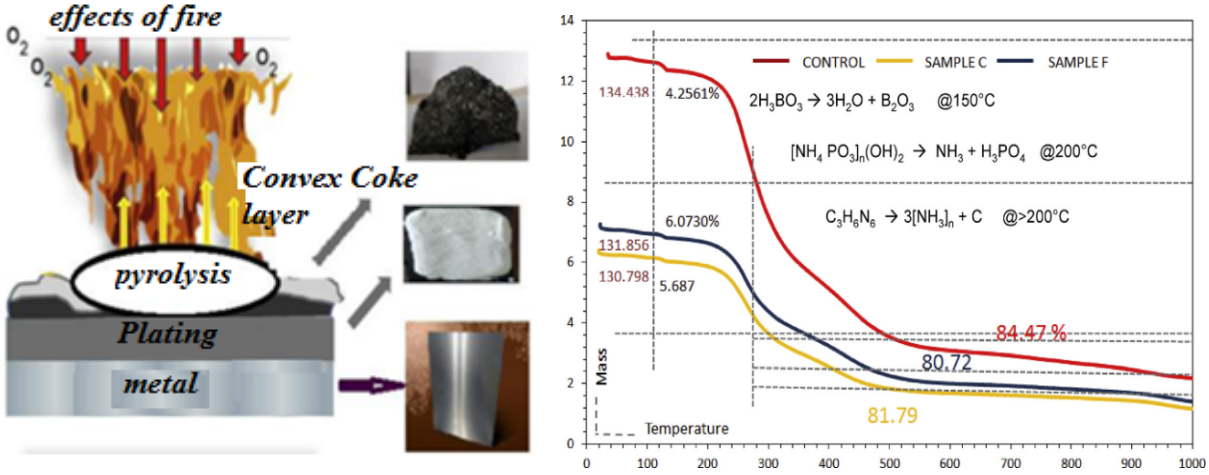


Figure 1. The mechanism of temperature-influenced blistering of convex polymer coatings.

During the research carried out, the effect of metal oxides and dolomite [CaMg $(CO_3)^2$] additives on properties and properties as a result of pyrolysis was studied, creating compositions consisting of ammonium polyphosphate-melamine-expanded graphite, which form polymer coatings that protect metal structures. Fire Protection compositions have been analyzed under various standard requirements. Thermogravimetric analysis (TGA) analyzed the structure construction of the coating, while significant levels of changes in the composition of the coatings have been researched using a scanning electron microscope (SEM). The formation of coke by the action of the compounds contained in it by thermal temperature has helped to increase its thermal stability. Figure 1 below shows a schematic diagram of how conventional intumescent coatings are activated by pyrolysis to protect steel plates[4].

In the event of a fire, the convex coatings become convex and form a Coke that serves as a protective barrier to suppress and prolong thermal penetration and prevents the failure of steel plates.

When applying fire-resistant coatings as protective coatings in buildings of metal structures, the benefit from polymer binders, convex-laning chemical compositions, antipyrenes and other additives is reduced. It has been widely studied that the main additive in these coatings are convex-forming compositions, to which the application of graphite to them will work well. Based on graphite, the species obtained convex coatings in different proportions, the results of which were studied in their physicochemical and mechanical properties. Rubbers with n-butylmethacrylates with thermoelastoplasmic properties were obtained by scientists of the Republic along with antipyrenes[7].

The coating has a thermal reflection effect, many heating and cooling cycles do not lead to consequences.

The field of application of high temperature thermal insulators concerns the metallurgical industry, mechanical engineering, energy, industrial and civil construction. In the event of a fire, heat-resistant coatings and partitions can withstand high temperatures for a long time, preventing fire from passing into neighboring rooms and objects.

Polymer composite coatings with thermal and corrosion protection form fundamentally high molecular compounds, and the structure of the molecule is made up of a large number of atomic groups connected by chemical bonds to long chains. The chemical composition of these polymer composites consists of organic, inorganic and elemental fbirics.

IQ-spectroscopy analysis of epoxide simolase has been studied.

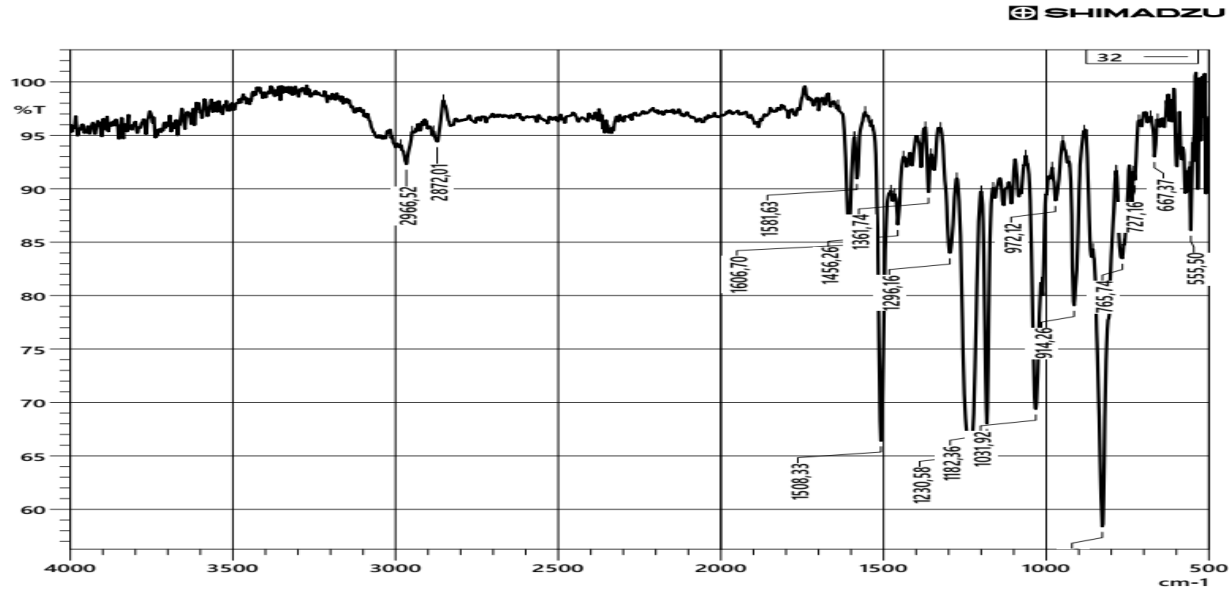


Figure 2-IQ spectrum of epoxide Smola.

Epoksidni smolaning IQ-spektr tahlillari o‘rganilganda, 2966,52-1456,26 sm^{-1} assimetrik valent yutulish sohasida –CH_2 guruhi, 2872,01 sm^{-1} valent yutilish sohasida – CH guruhi, 1182,36 sm^{-1} yutilish sohasida – CH –O– guruhiga tegishli bog‘ilarning mavjudligini ko‘rsatdi.

Tadqiqotlar natijasida biz F-1 markali qavariqlanuvchi qoplama oldik. Ushbu F-1 markali qavariqlanuvchi qoplama ED-20 epoksid smola, $CaCO_3$ va melamindan iborat kompozit bo‘lib, uning asosiy xususiyatlaridan biri qoplamaga yuqori darajadagi harorat ta'sir etishi natijasida qavariqlanish yuzaga keladi va alanga haroratini metall yuzasiga kirib borishini kamaytirishi oqibatida turli zararlarni oldini oladi.

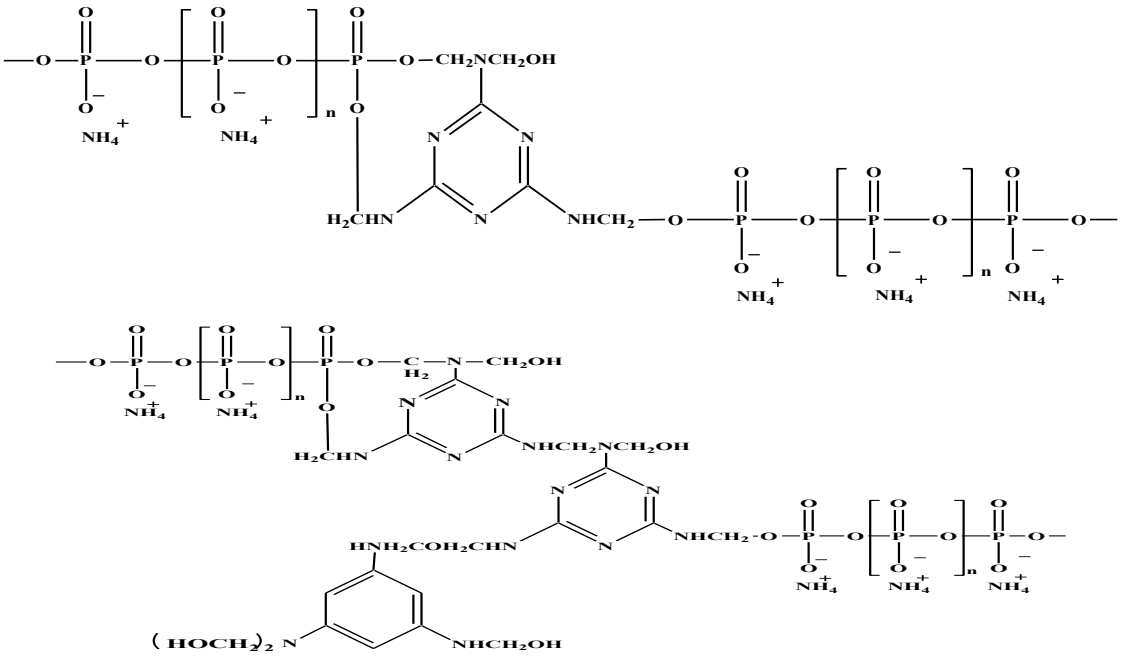
F -1 tarkibli issiqlik va korroziyadan himoyalovchi polimer kompozitli qoplamani tarkibi, massa.n., g.

Obtaining an F-1 branded convex coating in the laboratory. 50 g of epoxide per glass, which is stable to a temperature of 250 ml

Epoksid smolasi	50 gr
$CaCO_3$	10 gr
Melamin	5 gr
otverditel (PEPA)	5 gr

Tar (ED-20 - brand) is mixed with 10 g of $CaCO_3$ and 5 g of melamine until the same condition is removed. The mixture is stirred for 30 minutes and a solvent (mark 646) is added until the fluidity forms a working solution. The clay mixture is mixed in a non-host state for 1 hour at a temperature of 25-30 ºC until the pH is 6.7-7.2. Epoxy tar-based composites consist of a-b compositions mixed for 20 minutes with the addition of 10% PEPA compared to the mass of epoxide tar to solidify the finished product. The technology for obtaining these fireproof convex coatings is considered economical and environmentally efficient due to its simplicity[11].

Based on the modification of melamine-formaldehyde oligomers synthesized by scientists of the Republic with ammonium polyphosphate oligo-MERS in the solution State, work has been carried out aimed at improving the fire resistance and mechanical properties of wood and polymer materials. The process of modifying melaminformaldehyde oligomers with ammonium polyphosphate oligomers in the solution State is based on a polycondensation mechanism with the release of NH_3 and H2O.



3.- fig. An antipyrene derived from the polycondensation reaction of a polyphosphate ammonium oligomer with a melaminformaldehyde oligomer.

In these studies carried out, IQ spectroscopy of antipirens obtained on the basis of the polycondensation reaction of melaminformaldehyde oligomers and polyphosphate ammonium, as well as the melaminformaldehyde oligomer in the reaction process, was analyzed and showed substance-character Gardens[9].

Conclusions. The developed method of finding universal methods and means of protecting metal structures against corrosion is based on experimental data and implies the possibility of processing inaccurate data.

The considered methodology for establishing the criterion for assessing the quality of anti-corrosion coatings can be used to create the necessary criteria for assessing the safety of the use of metal structures, since it relies on proven decision-making methods.

The fire-fighting efficiency of the developed 1mm thick inflatable composition has been confirmed to be 11-21% greater than similar certified coatings (endotherms XT-150 and Proterm stil).The use of fire-resistant paints with grunts produced by BMP makes it possible to create coating systems that provide long-term comprehensive protection of metal structures from corrosion and fire.

To protect objects operating in an open industrial environment with high levels of pollution, BMP proposes the use of weather-resistant flame retardant plamkor-3 paints. It is recommended to use its composition for the indoors processing of metal structures.

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