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SYNTHESIS OF ORGANOSILICON POLYMER BASED ON HYDROLYZED POLYACRYLONITRILE

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ABSTRACT: The article presents the synthesis of organosilicon compounds based on tetraethoxylane and industrial by-products, and also studied the ratio of reagents, solvents and temperature to the reaction product. Hydrophobic compositions based on synthesized organosilicon polymers were also developed and tests of the building material - concrete were carried out.

KEYWORDS: Hypane, acrylic emulation, liquid glass, hydrophobization, reaction efficiency, concrete, hydrophobic compositions.

INTRODUCTION

The world pays great attention to the production of moisture protection products based on modern technologies and their use to increase the moisture resistance of building materials and structures. The creation of chemical materials that increase hydrophobicity and their inclusion in the composition of building materials is an urgent problem in all respects. Therefore, it is important to create a new generation of complex chemicals based on innovative technologies in the creation of moisture-resistant hydrophobic materials and their use in various fields.

At this time, organosilicon compounds are widely used to protect building materials from aggressive environmental influences. This is due to the fact that organosilicon compounds have the property of film formation and the film, in turn, being part of the processed material,

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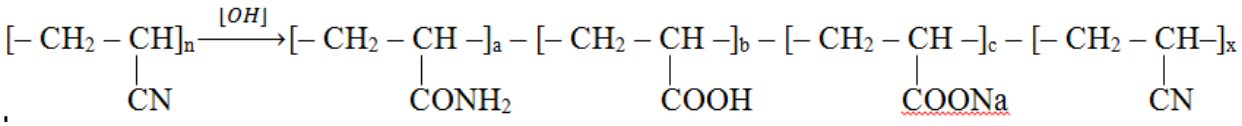
consists of alternating silicon and oxygen atoms. In addition, organosilicon compounds, on the one hand, bind to the workpiece through an oxygen bridge, and on the other hand, reduce the wetting of the object due to the presence of nonpolar molecular alkyl or aryl radicals[1,3,4].

THE MAIN FINDINGS AND RESULTS

In connection with the above, tetraethoxysilane and secondary industrial raw materials were used for the synthesis of new types of polymer compounds, the creation of new hydrophobic compositions, the production of hydrophobic building materials and the expansion of the range of the most widely used organosilicon compounds.

Hydrolyzed polyacrylonitrile, which is a secondary industrial raw material, is obtained by hydrolysis of acrylonitrile. The number of functional groups may vary depending on the reaction conditions (temperature, type of catalyst, presence of organic solvent) [6,8,9].

The structure of HYPANe and its functional groups is described below:



a, b, c, x depend on the conditions and duration of the hydrolysis reaction.

The binder tetraethoxysilane (Si (C2H5O) was used for the synthesis of a hydrophobic substance in the reactor4) and industrial secondary raw materials HYPANE in a ratio of 1:10 and at a temperature of 40 oC.

With an increase in temperature and the amount of TEOS, the solid mass obtained as a result of large-scale crosslinking becomes insoluble in solvents, which is probably due to the complete crosslinking of the reagents. The linear form of HYPANE is explained by the fact that the solubility of the resulting polymer decreases with an increase in the degree of transition to the lattice state and the formation of a solid mass[5].

The reaction of functional groups of hydrolyzed polyacrylonitrile with tetraethoxysilane based on experiments is described below:

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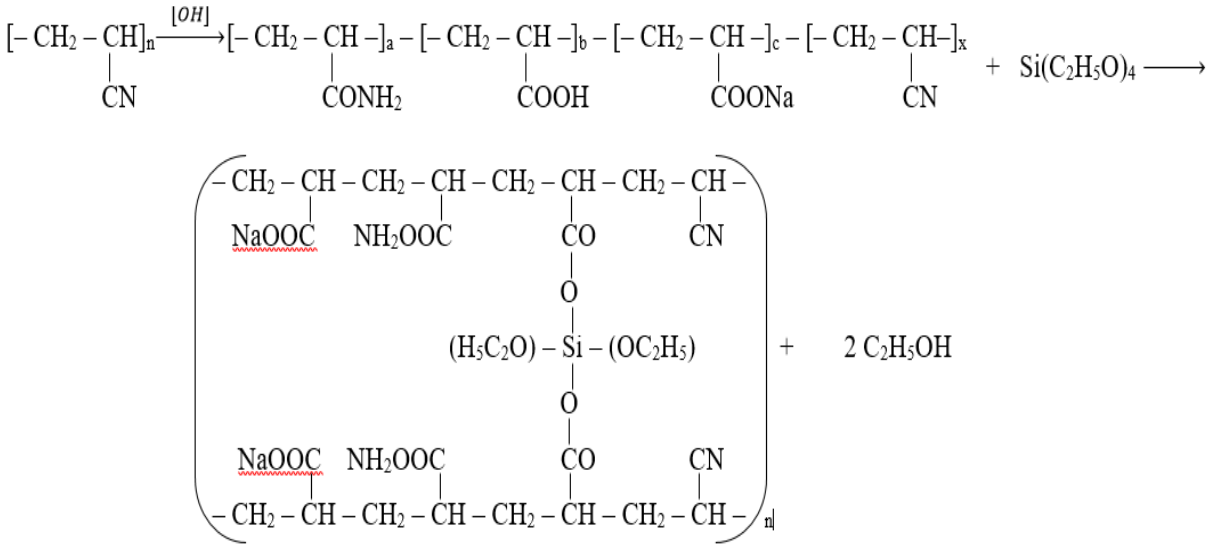

In diagram b (the number of functional groups in the schematic representation of hydrolyzed polyacrylonitrile) determines the level of crosslinking of CH-COO and the viscosity of the resulting polymer. Exceeding this value in a ratio of 10: 1 leads to the transformation of the polymer into a solid (rubber-like) mass[7,10].

CONCLUSION

Thus, organosilicon compounds based on industrial secondary raw materials and tetraethoxysilane have been synthesized. Compositions of hydrophobic compositions based on synthesized polymer the measures are designed and tested in concrete mixes.

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