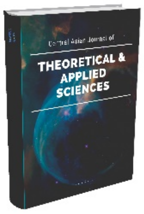

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Technology for Obtaining Organosilicon Polymers

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Abstract: *The article presents the synthesis of organosilicon compounds based on tetraethoxylane and industrial by-products, and also studies the ratio of reagents, solvents and temperature to the reaction product. Also, hydrophobic compositions based on synthesized organosilicon polymers were developed and tests were carried out for a building material - concrete. As a result, it turned out that the water absorption of concrete is reduced by 40%.*

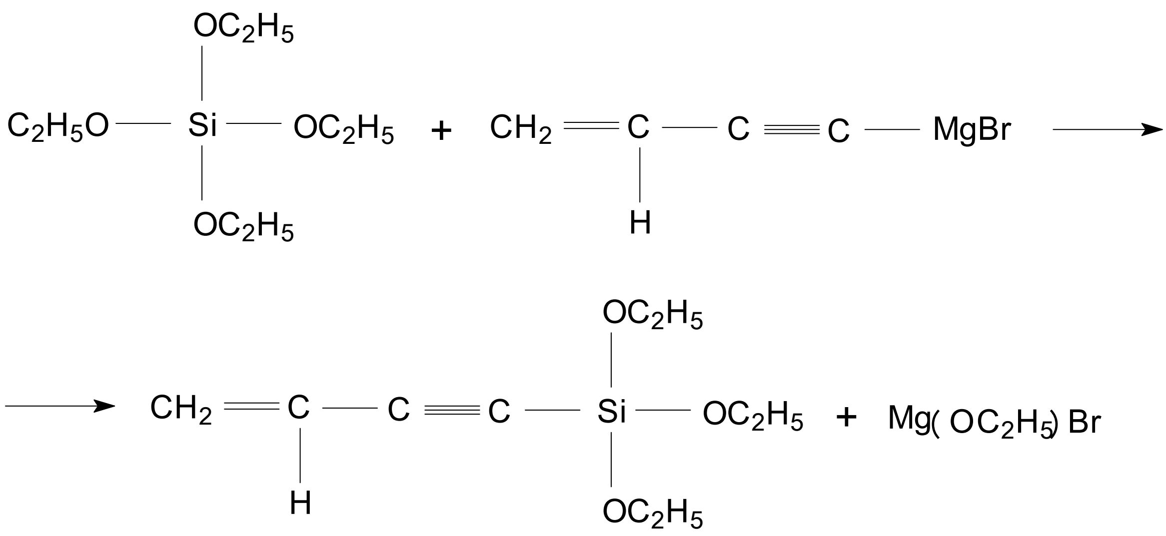
KeyWords: *ethyl ethers, benzene, chloroform, tetrahydrofuran, dioxane, tetraethoxyxane, vinyl ethyl magnesium bromide, vinyl ethyl triethoxylane, urea, formalin, hypane, acrylic emulsion, liquid glass, hydrophobization, reaction efficiency, concrete, hydrophobic compositions.*

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, 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, they reduce the wetting of the object due to the presence of non-polar molecular alkyl or aryl radicals [1,3].

In connection with the above, tetraethoxysilane and secondary industrial raw materials were used to synthesize new types of polymer compounds, create new hydrophobic compositions, obtain hydrophobic building materials and expand the range of the most widely used organosilicon compounds.

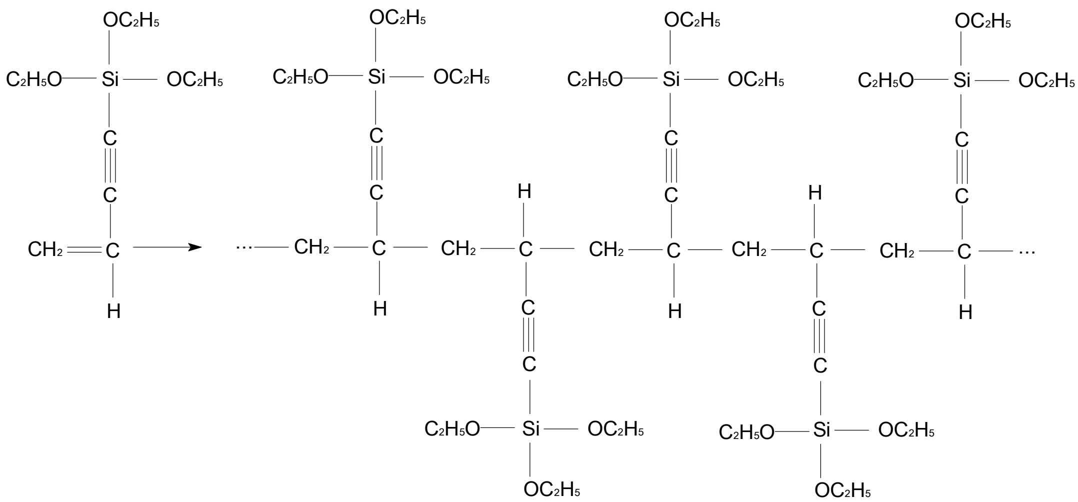
The interaction of tetraethoxylane and vinyl ethynyl magnesium bromide in equimolecular ratios is accompanied by the formation of vinyl ethynyl triethoxylane according to the following scheme: [2,7]



This reaction takes place at 30 ° C for 6 hours. The reaction yield is influenced by the ratio of the starting materials and the nature of the solvents. Unlike dry ether and benzene, the reaction yield is low in reactions carried out in toluene, dioxane, and other solvents.

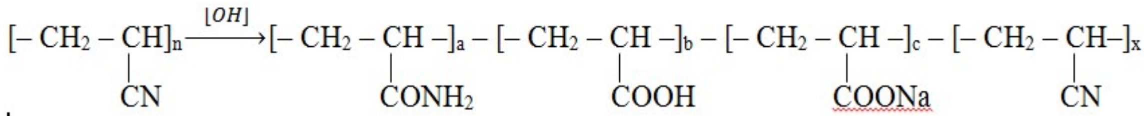
The resulting product is rectified for the presence of water, ethyl alcohol and unreacted monomer in polyvinylethynyltriethoxysilane, resulting in a product with polyvinylethynyltriethoxysilane in 150 ml (50%) or benzene in 140 ml (48%), 1.0183.

The scheme of thermal polymerization of vinyl ethynyltriethoxysilane monomer at a temperature of 30-40 ° C can be represented as follows:



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

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

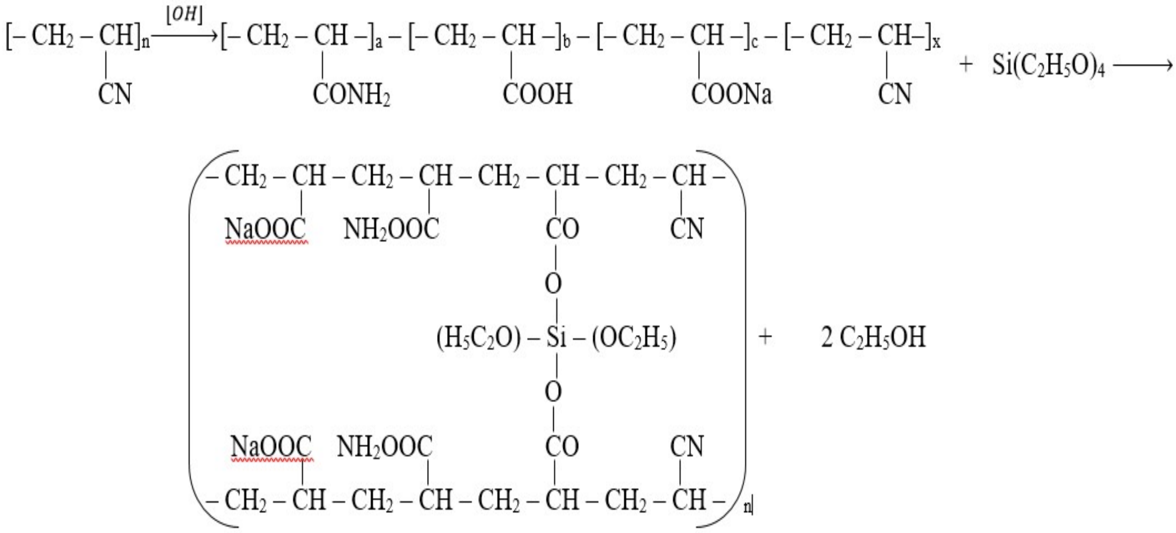


a, b, c, x depend on the conditions and duration of the hydrolysis reaction.

To synthesize the hydrophobic substance in the reactor, tetraethoxysilane (Si (C2H5O) 4) binder and industrial secondary raw material GIPAN were used in a ratio of 1:10 and at a temperature of 40 oC.

With an increase in the 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 HIPAN is explained by the fact that the solubility of the obtained polymer decreases with an increase in the degree of transition to the lattice state and the formation of a solid mass [5].

The following describes the reaction of functional groups of hydrolyzed polyacrylonitrile with tetraethoxylane based on experiments:



In Scheme b (the number of functional groups in the schematic representation of hydrolyzed polyacrylonitrile) determines the level of CH-COO crosslinking 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 (rubbery) mass.

Thus, organosilicon compounds based on industrial secondary raw materials and tetraethoxysilane have been synthesized. Compositions of hydrophobic compositions based on synthesized poly (oligomers) have been developed and tested in concrete mixtures.

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