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ABSTRACTS

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STYRENE POLYMERIZATION BY DISPERSING BENTONITE

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Perspective direction of creating ion-exchange composite materials based on natural minerals with highoperating characteristics. The simplest way to obtain them is mechanochemical method [1,2].

In case of intensive dispersion of the solid phase in presence of the monomer, on the newly formed surfaces happenedgraft polymerization [3]. These allow to hydrophobize surface of hydrophilic mineral and improve their compatibility with the polymer. Analogously other methods of modifying solid bodies mechanochemical graft polymerization can be regarded as one of the effective ways of directed change of nature of the particle surface. Thus it is possible to obtain organomineral system with a wide range of applications.

We studied bentonite dispersion with styrene. Final product of the following reaction after separation him from solid part of a polymer, is soluble in organic solventspolymer.In the dynamic conditions of mechanical impact causes a break already grafted to the surface of the macromolecular chains, which explains the formation of the soluble fraction of the polymer. Average molecular weight of 12,000. The small value connected with high concentration of active centers A direct estimate by electron paramagnetic resonance method is result the amount of the last vibration grinding of quartz at -196 °C showed that forms an average of $2 \cdot 10^7$ particles per gram [3]. At higher temperatures their concentration is less, but anyway sufficient to process efficiency does not affected oxygen in the air. As a result, the role of factor of recombination and disproportionation is growing macroradicals.

Another reason for obtaining products with a low molecular weight is a flowing along with the polymerization processes of degradation of the macromolecules. This is indicated by the data on reduction of the molecular weight of polystyrene.

It should be noted that, when bentonite mixed with styrene is able to induce almost instantaneous polymerization at room temperature in the presence of atmospheric oxygen. This is due to the high activity of the montmorillonite clay, subjected to an acid treatment. This results in substitution of metal cations occupying exchange position on the surface of the bentonite mineral acid hydrogen ions. The result is exchange acid centers (H^+ , Al^{3+}) [4].

Results variations in the yield of percentage of polymer in a system monomer composition (dispersion 15 min, the total amount of the components is 5 g) showed that the mixing ratio bentonite: styrene equal to 60:40 by weight. % leads to the

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highest content of the polymer product, due to favorable conditions for grinding in these conditions and low absolute amount of polymerized substance. Decrease output polystyrene connected with increasing of monomer concentration and system viscosity and decreasing process efficiency.

When dispersing increases the number of active centers, and at the same yield of the polymer increases and then becomes independent of the time of grinding. It is connected to the processes of degradation and worsening conditions for the formation of new centers of the polymerization reaction a result changes in system viscosity.

The results of the extraction data show the different contributions of chemisorption bonds during interaction depending on the ratio of components and the duration of modification of bentonite. The amount to grafting polymers 3-4 %.

The XRD patterns of samples showed that the resulting penetration of macromolecules between the layers of montmorillonite interplanar spacing varies from 14.8 to 15.4 Å.

The structure of the montmorillonite is easily exposed to profound changes in the machining process. [5] Mechanochemical activation in the presence of styrene causes changes in the nearest coordination sphere of aluminum atoms. The NMR spectrum of ^{27}Al present only the signal from the aluminum ions in the octahedral oxygen coordination. Mechanochemical modification of bentonite in environment of styrene reduces of the signal characteristic for aluminum carcass, and is accompanied by a change in position of the maximum signal induced by aluminum atoms in the cation positions downfield. This demonstrates the realization of acid sites related to four-coordinated Al^{3+} during the polymerization of styrene during dispersion.

During the intensive mechanical dispersing of natural bentonite the polymerization of styrene carried in ordinary conditions obtained graft polymers with containing inorganic components and organic nature.

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