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ANALYSIS OF IMPORTANCE AND METHODS OF PRODUCTION OF BLOCK SOPOLYMERS BASED ON POLYETYLENTEREPHTALATE

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Annotation. The article analyzes the importance and methods of obtaining polyethylene terephthalate-based copolymers, which play a leading role in the creation of a new generation of polymer materials with properties based on the achievements of innovative technologies in the polymer industry.
Key words: block copolymerization, copolyesters, antipyrenes, modifiers, hydroquinone, terephthalic acid, exchange bisphenols, polyethylene terephthalate

АНАЛИЗ ЗНАЧЕНИЯ И СПОСОБОВ ПОЛУЧЕНИЯ БЛОК-СОПОЛИМЕРОВ НА ОСНОВЕ ПОЛИЭТИЛЕНТЕРЕФТАЛАТА

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Аннотация. В статье анализируются значение и способы получения сополимеров на основе полиэтилентерефталата, играющих ведущую роль в создании полимерных материалов нового поколения со свойствами, основанными на достижениях инновационных технологий полимерной промышленности.
Ключевые слова: блок-сополимеризация, сополиэфиры, антипирены, модификаторы, гидрохинон, терефталевая кислота, обменные бисфенолы, полиэтилентерефталат.

POLIETILENTEREFTALAT ASOSIDAGI BLOK-SOPOLIMERLARNING AHAMIYATI VA OLINISH USULLARI TAHLILI

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Annotatsiya. Maqolada polimer sanoatida jafon amaliyotida innovatsion texnologiyalar yutuqlariga asoslangan xususiyatlarga ega yangi avlod polimer materiallarini yaratishda yetakchi o'rinni egallayotgan polietilentereftalat asosidagi blok-sopolimerlarning ahamiyati hamdaolinish usullari tahlili keltirilgan.
Tayanch so'zlar: blok-sopolimerlanish, sopoliefirlar, antipirenlar, modifikator, gidroxinon, tereftal kislota, almashingan bisfenollar, polietilentereftalat

Analysis of importance and methods of production of block sopolymers based on polyetylenterephtalate

Today in the polymer industry in the world practice is the creation of a new generation of polymer materials with properties based on the achievements of innovative technologies.

The chemistry and technology of polymeric materials is an important technology of modern development, the search for the possibility of obtaining new properties of materials based on a given binding of certain polymers.

One of the interesting ways in this direction is the creation of block copolymers, the macromolecules of which are hybrids of blocks with different chemical structure and composition. The thermodynamic incompatibility of the blocks often leads to a solid microphase layering, which eventually allows the properties of the block-copolymers to combine in an odd way [1].

Depending on the chemical nature of the blocks, it is possible to obtain structural and properties materials that differ significantly from the properties of the original component, depending on their length, number and sequence of exchange. There is a great potential for this, and they are beginning to be realized. The most typical is the creation of thermoelastoplasts large-toned polymeric materials, the application of the principles of block-copolymerization in their synthesis allowed to combine the properties of thermoplastics and elastomers in one material. The great potential of block copolymers has led to a sharp increase in interest in them in recent years [2].

At present, all the main problems of polymer physics and physical chemistry in the field of block copolymer testing - the nature of polymer sequencing, phase separation properties in polymers and the influence of basic molecular parameters, phase strength under temperature and force, physical and mechanical properties of microphases and their role in these properties. being investigated.

There are some limitations and unresolved issues in the field of synthesis, analysis, properties description and application of block copolymers. This provides a good incentive for intensive inspections, research and development of relevant industries.

The following three methods are the most preferred methods for the synthesis of block copolymers:

The first method uses polymerization by the addition of monomers one after the other on the mechanism of "living" chains.

The second method is based on the interaction of two initially derived oligomers with functional groups at the end.

The third path is the polycondensation of the second block at the expense of the group at the end of the initially obtained block of the first monomer.

The second and third methods allow the use of a large variety of chemical structures.

Thus, a large number of reactions can be used to obtain block copolymers by attaching loops (cycles) or binding to the macromolecule the blocks synthesized by polycondensation methods due to their opening.

Morphological studies have now been performed on block copolymers that retain two blocks A and B, which differ in nature. For a three-block copolymer that retains three different incompatible block (ABS) n, the manifestation of relatively new morphological structures can be expected, with very little information about such copolymers in the literature [3].

Simple and complex aromatic polyesters, polysulfones and polyarylene ketones have high physical-mechanical and dielectric properties as well as high thermal stability, which is a complex of properties of a number of valuable properties.

Due to the importance of the problem of creating thermogenerated polymers with high flame - and heat tolerance combined with good physical - mechanical properties for various fields of technology , to determine the relationships between composition and properties is important from a scientific and practical point of view.

The synthesis of copolyesters and block-copolyesters to improve the basic physical-mechanical strength and processingability of polymers, in particular, was carried out through the formation stage of oligomers with functional groups that are finally reactive.

As a result of the work, oligomers of different chemical structures - oligosulfon, oligocetone, oligosulfonetone, oligoformals were synthesized and on their basis new aromatic copolyesters and block copolyesters were obtained.

The obtained ceramic- and block-copolyefirsulfone ketones and polyacrylates based on dichlorohydrides of phthalic acids and 3.5- dibromo-p-oxybenzoic acid chlorohydride and terephthaloid (p-oxybenzoic) acid groups have high mechanical and dielectric properties, high chemical and dielectric properties. In the synthesis of the mentioned polymers, the acceptor catalytic method of polycondensation and the laws of high-temperature polycondensation were studied, the laws between the structure, composition and properties of the obtained polyesters were determined. The block synthesized within the scope of this research - ceramic polyester and ceramic film can be used in various industries of modern industry (automotive - radio-electronic, electrical aviation, electronic, chemical, etc.) as heat-resistant construction and film materials.

Synthesis of copolymers with polyethylene terephthalate (PETP) and other components of p-oxybenzoic acid can also be performed. It has been found that when copolymers are introduced into a PETP reaction mixture of a two-phase nature, copolymers with a block structure are formed.

The effect of temperature and heating time and heating rate on the properties of ceramic fibers is considered. The glassing temperature increases with increasing heating time. Much of the work has been devoted to the study of the complex of physical and mechanical properties of liquid crystalline copolyesters based on p-oxybenzoic acid (p-OBK) and polyethylene terephthalate (PETP).

Up to 75% liquid-crystalline (LC) - pure PETP liquefaction and crystallization have been detected in mixtures containing the component. Copolies that retain less than 30% p-OBK are in the isotronic glassy phase, copolies with a much higher content of the second component are in the liquid crystalline state and are characterized by greater dielectric constant than the glassy state. This difference is due to the presence of different orientation distributions on the copolyesters relative to the electric field direction of the main chains in different structural states. infrared spectral data show that the components of the mixture interact due to the re-esterification reaction in the liquid. An increase in pressure slows down the reaction between its components, reducing the free volume and mobility in the mixture

In the study, p - OBK / PETP and their mixtures with isotactic polypropylene (PP), polymethyl methacrylate (PMMA), polysulfate, polyethylene - 2,6 - naphthalate (PEN), p - oxybenzoic acid and 6,2 - oxynaphthoic acid (ONA) copolyester Investigation of the properties of SK based sopholofir is underway. The following properties of mixtures with P - OBK / PETF SK - copolymer of PP were expressed by measured-specific volume, coefficient of thermal expansion a (alpha) and compressibility b (betta). High pressure has been found to cause sorting in PP fluid. In the field of liquefaction and crystallization temperatures of PP, an increase in the coefficient of thermal expansion and compressibility for all components of the mixture (100 - 25% PP) was found, with a slight change in these parameters for the SK - copolyeper. An increase in the amount of SK-polymer in the mixture

significantly reduces the coefficient of thermal expansion, both in its solid state and in the liquid state of PP, which must be taken into account when processing the mixture into a product. In a mixture with polysulfon, the SK component is grouped in the form of concentric cylinders of different radii. Under such conditions, it remains responsible for the viscosity properties of the mixtures.

Piezoelectrics were obtained from p-OBK /PETP and p-OBK/ ONA-based SK-polymers. 6, 2 - The temperature range of the time stability and performance of piezoelectrics from oxynaphthoic acid-based polymer is higher than that of PETF-based polymer. Table 1 shows the brands of PETF and p OBK-based ceramic fibers produced in the United States.

Table 1

PETP and p OBK-based polyesters

Company	Country	Trade name
Eastman Kodak Co	United States	Vectron
		LCC - 10108
		LCC - 10109

It was found that the use of 30% p-OBK / PETP SK copolifier results in a 110% increase in the 30% solubility modulus of PMAA strength, without compromising its recyclability.

The structure and properties of various SK ceramic polyesters are being investigated in the works. For example, copolymers based on p-oxybenzoic acid (p-OBK), polyethylene terephthalate, hydroquinone and terephthalic acid are being studied. The addition of a mixture of hydroquinone and terephthalic acid accelerates crystallization and increases the degree of crystallization of polyesters.

In the study of the flow curves of homogeneous and heterogeneous liquids of PETP and acitoxybenzoic acid-based copolifers, it was confirmed that there are two structural areas of copolifier liquids. At low temperatures, there are highly liquefied crystals in the nematic phase, and at high temperatures, where a homogeneous nematic liquid is formed. SK - fluid flow curves are typical for viscous plastic systems, however, the tendency to have a flow limit increases with increasing molecular mass and decreasing temperature. Extruds formed from homogeneous liquefaction have much higher values of molecular orientation and strength than extrudates formed from heterophasic liquefaction. The effect of highly liquefied crystallites on the orientation process of the structure and the decrease in the strength of the exudates increases with increasing proportion of the mesogent fragment in the chain.

Examination of the structure of p-OBK / PETP and m atestoxibenzoic acid-based SK-copolymers by IQ, YaMPN and X-ray diffraction methods at wide angles showed that the degree of orientation in copolymers increases when the amount of p-oxybenzoy units increases from 60 to 75%.

Under the harsh conditions of operation of polymers in the presence of the effect of open flame, oxygen, high temperatures, polymer materials are required to maintain their shape and size under the influence of high fire resistance and high temperature heat fluxes. Extensive research is being conducted on the synthesis of aromatic polyesters with high fire resistance and modification of existing samples of this type of polymer, based on the requirements for polymer materials. Currently, the most widely used methods of reducing flammability are:

–- Laying fire protection coatings;
– Add fillers;
– Oriented synthesis of polymers;
– Introduction of flame retardants;

– Chemical modification.

A common, technologically easy way to increase the fire resistance of polymers is their chemical modification, which can be carried out directly in the process of copolymerization with a synthetic reactive modifier, for example: exchange of bisphenols, various acids, other oxybrids and reaction of the obtained polymer. by modification during mechanical chemical treatment with additives capable of or during the processing of the polymer liquid.

The most optimal methods of modification of aromatic polyesters in order to obtain high-strength self-extinguishing materials under the influence of aggressive environments are condensing them from halogen-retaining monomers, as well as combining aromatic polyesters with halogen-containing compounds and using halogen-containing sewing agents.

Various compounds (aromatic and aliphatic) are used as modifiers. They inhibit combustion processes and can not only give polymers some new properties, but also improve their physical properties.

REFERENCE:

1. Темирова, Матлаб Ибодовна, and Элбек Улуғбекович Файзиев. "ЧАРМНИ ОШЛАШДА МАҲАЛЛИЙ СУВДА ЭРУВЧАН ФАОЛ СИНТЕТИК ПОЛИМЕРЛАРНИ ҚЎЛЛАШ." International Journal of Advanced Technology and Natural Sciences 2.1 (2021): 33-38.

2. Rayimov, Zuhriddin Xayriddin O'g'li. "Ftal angidridning vinillanish jarayoni erituvchilari. "Science and Education" 2.12 (2021): 266-269.

3. Садирова, Саодат Насреддиновна. "ИННОВАЦИОННЫЕ БИМОДАЛЬНЫЕ СМОЛЫ." Universum: технические науки 11-4 (92) (2021): 74-76.