O'ZBEKISTON RESPUBLIKASI
OLIY VA O'RTA MAXSUS
TA'LIM VAZIRLIGI

BUXORO
DAVLAT
1930 UNIVERSITETI

O'ZBEKISTON RESPUBLIKASI
INNOVATSION
RIVOJLANISH VAZIRLIGI

IQTIDORLI TALABALAR, MAGISTRANTLAR, TAYANCH
DOKTORANTLAR VA DOKTORANTLARNING

TAFAKKUR VA TALQIN

MAVZUSIDARESPUBLIKA MIQYOSIDAGI ILMIY-AMALIY ANJUMAN TO'PLAMI

Бухоро-2021

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mavzusida

Respublika miqyosidagi ilmiy-amaliy anjuman to’plami

2021 yil, 27-may

O'zbekiston Respublikasi Prezidentining 2020 yil 24-yanvardagi Oliy majlisga yo'llagan murojatnomasi va O'zbekiston Respublikasi Vazirlar mahkamasining 2020 yil 7- fevraldagi 56-F-son farmoyishiga hamda Oliy va o'rta maxsus ta'lim vazirligining 2021 yil 4-maydagi № 3/19-04/05-26 son xatiga asosan ushbu Respublika ilmiy-amaliy anjuman tashkil etildi. To'plamda iqtidorli talabalar, magistrantlar, tayanch doktorantlar va doktorantlarning ilmiy izlanishlari, tajriba almashish, sohalarda amalga oshirilayotgan ishlarni tahlil qilish va bu boradagi takliflarni ishlab chiqish bo'yicha ilmiy-amaliy va uslubiy tavsiyalar ishlab chiqilgan.

Mazkur to'plamga kiritilgan maqolalar va tezislarning mazmuni, statistik ma'lumotlar hamda bildirilgan fikr va mulohazalarga mualliflarning o'zlari mas'uldirlar.

Foydalanilgan adabiyotlar ro'yxati.

1. "Физика соҳасидаги таълим сифатини ошириш ва илмий тадқиқотларни ривожлантириш чора-тадбирлари тўғрисида" Ўзбекистон Республикаси Президентининг Қарори. 19.03.2021 й., 07/21/5032/0226-сон.
2. O'zbekiston Respublikasi Prezidenti Sh.Mirziyoyevning Oliy Majlisga yo'llagan Murojaatnomasi (2021)
3. Sh.M.Mirziyoyevning 2017-yil 20-apreldagi "Oliy ta'lim tizimini yanada rivojlantirish chora-tadbirlari to'g'risida"gi PQ-2909-sonli qarori.

ELASTOMERES ARE MOLECULAR OF MATERIALS STRUCTURE AND MACROSCOPIC PROPERTIES

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Abstract: The distinguishing feature that causes rubbers or elastomers to belong to a separate class of compounds is their high flexibility or their high degree of reversible deformation in a small modulus of elasticity. These properties determine the technical value of rubber materials in the first place.

Key words: structure, elastomer, cis-trans isomerism, diene, link, monomer, polymer, valence, configuration, elongation, plastic, fiber, crystal, microstructure, carbochain, amorphous, isoprene polymer, polypentanomer, macromolecule.

High flexibility results from the molecular structure of elastomers, among other properties. All elastomers belong to higher polymers with a chain structure, i.e., they are composed of many multi-chain molecules in which

thousands of repeating structural units are bonded to each other by simple valences.

Because polymer chains in space rotate a group of atoms to a certain extent freely, many wrappers can move to different configurations. The relationship between the structure of elastomers in their individual form and their large reversible deformation is obvious. Under the influence of external forces, for example, due to elongation, molecular chains can move to a less twisted configuration.

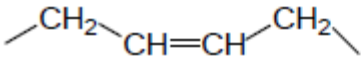
High-chain polymers include a range of plastics, fiber-forming materials. However, the high elastic properties over a wide range of temperatures are unique to elastomers, and this property makes them widely used. These qualities of elastomers, along with their chain structure, are due to the sufficient mobility of their internal system. This is due to the lack of a certain degree of crystallinity and the weak intermolecular bonding of the chains.

Based on the above comments, the properties of higher polymers, including elastomers, are not only their chemical nature, but also the structural parameters of molecular chains: their size, spatial location of monomer links, the presence of a branched structure, etc. The main task of the science of polymers is to develop theoretical and practical methods for studying molecular parameters, that is, to explain the relationship between the quantitative characteristics of the structure of macromolecules and the properties of materials.

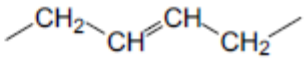
The main elements of the molecular structure of synthetic rubbers are the structure, spatial configuration of the polymer and the relative position and sequence of the main links.

The Sis and trans-configuration of the monomer links belong to the rigid part of the chain and do not allow internal rotation.

In polymers, cis-trans isomerism occurs in polymers of diene (e.g., polybutadiene). This is also a special type of spatial (geometric) isomerism:



Sis- izomer



Trans- izomer

This isomerism also significantly affects the properties of polymers. For example, the cis-isomer of 1,4-polyisoprene is used as a rubber in its elastic state at natural temperatures (natural rubber, derived from the Hevea tree). However, at room temperature, the trans-isomer is a hard plastic called gutta-percha because it softens at much higher temperatures (+65°C) and exhibits a rubbery property only at higher temperatures.

In carbon chain polymers, such fields are the secondary bonds between the carbon atoms of the main chain. It is known that the cis-trans isomerism in the chain of these polymers leads to significant changes in their properties. For example, trans-isomers of butadiene and isoprene polymers are elongated in phase and crystalline even at high temperatures, while cis-isomers are amorphous at normal temperatures and are the most basic elastomers. is calculated. For other carbocyclic polymers, such as polypentanomers, elastomers play the role of trans-isomers as necessary properties. This is because the melting temperature of the cis-isomer crystals is pushed to the lower temperature limit.

1. Interaction of molecular chains in isoprene polymers (NK and synthetic cis-1, 4-polyisoprene) affects the physical properties of the polymer.

2. In monomeric links attached to the molecular chains 1,4 1,2 or 3,4, the composition of the added compounds 1,2 and 3,4 affects the molar cohesion and polymerization of the polymer.

3. Finally, polymer chains with asymmetric carbon atoms form right and left steroisomers with different locations. Here, the predominance of molecular chain structure has a major impact on the physical and chemical properties of elastomers.

Along with the macroscopic properties of polymeric materials, their mechanical properties also lie. This is very important for polymers.

This led to the inclusion of high-grade polymeric materials in the most basic class. It is known that in molecular physics, these conditions depend on the nature of the thermal motion of the basic structural and kinetic units. In the case of small molecules, both types of units are compatible, but in polymers it is different. A structural unit in a polymer is a macromolecule.

At temperatures above the nominal value (more commonly called the flow temperature T_t) in amorphous polymers, the velocity of the segments is so high that the lattice, which is not attached to the macromolecule, is displaced by external mechanical loads. The physical state of polymers belonging to such a temperature is called a dark reader. Because they are characterized by a large state of irreversible deformation.

The polymerization reaction occurs with the opening of unsaturated bonds or closed chains of small molecules $nM \rightarrow Mn$. In this case, the chemical composition of the monomer and macromolecule joints is the same. The bond in this case is called the monomer bond of the polymer. Polymerization takes place through the formation of active particles (free radicals, ions) from substances that are added to the monomer separately (initiator, catalyst). As with any process, polymerization can only take place under certain conditions. According to the second law of thermodynamics, for polymerization to take place spontaneously, $\Delta G = (\Delta H - T\,\Delta S) < 0$. Here $\Delta G, \Delta H, \Delta S$ is the change in the free *Gibbs* energy, enthalpy H and entropy S of the system of substances in the polymer transformation of the monomer.

At much lower temperatures ($T < T_t$) the mobility of the segments is preserved, and for polymers - this means high flexibility. This is only the case for high-molecular-weight compounds, which give the material a large reversible deformation property.

Also, a number of polymers, copolymers and elastomers widely used in industry are obtained by radiation polymerization. In short, one of the prospects for the peaceful use of nuclear energy, which is an important factor in the development of modern technology, is the use of nuclear energy sources as a source that accelerates the polymerization process in the chemical industry. Radiation polymerization was first used in 1925 to polymerize acetylene using radon particles and electrons. In 1939, the polymerization of vinyl monomers in the liquid state by γ-rays was studied. After the development of nuclear energy in the 1940s, scientific research into the process of radiation polymerization became widespread around the world, including in Uzbekistan.

The most important feature of a macromolecule of polymers is its chain structure, ie the size of the linear length of the molecule is many times larger than the transverse dimension (several orders of magnitude). For example, the length of macromolecules in various polyethylene tapes is $1000 - 10000$ times larger than the diameter.

Polymers also exhibit new properties in solubility. They do not dissolve directly. It swells first, then melts. The viscosity of the solution is so high that $1\% - 2\%$ of the solution loses its fluidity and turns into a gel.

Thus, at much lower temperatures, the mobility of the segments is significantly reduced, resulting in a polymer glass state. This condition is considered to be the third major physical state of the polymer.

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ФОТОЭЛЕКТРИЧЕСКИЕ ХАРАКТЕРИСТИКИ ПОЛЕВОГО ТРАНЗИСТОРА В РЕЖИМЕ ОТСЕЧКИ КАНАЛА

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Аннотатция: *Приведены результаты экспериментального исследования фотоэлектрических характеристик полевого транзистора в режиме запирания канала. Показано, что полевой транзистор в режиме запирания канала обладает существенной чувствительностью к световому излучению.*

Ключевые слова: *полевой транзистор, фоточувствительность, падающие напряжения, режим отсечки.*

Выявление оптимальных режимов эксплуатации полупроводниковых приборов, [1] направленных на обеспечение малого потребления энергии, надежности, большого срока службы, а также высокой стабильности их параметров на сегодня является актуальной задачей. В этом аспекте полевые транзисторы с управляющим p-n- переходом являются востребованными. В частности, подбирая толщину канала и режим

MUNDARIJA: