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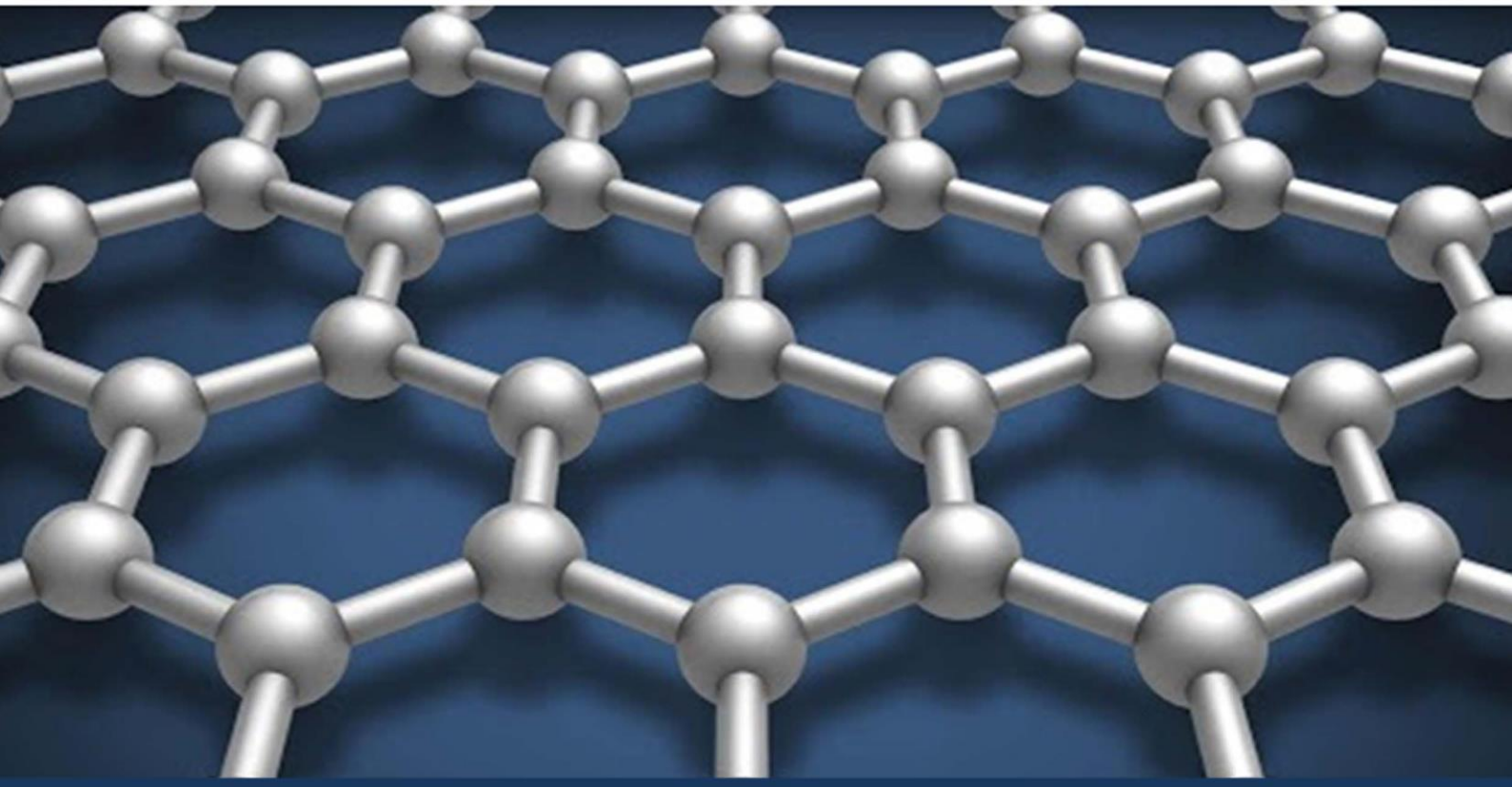

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STUDY OF PHYSICOCHEMICAL AND MECHANICAL PROPERTIES OF SYNTHESIZED OLEIN-PALMITIN PLASTICIZED RUBBER COMPOUNDS

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Abstract. The article analyzes the methods of processing and modification of polymer materials. The main goals in modifying the properties and systems of materials are defined. Increases in the production of additives are analyzed and their inclusion in the composition of rubber mixtures of plastics is shown. The plasticization method was mainly used to increase the elasticity and cold resistance of polymers and to facilitate processing technological processes. The results of experiments obtained in cooperation with the Tashkent Chemical-Technological Research Institute and the enterprises “Birinchi rezinotexnika Zavodi” LLC and “URGANCH YOG’-MOY” JSC are presented. According to the obtained results, it is known that the physico-mechanical properties of the rubber mixture and the vulcanization process are changed by modification.

Key words: Polymer resin mixture, plasticizers, fillers, stearic acid, olein-palmitin, quality indicators.

Introduction. It is known that the economic development of each country and the well-being of its people depend on the types of energy produced and the quality and quantity of work-resistant polymer composite materials. Because nowadays it is difficult to imagine various sectors of the national economy without cheap, high-quality and durable composite materials produced on the basis of polymers. Agents that increase plasticity or elasticity in the processing and use of polymers and materials derived from them are called plasticizers. The appearance of a true solution of the polymer plasticizer indicates its compatibility with the polymer. If the polymer swells on its own in the plasticizer, then it is compatible with the plasticizer. In order to facilitate the processing of polymer materials, to modify their properties and systems, to obtain durable, high-quality, work-resistant and competitive products from them, various chemical additives are included. The production of additives (plasticizers, fillers, stabilizers, dyes and other substances) is increasing year by year. If in 1980, 4,000 tons of additives were produced, by 2017, their amount was 8,500 tons. There are more than 20 species, most of which are poisonous. All of them are included in the composition of plastics. This makes it possible to increase the types and range of polymers [1-3].

One of the main methods of modifying the polymer system is their plasticization. The main purpose of plasticization is to increase the elasticity and cold resistance of the material by introducing various liquids or solids into the polymer composition and to facilitate the technological processes of processing [4-6].

Tashkent Scientific Research Institute of Chemical Technology and "First Rezinotechnika Zavodi" LLC and "URGANCH YOG'-MOY" JSC enterprises in cooperation with improving the physical and mechanical properties of rubber equipment, resistance to various external influences, wear and tear, etc. in order to reduce the consumption of imported stearic acid, scientific-practical work was carried out on the use of olein-palmitin mixture, which is a local raw material that can replace imports.

Methods. In the laboratories of "URGANCH YOG'-MOY" JSC and Tashkent Scientific Research Institute of Chemical Technology, experimental tests of raw materials of olein-palmitin mixture based on technical regulations were conducted, and the results are presented in table 1 below.

Table 1

Physico-chemical and technological parameters of the experimental rubber mixture based on olein-palmitic acid of "Urganch Yog'-Moy" JSC

№	Test types	Indicators of a standard rubber mixture based on stearic acid	Indicators of standard rubber mixture based on olein and palmitic acid "URGANCH YOG'-MOY" JSC
1	Curved vulcanization line 185°C·3 min T30/s T60/s ML/dN·m MH/dN·m	 32,63 34,92 7,23 14,14	 22,60 34,13 7,95 15,91
2	Mun viscosity (1+4) 100 ^{0}C	186,26	184,18
3	Hardness (180^{0}C*6 min)	56	56
4	Elongation at break, %	511,77	545,67

5	Modulus of elasticity, MPa 100% 300%	 0,941 5,09	 0,853 4,36
6	Conditional tensile strength, MPa	12,99	12,70
7	Dispersion	7,13	7,03
8	Vulcanization of Munia t5 (127^0C)	12:17	11:29
9	Density	1,127	1,128
10	Curved vulcanization line 150°C·30 min	125	117

It is known from the table that the physico-chemical parameters of the samples of the standard rubber mixtures based on stearic acid synthesized by us were compared with the standard rubber mixture based on olein and palmitic acid of "URGANCH YOG'-MOY" JSC, and the stearic acid substitute In order to use raw materials of olein-palmitin mixture, rubber mixtures were prepared in laboratory conditions based on a standard recipe.

Results and Discussion: The cooled rubber mixture was tested in laboratory conditions on the "Electronic tensile testing machine "AI-7000"" device, such as its tensile strength, relative elongation at break, elasticity, modulus of elasticity; The kinetics of the vulcanization process were studied in the "Rotorless Rheometer (Vulcanization Instrument Without Rotor) M-3000A" device and the hardness in the "Shore Hardness Tester N14/1" device, and the results are presented in table 2.

Table 2

The results of the study of the hardness, relative elongation, tensile strength and vulcanization process kinetics of rubber mixtures obtained on the basis of imported stearic acid and local raw material olein-palmitin mixture

№	Rubber compound	Hardness	Discontinuity in relative expansion	Tensile strength ≥Mpa	180^0C*4 min Vulcanization process			
			N/mm	Mpa	T30 s	T60 s	ML dNm	MH dNm
1	Rubber compound obtained on the basis of imported stearic acid	56	511,77	12,9	32,63	34,92	7,23	14,14
2	A rubber mixture obtained on the basis of a mixture of local raw materials olein-palmitin	56	545,67	12,8	22,60	34,13	7,95	15,91

Curvilinear vulcanization of the rubber mixture obtained in laboratory conditions, parameters such as munit viscosity, tensile strength, elastic modulus, required tensile strength, results of vulcanization processes under munit were checked, and the results are shown in table 3.

Table 3

Curvilinear vulcanization, viscosity, tensile strength, elastic modulus, required tensile strength, results of vulcanization processes under munit of rubber mixtures obtained on the basis of imported stearic acid and local raw material olein-palmitin mixture

№	Types of experience	NK and imported stearic acid based on the indicators of the rubber mixture	NK and olein-palmitin indicators of acid-based rubber mixture
1	Vulcanization curve 160°C·20 min T30/s T60/s ML/dN·m MH/dN·m	 34,9 45,7 1,5 21,05	 34,75 45,1 1,55 20,9
2	Viscosity by Munit (1+4) 100^0C	40,02	39,12
3	Resistance to stretching, %	680,00	786,92
4	Modulus of elasticity, MPa 100% 300%	 0,602 1,39	 0,570 1,32
5	Conditional tensile strength, MPa	20,10	20,85
6	Vulcanization under Munit 5 (127^0C)	12,4	15,2