

*Blokh, G. A.*

USSR/Chemical Technology. Chemical Products and  
Their Application-Crude rubber, natural  
and synthetic. Vulcanized rubber

I-22

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9781

Author : Blokh, G. A. and Mal'nev, A. F.

Inst : Not given

Title : The Infrared Spectra of Natural and Synthetic  
Rubbers

Orig Pub: Legkaya prom-st, 1956, No 4, 38-44

Abstract: Structural changes occurring in rubbers during sulfur and thermal vulcanization have been investigated with a view towards the clarification of the effect of O<sub>2</sub>, S, and of accelerators. 2% benzene solutions of natural rubber, Na-butadiene [TN: Buna S], and butadiene-nitrile rubber with and without antioxidants (Neozon) and accelerators (Captax, thiuram, D<sub>1</sub>G) were prepared. Films prepared from these solutions were subjected to step-

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USSR/Chemical Technology. Chemical Products and I-22  
Their Application--Crude rubber, natural and  
synthetic. Vulcanized rubber.

Abs Jour: Ref Zhur-Khimiya, No 3, 1957, 9781

Abstract: No such bands were observed in the spectra of the vulcanized articles or in the spectra recorded in an atmosphere of  $N_2$ . Bands characteristic of oxygen compounds were not present in the spectra of mixtures of butadiene-nitrile rubber and S. Oxidation bands were also absent from the spectra of press-vulcanized natural rubber specimens in contrast to the spectra of such specimens vulcanized at atmospheric pressure in contact with the air. The spectroscopic investigations confirm the active influence of the accelerators on the structural changes occurring in natural rubber during vulcanization.

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*Infrared transmission spectra of vulcanized rubber*  
 Q. A. Baka and A. E. Mal'nev, *Trudy Inst. Fiz. Akad. Nauk S.S.S.R.* 1956, No. 7, 116-30 (in Russian)

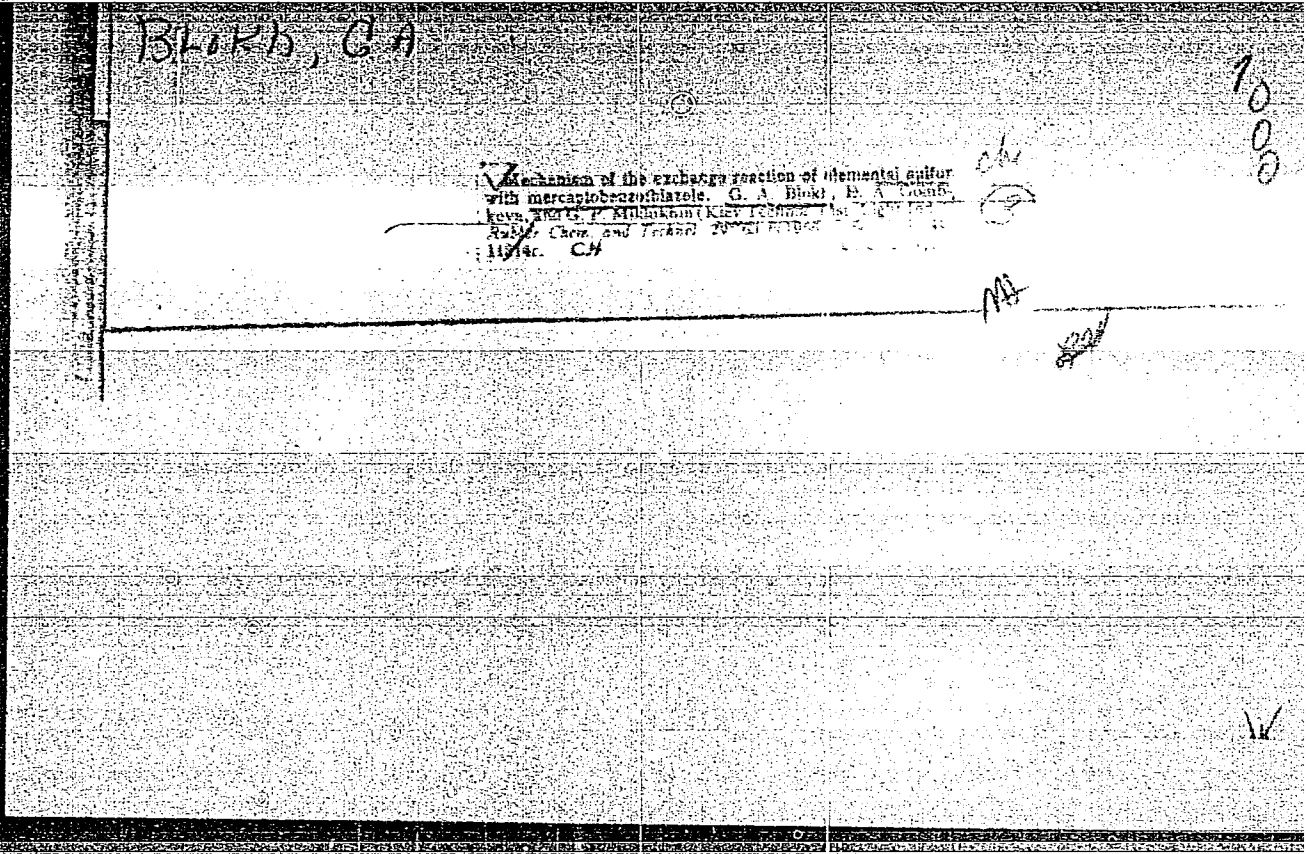
Structural changes in polybutadiene rubber during the curing cycle were investigated in the presence of phenyl-naphthylamine (I), S, and accelerators. Films of polybutadiene (II) approx. 50  $\mu$  thick were formed on the surface of NaCl crystals by evapn. of a 2% benzene soln. of the rubber. The spectra were recorded in the interval of wave lengths from 4.22  $\mu$  to 18.22  $\mu$  during and after a heating cycle. After one hr. at 145° in the presence of air, the spectrum of II contg. no I showed a wide band in the 1748-1650  $\text{cm}^{-1}$  region. This was simultaneously accompanied by a decrease in the transmission. Adnl. curing for 2 hrs. at 145° still further decreased the transmission in the 1726  $\text{cm}^{-1}$  region. Because the characteristic frequencies of the carbonyl bond in aldehydes, ketones, esters, and acid anhydride groups are, resp., 1727-1703, 1721-1669, 1769-1721, and 1782-1748-1693  $\text{cm}^{-1}$ , it was concluded that thermal treatment of II caused the oxidation leading to the formation of compds. of similar nature. This point was further confirmed by the appearance of a band and the decrease in the transmission in 1187  $\text{cm}^{-1}$  region, which is characteristic for the absorption of  $\text{RCH}_2\text{OCH}_2\text{R}_1$  type of compds. Under the same conditions the spectra of II contg. I showed no intense absorption in the above mentioned regions. Samples of butadiene-Na polymer (III) in a N atm. either with or without I also showed the absence of the absorption owing to the oxidation. In the presence of S, III after heating for 60-150 min. at 145° in N atm. or in air showed absorption at 640-1700  $\text{cm}^{-1}$  typical for  $\text{RC}(\text{O})\text{SR}$  and  $\text{RC}(\text{O})\text{SH}$  type of compds.

A. P. Kotloby

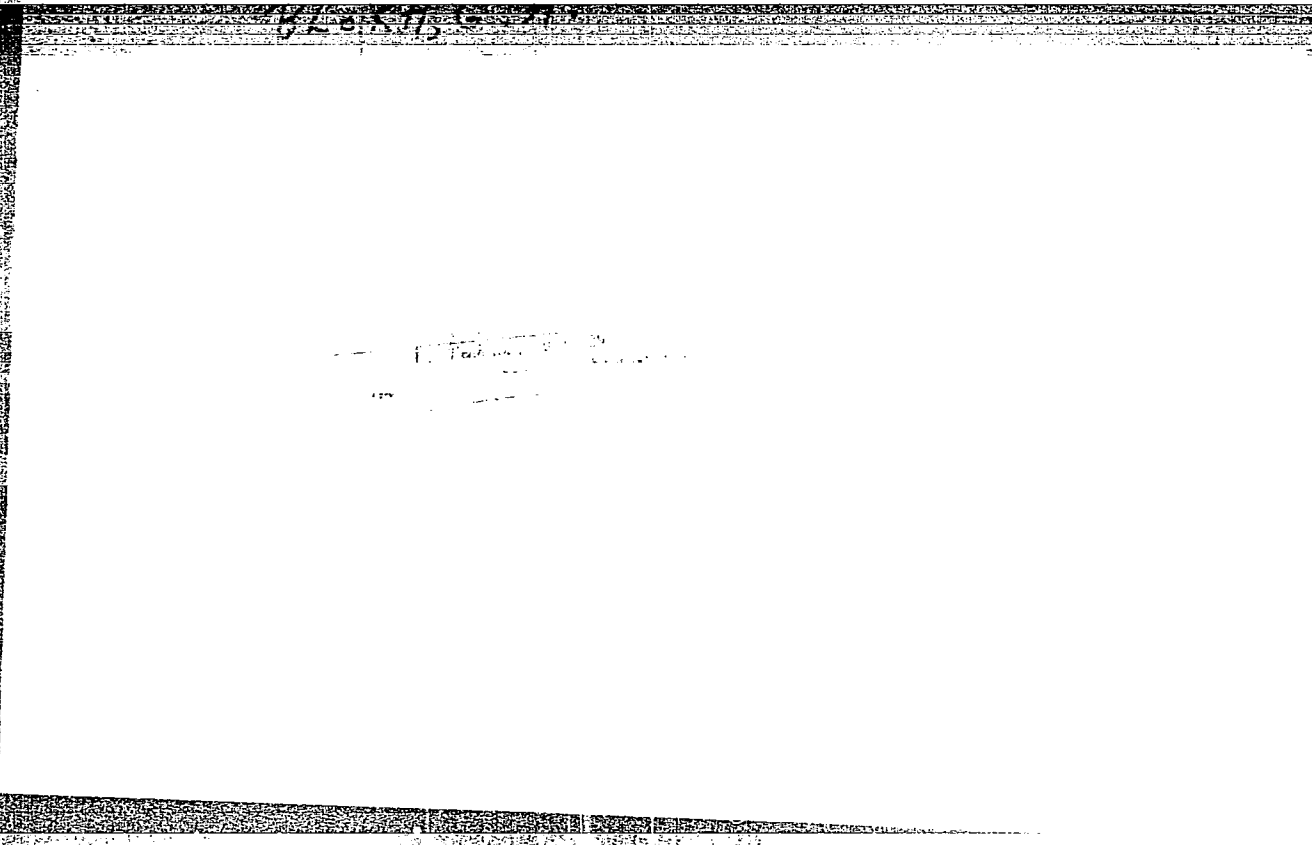
1841 - Study of the diffusion of polonium in rubber by the method of radioactive isotopes.  
 BLOKH, Z. P. KOZMIN, ZARVA, L. A. OL'SHANSKIYA, and Y. N. KULIKOV. *Vestnik AN SSSR* 1956 27 No. 3 p. 100-102.

The diffusion of  $\alpha$  from various barriers of various materials into initially non-radioactive rubber, was measured for different vulcanisation periods (20 to 40 min at 145°C). Rubberised and non-rubberised eolies (0.31 mm thick) offered no hindrance to diffusion. Polyethylene (0.25 mm), polyvinyl chloride and polystyrene were also ineffective barriers. Polypropylene, and metallized polypropylene completely stopped the diffusion of  $\alpha$ . The measured  $\alpha$  concentration was determined in copper sheet 0.15 mm, counter on rubber, probably because of the interaction between copper and sulphur.

Dnepropetrovskiy khimiko-tekhnologicheskiy Institut.







20-1-28/44

AUTHORS: Blokh, G.A., Yaroshevich, A.G.

TITLE: The Interaction between Soot and Sulphur in the Process of Rubber Vulcanization (O vzaimodeystvii sazhi s seroy v protsesse vulkanizatsii kauchuka)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 1, pp. 105 - 108 (USSR).

ABSTRACT: First, a short report is given on previous works dealing with the same subject. The present work contains kinetical data concerning the interaction of soots (gas black, lamp black) with sulphur and with the accelerators. In connection with the investigation of these problems the following was studied: The interaction between radioactive sulphur and soot at temperature conditions which corresponds to vulcanization. The adsorption of caoutchouc molecules from the benzene solution by the surface of soot particles. The influence of pre-heating the soot sulphur accelerator mixture upon the physical and mechanical properties of the types of rubber on the basis of various synthetic rubbers. There follows a description of the experiments. First, the kinetics of the connection between radioactive sulphur with a gas black and lamp black is discussed. Three experi-

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The Interaction between Soot and Sulphur in the Process of Rubber Vulcanization 20-1-28/44

mental series were developed on this occasion: I. series: The exactly weighed quantities of soot are mixed with equal quantities of radioactive sulphur and are then heated at a temperature of 145° for 1, 3, 5, 8, 10 hours. II. series: Before being mixed with the soot the exactly weighed quantities of radioactive sulphur were kept at a temperature of 145° for 1 - 10 hours and were then mixed with the soot. III. series: The exactly weighed quantities of soot and of radioactive sulphur were mixed and not heated. The experimental series II and III made possible to explain the quantitative side of the adsorption binding of sulphur with soot. By comparing the remanent radioactivity of the I. experimental series with remanent radioactivity of the second it was possible to obtain a true picture of the chemical bond between sulphur and soot. On the occasion of the heating of soot with sulphur it is certain that a chemical bond between the two is formed. Even after a 600 hours' extraction of sulphur from the mixture with soot. Gas black is more strongly bound to sulphur than lamp black. The authors then deal with the adsorption of the caoutchouc molecules by soot-sulphur complexes and with the influence exercised by the pre-heating of the soot with accelerated vulcanized substances upon the porosity of types of rubber.

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The Interaction between Soot and Sulphur in the Process of Rubber Vulcanization 20-1-28/44

The thermal treatment of the soot at 145°, which takes 1 - 3 hours, increases the adsorption of the caoutchouc molecules by the soot particles. There are 4 figures and 13 references, 8 of which are Slavic.

ASSOCIATION:

Dnepropetrovsk Chemical Technology Institute imeni  
F. E. Dzerzhinskiy  
(Dnepropetrovskiy Khimiko-tekhnologicheskii institut im. F.E.  
Dzerzhinskogo)

PRESENTED:

April 3, 1957, by P.A. Rebinder, Academician

SUBMITTED:

July 12, 1956

AVAILABLE:

Library of Congress

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110-SX-6-12/22

AUTHORS: Blokh, G.A., Candidate of Technical Sciences, Kogen, V.B.  
and Ol'shanskaya, I.A., Engineers

TITLE: On the Vulcanisation of Rubber Mixtures for Cables  
(K voprosu o vulkanizatsii kabel'nykh rezinovykh smesey)

PERIODICAL: Vestnik Elektropromyshlennosti, 1958, ~~№ 6~~, Nr 6,  
pp 54 - 55 (USSR).

ABSTRACT: The work on which this article was based was done by the Works and the Institute in collaboration. Recent researches by Scheele and others (German) into the mechanism of vulcanisation by tetramethyl thiuramdisulphide (thiuram) and by Dogadkin and others on the action of zinc and vulcanisation with dibenzothiazoldisulphide (Al'taks) are of particular interest in connection with insulating rubbers for which carbon black is not used. A study was made of vulcanisation by Al'taks in these rubbers in which chalk and talc are used as filters. The study includes various insulating rubbers; the results of the physical and mechanical tests are given in Table 1. Al'taks cannot fully replace thiuram because the properties of the rubber are than impaired but if these materials are used in the ratio of 1:1, the properties are acceptable.

The effect of zinc oxide in accelerating vulcanisation is well

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On the Vulcanisation of Rubber Mixtures for Cables 110-58-6-12/22

known. Recent work of Dogadkin and Benisk have shown that zinc oxide promotes the formation of strong sulphur cross-links in the rubber. A study was made of the physical and mechanical properties of cable-sheath rubber in which the content of zinc oxide ranged from 0 to 3% and the content of manganese oxide was kept constant: the results are given in Tables 2 and 3. A number of cable specimens were made up with rubber of reduced zinc-oxide content and had properties conforming to standard GOST 2068-54. Therefore, the zinc content commonly used could be reduced. There are 3 tables and 3 references, 2 of which are Soviet and 1 German.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskiky institut (Dnepropetrovsk Chemicó-technological Institute) and Zavod Azovkabel' (Azovkabel' Works)

SUBMITTED: July 10, 1957  
Card 2/2

- 1. Vulcanizatsiá--Physical properties
- 2. Vulcanization
- Materials

5(1,3)  
AUTHORS:

~~Blokh, G. A.~~, Kogan, M. S.,  
Bogdanovich, N. A., Bol'shakova, Z. N.,  
Tyuremnova, Z. D.

SOV/153-58-6-18/22

TITLE:

On the Stability in Water of the Petroleum and Benzene-resistant Rubbers (Ob ustoychivosti k vode maslobenzostoykikh resin)

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i  
khimicheskaya tekhnologiya, 1958, Nr 6, pp 101-107 (USSR)

ABSTRACT:

The rubbers mentioned in the title get into contact as well with water at normal and at raised temperatures under operational conditions beside the substances to which they are resistant. A particular shortcoming of the rubber products for special use (butadiene nitril- and chloroprene rubber) in operation is their low stability in water. They swell up to 3-5% at normal temperatures and up to 7-9% at 100°. In consequence of this water penetrates e.g. into cables. In the present investigation the action of the following factors upon the stability in water of the rubbers mentioned in the title was investigated: a) vulcanization conditions (duration, temperature), b) substitution of the hydrophilic components

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On the Stability in Water of the Petroleum and  
Benzene-resistant Rubbers

SOV/153-58-6-18/22

of the rubber mixture by hydrophobic ones, c) introduction of synthetic resins, d) of lead oxides and e) the previous heating. On the strength of the above mentioned the attempt was made to increase the stability in water of the mineral oil-resistant rubbers from synthetic homerubbers (SKN-26, nayrit) technologically and according to schedule. For this purpose the mentioned rubbers were soaked in technical water for 1.5 and 10 days at 80 and 100°. The composition of the experimental rubber is given. The action of the duration and the temperature of the vulcanization (142, 151, and 160°) on the stability in water is shown in figure 1. At 25° this action is practically equal to zero, it rises to a certain extent at a water temperature of 100° if higher vulcanization temperatures are used. The previous heating of the rubber did not cause any important effect. Furthermore the influence of all rubber ingredients on the stability in water was investigated. Figure 2 shows that an unfilled rubber mixture which consists of only SKN-26 and the group which accelerates the vulcanization swells in water much more than a mixture with filler. Dibutyl phthalate reduces the swelling of the

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On the Stability in Water of the Petroleum and  
Benzene-resistant Rubbers

SOV/153-58-6-18/22

filled rubber in the case of boiling by the 2-3 fold, as compared to unfilled rubber. This influence cannot be observed at room temperature. Figure 3 shows the influence of the nitril groups. They increase the stability in water at 100° by almost 50%. The introduction of synthetic resins improves the physico-mechanical properties of the rubber. Cresol formaldehyde resins do not improve the stability in water, Yarrezin-B-resin deteriorates it at 100°, increases it, however, at room temperature. Carbolitē resin and alkyd resin improve the stability in water. The stability in water of the rubber on the chloroprene rubber basis may be improved by the substitution of the zinc oxide and magnesium oxide in preparation by minium or red lead, combined with Thiuram and diphenyl guanidine. The introduction of soot and the removal of chalk mixtures from the preparation has a similar effect. There are 6 figures, 1 table, and 6 Soviet references.

## ASSOCIATION:

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Kafedra tekhnologii reziny, Dnepropetrovskiy khimiko-  
tekhnologicheskii institut i Yaroslavskiy zavod rezinovykh  
tekhnicheskikh izdeliy (Chair of Rubber Technology,

On the Stability in Water of the Petroleum and  
Benzene-resistant Rubbers

SOV/153-58-6-18/22

Dnepropetrovsk Institute of Chemical Technology and Yaroslavl'  
Plant of Technical Rubber Products)

SUBMITTED: November 29, 1957

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67634

SOV/81-59-14-51894

15.9130

Translation from: Referativnyy zhurnal, Khimiya, 1959, Nr 14, p 556 (USSR)

AUTHORS: Blokh, G.A., Borisova, G.S., Burmistrov, S.I., Przhebylskiy, M.I.

TITLE: Technological Investigations of Some Organic Compounds as Accelerators for the Vulcanization of Dipped Products

PERIODICAL: Tr. Dnepropetr. khim.-tehnol. in-t, 1958, Nr 6, pp 166 - 173

ABSTRACT: The action of the following compounds as accelerators of the process of sulfur vulcanization at 100 - 120°C was investigated: trithiane  $\text{CH}_2\text{SCH}_2\text{SCH}_2\text{S}$  (I), triisopentoxythiophosphate  $[(\text{C}_2\text{H}_5)_2\text{CHO}]_3\text{P}=\text{S}$  (II), diethoxydithiophosphoric acid  $(\text{C}_2\text{H}_5\text{O})_2\text{P}(\text{S})\text{SH}$  (III), and its salts (IV), the diethyl ester of the 2-ethylmercaptoethanethiophosphoric acid  $(\text{C}_2\text{H}_5\text{O})_2\text{P}(\text{S})\text{CH}_2\text{CH}_2\text{SC}_2\text{H}_5$  (V), dibenzylthiourea  $(\text{C}_6\text{H}_5\text{CH}_2\text{NH})_2\text{CS}$  (VI), the benzthiazole ester of the diethyldithiocarbamic acid (VII), benzylammonium dithiocarbamate  $\text{C}_6\text{H}_5\text{CH}_2\text{NHC}(\text{S})\text{S}(\text{NH}_2)\text{CH}_2\text{C}_6\text{H}_5$  (VIII), hexamethyleneimine hexamethylenedithiocarbamate  $(\text{CH}_2)_6\text{HC}(\text{S})\text{SN}\cdot\text{NH}(\text{CH}_2)_6$  (IX). The compounds I-VI and VIII have no accelerating action. VII produces opaque films with good physical-chemical properties, IX is an accelerator which has been introduced

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SOV/81-59-14-51894

Technological Investigations of Some Organic Compounds as Accelerators for the  
Vulcanization of Dipped Products

into production and shows transparent highly-stable films.<sup>5</sup> The films were obtained  
by dipping into a standard glue with S and later on into a glue with the accelerator  
or into a toluene solution of the accelerator. The glue with IX is stable on storing  
for two weeks. Analogous results were obtained also in press vulcanization. 4

V. Kuleznev

Card 2/2

BLOKH, G.A.; BORISOVA, G.S.; PRZHEBYL'SKIY, M.I.

Thermal activation of the ingredients of rubber stocks.

Trudy DKHFI no.6:174-184 ' 58.

(Rubber)

(MIRA 13:11)

**AUTHORS:** Blokh, G.A., Kormil'tseva, Z.P., SOV/138-58-7-10/1,  
Bakharev, V.I., and Tikhomirov, B.P.

**TITLE:** Study of Diffusion Processes Occuring in Tyres During  
Vulcanisation (Part I) (Issledovaniye diffuzionnykh  
protssessov pri vulkanizatsii avtopokryshek) (Soobshchen-  
iye I)

**PERIODICAL:** Kauchuk i rezina, 1958, Nr 7, pp 35 - 36 (USSR)

**ABSTRACT:** In this investigation, radioactive sulphur,  $S^{35}$ , was  
introduced into the tread, breaker and carcass rubber  
mixes and the diffusion of the isotope from each of these  
parts of the tyre into adjacent parts of the tyre was  
studied.  
The appropriate rubber mixes containing the isotope  
sulphur were rolled into thin laminae 0.4 to 0.8 mm  
thickness and discs 16 mm diameter were cut from these  
laminae. The discs were placed under a (Geiger) counter  
and their radioactivity was determined before vulcan-  
isation. Measurements were taken from both sides of the  
discs. The discs were then stacked into piles to form  
representative sections of a tyre. 30 discs represented  
the tread and 8 to 10 discs the breaker and the carcass.  
The discs were dusted with talc to assist separation of

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SOV/138-58-7-10/19

## Study of Diffusion Processes Occuring in Tyres During Vulcanisation

the laminae after vulcanisation. Piles of discs from mixes containing  $S^{35}$  were assembled with piles of discs from mixes containing normal sulphur in the appropriate sequences so that diffusion could be assessed for the different cases of: 1) tread to breaker to carcass; 2) breaker to tread, breaker to carcass and 3) carcass to breaker to tread. The stacked piles were vulcanised at  $145^{\circ}C$  for half to two hours. The individual discs were then stripped from the vulcanised samples and the activity of each disc measured by the counter. Diffusion of the isotopic sulphur from discs to disc could then be assessed, as also diffusion from one part of the representative tyre section to another. Table I shows the extent of the diffusion from the tread (where the active sulphur was originally located) into breaker and carcass. The  $S^{35}$  diffused from the tread into the breaker to a depth of 3 to 3.5 mm. The breaker rubber taking up more than 40% of the activity of the tread rubber to a depth of 0.9 mm and over 60% to a depth

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SOV/138-58-7-10/19  
Study of Diffusion Processes Occurring in Tyres During Vulcanisation

0.6 mm. The diffusion did not extend to the carcass rubber where the activity remained at background level. Table 2 shows results from a test where the active material was located in the breaker rubber and diffused both to the tread and to the carcass parts of the sample to a depth of 3 to 4 mm. Table 3 shows the results of a similar test with the  $S^{35}$  diffusing from carcass into the breaker rubber but not extending through to the tread. Similar experiments were made by assembling layers of tread, breaker and carcass rubber but in this case all containing  $S^{35}$ . After vulcanisation at 145 °C for 2 hours, the sample was stripped and the activity of the laminae at the interfaces between the different mixes was determined and compared with the activity at the same locations before vulcanisation. The results, given in Table 4, indicate concentration of the vulcanising groups at these interfaces, through differences in chemical rate and kinetic flow during vulcanisation. Such concentrations of polysulphide groups will undergo decomposition and re-grouping while the tyre is in use because of the temperature differences that are caused by deformation. Knowledge of the extent of these

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SOV/138-58-7-10/19

Study of Diffusion Processes Occurring in Tyres During Vulcanisation

concentrations is important since it will enable the ageing and fatigue characteristics of the tyre to be assessed. The diagram has been constructed from the data in tables 1, 2 and 3 and relates the activity level to the position of measurement in the stack. The shaded areas indicate concentration of activity at the interfaces between different parts of the tyre.

Attempts to study diffusion of calcium hydroxide, using  $\text{Ca}^{45}$ , in similar experiments were unsuccessful, evidently because of the insolubility of this material in rubber. There are 4 tables and 5 Soviet references.

1. Tires--Test methods 2. Sulfur--Diffusion 3. Sulfur isotopes (Radioactive)--Applications 4. Vulcanization

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SOV/119-58-10-5/19

**AUTHOR:** Blokh, G. A., Candidate of Technical Sciences

**TITLE:** Gears With Continuously Variable Speed Transmission  
(Zubchataya peredacha s besstupenchatym izmeneniyem pere-  
datochnogo otnosheniya)

**PERIODICAL:** Priborostroyeniye, 1958, Nr 10, pp 15-18 (USSR)

**ABSTRACT:** In 5 cross-sectional drawings a gear is shown which is free of any deficiencies of a friction gear. It secures a continuously variable speed transmission. The transmission ratio adjusted does not vary by its own. The gear consists of a fixed gear clutch and a gear reducer. The operation of the single parts is described. The gear described can be used in two practical cases:

- 1) In a coordinate plotter (for the reproduction of a sine or cosine function). In this case it substitutes the linkages according to Wolf, or the rotating transformer of the type SVT.
- 2) As a continuously operating reducing gear in the place of the friction variator. It must, however, be pointed

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Gears With Continuously Variable Speed Transmission SOV/119-58-10-5/19

out that a transmission of greater power is not yet possible.  
There are 7 figures.

Card 2/2

AUTHORS: Blokh, G. A., Zdanovich, V. S. SOV/79-28-10-5/60

TITLE: Isotope Exchange of the Sulphur of 2-Mercapto Benzothiazole With Elementary Sulphur in the Presence of Amines (Izotopnyy obmen sery 2-merkaptobenzotiazola i elementarnoy sery v prisutstvii aminov)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 10, pp 2652 - 2656 (USSR)

ABSTRACT: In an earlier paper (Refs 1-3) G.A.Blokh and his collaborators proved that in the vulcanization of rubber a reaction of the accelerators with sulphur takes place. According to the method of the radioactive isotopes it was experimentally found that an intense isotope reaction of the sulphur atoms of the accelerators and the vulcanization products takes place. It turned out that the more active the accelerator, so the more intense this isotope reaction of the atoms is realized at the lower temperatures (Ref 4). As it is known the amines were first used in rubber industry and still play an important role as they increase the activity of the sulphur-containing organic accelerator (Ref 5).

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Isotope Exchange of the Sulphur of 2-Mercapto Benzo- SOV/79-28-10-5/60  
thiazole With Elementary Sulphur in the Presence of Amines

It was of practical and theoretical interest to determine the influence of the amine on the velocity of the isotope reaction of the sulphur atoms of the widest spread accelerator, the 2-mercapto benzothiazole, and of the vulcanization medium, the elementary sulphur. It was to be expected that in a correlative dependence of the vulcanization velocity on that of the isotope reaction the presence of the amines would intensify the reaction of the sulphur atoms. Thus, the kinetics of the reaction of the sulphur of 2-mercapto benzothiazole and of elementary sulphur was investigated in the presence of the following amines: dipropyl amine, diamyl amine and triethyl amine. The results obtained met with the expectations: It was proved that these amines accelerate at 100, 120 and 140° the isotope reaction of the sulphur atoms of mercapto benzothiazole with elementary sulphur. This agrees with the practical use of the amines in vulcanization. There are 1 table and 11 references, 7 of which are Soviet.

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Isotope Exchange of the Sulphur of 2-Mercapto Benzo- SOV/79-28-10-5/60  
thiazole With Elementary Sulphur in the Presence of Amines

ASSOCIATION: Dnepropetrovskiy khimiko-tehnologicheskii institut  
(Dnepropetrovsk Chemical and Technological Institute)

SUBMITTED: August 29, 1957

Card 3/3

BLOKH, G.A., dotsent, kand.tekhn.nauk; KORMIL'TSEVA, Z.P., inzh.

Investigating the vulcanization of rubber footwear by the  
method of radioisotopes. Izv.vys.ucheb.zav.;tekhn.prom.  
no.1:100-108 '59. (MIRA 12:6)

1. Dnepropetrovskiy khimiko-tekhnologicheskii institut im. Dzerzhin-  
skogo. Rekomendovana kafedroy tekhnologii raziny.  
(Vulcanisation)  
(Radioisotopes--Industrial applications)  
(Boots and shoes, Rubber)

BLOKH, G.A., dotsent; DENISENKO, V.Ye., inzh.

Effect of prolonged storage of filled rubbers on the quality  
of the finished products. Kozh.-obuv.prom. no.2:25-27 F '59.  
(MIRA 12:6)

(Rubber)

BLOKH, G.A., dotsent, kand.tekhn.nauk; MELAMED, Ch.L., inzh.

Reaction of carbon black with sulfur, Captax, and thiuram in the rubber vulcanisation process. Izv.vys.ucheb.zav.; tekhn.prom. no.2:28-38 '59. (MIRA 12:10)

1. Dnepropetrovskiy khimiko-tekhnologicheskii institut im. Dzerzhinskogo.  
(Carbon black) (Vulcanisation)

SOV/138-59-4-11/26

AUTHORS: Blokh, G.A., Kogan, M.S., Bogdanovich, N.A., Bol'shakova, Z.N., and Prokhorovich, E.P.

TITLE: Barium Sulphate as a Replacement for Lead Oxide in X-Ray Absorbing Rubbers (Sernokislyy bariy kak zamenitel' okisi svintsa v rentgenrezinakh)

PERIODICAL: Kauchuk i Rezina, 1959, Nr 4, pp 42-44 (USSR)

ABSTRACT: Formulae are given relating the stopping power of material to the wavelength of the X-rays, the density of the material, and to its atomic number Z. Barium has about one third of the stopping power of lead when considering X-rays of longer wavelengths, but has greater stopping power than lead to X-rays at the lower end of the spectrum. Table 1 gives the composition of the standard mix used for protective rubber sheet. This contains 1000 parts of lead oxide by weight to about 138 parts of rubber, sulphur etc., and of two other mixes containing 900 parts lead oxide and 100 parts Lithopon (Lithopon is an equimolecular mixture of barytes and zinc sulphide), in one case, and 750 parts of lead oxide and 250 parts barytes in the other case - the same rubber mix being involved in all three cases. Table 2 shows the equivalent thickness of rubber mixes containing different percentages of Lithopon

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SOV/138-59-4-11/26

Barium Sulphate as a Replacement for Lead Oxide in X-Ray Absorbing Rubbers

instead of lead oxide as compared with the thickness of a lead sheet of the same stopping power - these determinations being made by using an X-ray source and an ionization chamber. The stopping power of barytes is greater than lithopon. Table 3 shows that replacement of 25% of the lead oxide by barytes gives the same equivalent thickness as the standard mix with only lead oxide filler. The mix with 25% barytes has similar mechanical properties but has a specific gravity of 3.9 as against 4.62 for the standard mix. This lower density is the main advantage. Table 4 shows equivalent lead thicknesses for replacement of lead oxide by various percentages of filling materials, including antimony penta- and tri-sulphides, lithopon, barytes (barium sulphate), and barium carbonate. As a result of these investigations, the Yaroslavl' Factory of Technical Rubber Components, now replaces 25% of the lead

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SOV/138-59-4-11/26

Barium Sulphate as a Replacement for Lead Oxide in X-Ray Absorbing Rubbers

oxide formerly used in the standard X-ray rubber mixes with barytes. This gives an annual saving of 65 metric tons of lead oxide which is equivalent to 56 tons of lead. Greater proportions of barytes can be introduced into rubbers which are intended only for absorption of X-rays of wavelengths at the lower end of the spectrum, i.e. X-rays in the 0.260 - 0.200 kX range

(1 kX = 1.00202 Å =  $1.00202 \times 10^{-8}$  cm).

There are 4 tables and 4 Soviet references.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut i Yaroslavskiy zavod rezino-tekhnicheskikh izdeliy (Dnepropetrovsk Chemical Technology Institute and Yaroslavl' Factory of Technical Rubber Components)

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SOV/21-77

5(

AUTHORS:

Ovcharenko, F.D., Corresponding Member of the AS UkrSSR,  
Blokh, G.A., Gudovich, N.V., Lomov, Yu.I.

TITLE:

Pyrophyllite, a New Dielectric Filler for Cable Rubber

PERIODICAL:

Dopovidi Akademii nauk Ukrain's'koi RSR, 1959, Nr 5,  
pp 489-493 (USSR).

ABSTRACT:

The authors made a study of the physico-chemical properties of Ukrainian pyrophyllite of the Zbrankov deposits, Zhitomir region, with the purpose of applying it in cable rubbers as a dielectric filler, instead of chalk and talc (imported from the Urals). The Zbrankov pyrophyllite was found to consist in its basic mass of 85% of highly disperse pyrophyllite mineral, about 15% quartz with trace of talc. The structural formulas of pyrophyllite and talc are as follows: pyrophyllite -  $Al_2 [Si_4 O_{10} (OH)_2]$ ; talc -  $3MgO \cdot 4SiO_2 \cdot H_2O$ . The optical constants of pyrophyllite are  $n_g = 1.600 - 1.594$ ;  $n_p = 1.552 - 1.555$ ;

...rd 1/3

SOV/21-59-5-8/25

## Pyrophyllite, a New Dielectric Filler for Cable Rubber

Ng-Np = 0.048-0.039; of talc Ng = 1.575-1.590;  
Np = 1.538-1.545; Ng-Np = 0.037-0.045. Chemical compositions of pyrophyllite and talcs from the Urals are shown in table 1. Mixtures of pyrophyllite were substituted for talc and chalk, as shown in table 3, subjected to pressed vulcanization at  $143^{\circ} \pm 2^{\circ}$  for 10-60 minutes. The analysis of the results of testings showed in table 4 indicates that the physical and mechanical properties of the rubber remained unchanged both before and after ageing (24 hours -long, at  $70^{\circ}$ , in the air) and did not differ from serially-produced insulation rubber. Hence, pyrophyllite is a new effective dielectric filler for cable rubber. It is the most hydrophobic of all agrillaceous minerals, its heat of moistening is close to zero, the value of water sorption at P/Ps = 1 is 0.2 nmol/g, the dielectric constant is 7.7, angle of dielectric losses  $9-12^{\circ}$ , pH = 6.5. Thermal treatment and grinding may intensify the heat of moistening, value of water absorption and

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SOV/21-59-5-8/25

Pyrophyllite, a New Dielectric Filler for Cable Rubber

dielectric constant. There are 4 tables, 1 microphoto,  
1 graph and 4 Soviet references.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN UkrSSR  
i Dnepropetrovskiy khimiko-tekhnologicheskoy institut  
(Institute of General and Inorganic Chemistry of the  
AS UkrSSR, and the Dnepropetrovsk Chemico-Technological  
Institute)

SUBMITTED: February 18, 1958

Card 3/3

S/138/59/000/07/09/009

AUTHORS: Boguslavskiy, D. B., Tikhomirov, B.P., Blokh, G. A. ✓

TITLE: A Study of the Diffusion Processes in the Vulcanization of Automobile Tire Casings. Communication 2.

PERIODICAL: Kauchuk i Rezina, 1959, No. 7, pp. 47-50

TEXT: The authors briefly summarize the results of work carried out previously on the diffusion processes in rubbers and vulcanizates, referring to Ref. 1-9. The present article deals with the data obtained on the kinetics of sulfur and accelerator (captax) diffusion from the reinforcement rubber into the adhesive film which, in turn, is based in its composition on carboxyl-containing and 2-methyl-5-vinylpyridine copolymers. It is pointed out that at the present time the significance of impregnating tire cord with latex copolymers, having active functional groups in the molecular chains, is continuously increasing, as the latter affects the properties of vulcanizates depending on the content of sulfur and accelerators. Thus, the diffusion redistribution of the concentration of the vulcanizing agents can have a great effect on the mechanical properties of the adhesives. The experimental procedure undertaken is outlined, and it is established as a result that the rate of diffusion depends on the density of

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S/138/59/000/07/09/009

A Study of the Diffusion Processes in the Vulcanization of Automobile Tire Casings. Communication 2.

the vulcanizing lattice of the adhesive, on the type and content of the functional groups in the molecular chain of the copolymers and the dosages of the resorcin-formaldehyde resin. The various natures of the resorcin-formaldehyde resin's interaction with the carboxyl-containing and methylvinylpyridine copolymers, is pointed out. In discussing the obtained experimental data, it is also pointed out that the presence of the impregnating compositions of the carboxyl-containing and methylvinylpyridine latexes, in the adhesive, has a double effect: on the one hand, they increase the interaction of the molecules of the impregnated film and the reinforcement rubber, and, on the other hand, they have a significant effect on the elasticity of the molecular chains, reducing their diffusibility. It is noted that the degree of intermolecular action increases much more rapidly with the introduction of metaacrylic acid into the chain. The authors state, however, that the obtained experimental data do not enable one to clearly identify the nature of the bonds occurring between the resorcin-formaldehyde resin and the molecules of the investigated polymers. There are 4 tables, 1 diagram, 3 graphs, 13 references: 12 Soviet, 1 English.

ASSOCIATION: Yaroslavskiy shinnyy zavod (Yaroslavl' Tire Plant) ✓

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5(1,3)

AUTHORS:

SOV/153-2-1-21/25  
Blokh, G. A., Grishko, G. S., Podosinnikov, N. N.

TITLE:

On the High-temperature Treatment of Carbon Black for Rubber Strengthening (Vysokotemperaturnaya obrabotka sazhi-usilitelya kauchuka)

PERIODICAL:

Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 1, pp 114-122 (USSR)

ABSTRACT:

Though the effect of the afore-mentioned carbon black is generally known, its strengthening effect has not yet been fully explained. Recent investigations have demonstrated that some kinds of carbon black cannot be regarded as chemically passive ingredients any longer which do not enter reaction with rubber (Refs 6-8). The structure of carbon black contains such oxygen-containing groups as  $-\text{OH}$ ,  $-\text{COOH}$ ,  $-\text{C}=\text{O}$ ,  $\text{HO}-\text{C}=\text{O}$ , etc. The presence of  $\text{C}=\text{C}$  bonds is mentioned. The authors then refer to further publications (Refs 9-19). It was interesting from the practical and theoretical point of view to explain the influence exerted by the active oxygen-containing groups of the black structure upon its strengthening property in mixtures of syn-

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SOV/153-2-1-21/25

## On the High-temperature Treatment of Carbon Black for Rubber Strengthening

thetic rubbers. In this connection it was of special importance to explain the effect exercised by the removal of oxygen and hydrogen upon the strengthening properties. As is known, neither oxygen nor hydrogen can be completely separated from the black structure by temperature rise of up to 1000-1700°C. Table 1 shows the composition of the gas mixtures, the conditions of vulcanization, and experimental results. Electron-microscopic images (Fig 1) indicated variations in black chain-systems due to the effect of high temperatures. In general it was found that the elementary composition of black (Table 2) is changed by heating to high temperatures. Thus, also the specific surface (Table 3) and the adsorptive activity (Table 4) are reduced with respect to rubber. The authors investigated rubber kinds of divinyl-styrene- and chloroprene rubber. Figure 2 shows the X-ray pictures of black after the treatment at 900, 1400, and 1700°C which indicate that the spatial arrangement is improved with increasing temperature. Table 5 shows the structural change of black treated at high temperatures. The physico-mechanical indices of rubber produced from divinyl-styrene rubber with gas black heated up to 1700°C were considerably reduced. The number

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SOV/153-2-1-21/25

On the High-temperature Treatment of Carbon Black for Rubber Strengthening

of active centers of the chemical interaction of black with rubber decreases, and the specific surface and the adsorptive activity of the black structure with respect to rubber are reduced. K. A. Pechkovskaya and I. N. Duzhanskiy, Tsentral'naya laboratoriya ob'yedineniya "Ukrigas" g. L'vov (Central Laboratory of the Union "Ukrigas" (Ukrainian Gas), L'vov) assisted in the present investigation. There are 3 figures, 5 tables, and 24 references, 15 of which are Soviet.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut; Kafedra tekhnologii reziny i kafedra fiziki (Dnepropetrovsk Institute of Chemical Technology, Chair of Rubber Technology and Chair of Physics)

SUBMITTED: October 15, 1957

Card 3/3

5 (4)

AUTHORS:

Blokh, G. A., Mamaysur, O.

SOV/79-29-8-9/81

TITLE:

Isotopic Exchange of the Sulphur Atoms of 2-Mercaptobenzo-  
thiazole and of Elemental Sulphur in the Presence of Carbon  
Black Deposits

PERIODICAL:

Zhurnal obshchey khimii, 1959, Vol 29, Nr 8, pp 2500 - 2503  
(USSR)

ABSTRACT:

Lampblack, furnace soot, sewergas black, and other carbon de-  
posits are known to be important components of rubber mixtures,  
which cause to a high degree the necessary properties - dura-  
bility, hardness, etc. Experimental data of previous years  
(Refs 1-4) proved that the functional groups (oxygen- and hy-  
drogen-containing compounds, double bonds of the aromatic  
rings, and others) contained in the structure of the above  
deposits react with rubber and other components of the rubber  
mixture. In many papers (Refs 5-16) (the following Soviet  
scientists are mentioned here: Događkin (Refs 6,10), Blokh  
(Refs 7,8,15), Lezhnev and Kuz'minskiy (Ref 9), Skorodumova,  
Kovaleva (Ref 10), Bresler (Ref 14), Dolgoplosk, and Tinyakova  
(Ref 16)) it was ascertained by means of radioactive sulphur  
and catalysts that the above carbon black deposits react chem-

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Isotopic Exchange of the Sulphur Atoms of 2-Mercapto- SOV/79-29-8-9/81  
benzothiazole and of Elemental Sulphur in the Presence  
of Carbon Black Deposits

ically not only with sulphur but also with mercaptobenzo-  
thiazole and other organic sulphur compounds. The authors in-  
vestigated the Isotopic exchange of sulphur atoms of 2-mercapto-  
benzothiazole and of elemental sulphur in the presence of the  
above carbon black deposits. It was ascertained that in the  
presence of all these deposits the isotopic exchange of sul-  
phur atoms proceeds much more rapidly. It was also shown that  
the isotopic exchange of sulphur atoms does not proceed as well  
in the presence of sewer gas black in the quantities used in the  
rubber industry, as in the presence of lamp black and furnace  
soot. The similarity of the influence exerted by carbon deposits  
upon the vulcanization rate to the rate of isotopic exchange  
of sulphur atoms was ascertained. Experimental data are shown  
in 3 tables. There are 3 figures and 18 references, 14 of which  
are Soviet.

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Isotopic Exchange of the Sulphur Atoms of 2-Mercapto- SOV/79-29-8-9/81  
benzothiazole and of Elemental Sulphur in the Presence  
of Carbon Black Deposits

ASSOCIATION: Dnepropetrovskiy khimiko-tehnologicheskii institut  
(Dnepropetrovsk Institute of Chemical Technology)

SUBMITTED: July 14, 1958

Card 3/3

66740

SOV/20-129-2-35/66

~~5(4)~~ 15. 9120

AUTHOR: Blokh, G. A.

TITLE: Investigation of the Vulcanization Process of Rubber According to the Method of Electron Paramagnetic Resonance (Radiospectroscopy)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 2, pp 361 - 364 (USSR)

ABSTRACT: As in chemical reactions chemically active free radicals usually occur, which have electrons with unpaired spins, i.e. magnetic moments, the formation and vanishing of a radical may be followed by means of electron paramagnetic resonance. By employing this method the author investigated the reactions occurring in rubber vulcanization. A radiospectrometer constructed at Professor S. Ye. Bresler's laboratory was used for the investigation of the vulcanization of natural rubber by means of tetramethyl-thiuram disulphide (thiuram) in the presence of zinc oxide and stearic acid, further the vulcanization of similar mixtures, in which, however, natural rubber was replaced by polyisobutylene (Table 1). Non-plastified rubber without any additions had no paramagnetic spectrum. If rubber

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Investigation of the Vulcanization Process of Rubber SOV/20-129-2-35/66  
According to the Method of Electron Paramagnetic Resonance (Radiospectroscopy)

is subjected to plastification, a spectral line occurs, which indicates the formation of peroxide radicals as a result of oxidation processes. The same line was observed with the addition of thiuram already before heating, i.e. before vulcanization began. During vulcanization an increasing complication of the paramagnetic spectrum occurs. The presence of zinc oxide and stearic acid does not influence these spectra. This electron paramagnetic resonance is a convincing proof of the radical character of vulcanization in the presence of thiuram. In vulcanization with pure sulphur (in the presence of diphenyl guanidine) no spectrum occurred, nor did the mixtures in which natural rubber was replaced by polyisobutylene show any paramagnetic spectra. It is concluded herefrom that in the vulcanization of natural rubber with thiuram, polymer radicals are formed, which exist sufficiently long at the temperature applied (140-200°C) and, according to an approximate calculation, attain a concentration of  $4 \cdot 10^{-7}$  mol/g. The spectra found require a further investigation by means of a substitution of isotopes for the individual structural elements of tetramethyl thiuram

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Investigation of the Vulcanization Process of Rubber SOV/20-129-2-35/66  
According to the Method of Electron Paramagnetic Resonance (Radiospectroscopy)

disulphide. For the dissociation of thiuram and the formation of the radicals reaction equations are suggested. It is further mentioned that the author thanks Professor S. Ye. Bresler, Ye. M. Saminskiy, and E. N. Kazbekov for ~~their~~ assistance in carrying out the investigation. There are 2 figures, 1 table, and 9 references, 8 of which are Soviet.

ASSOCIATION: Dnepropetrovskiy khimiko-tehnologicheskii institut (Dnepropetrovsk Chemico-technological Institute) H

PRESENTED: May 18, 1959, by P. A. Rebinder, Academician

SUBMITTED: February 20, 1959

Card 3/3



80600

S/138/60/000/01/08/010

15.9/30

AUTHORS: Balabkin, P.I., Blokh, G.A., Borisova, T.S., Burmistrov, S.I.,  
Przhebyl'skiy, M.I., Fedorina, Zh.A., Chugay, A.D.

TITLE: Organic Accelerators for Continuous Vulcanization of Dipped Rubber Goods

PERIODICAL: Kauchuk i Rezina, 1960, No. 1, pp. 48 - 51

TEXT: Development work performed in the plant in 1954 has shown that it is possible to carry out vulcanization of dipped articles in the medium of hot air without pressure by individual dipping in sulfur-containing glue and subsequent processing of the film in a benzole solution of accelerator K-48. The toxicity of benzole and of the accelerator solutions rendered this technology prohibitive for industrial application. In this connection, the necessity arose of searching for ultra-accelerators highly soluble in less toxic solvents, e.g. in gasoline. For the synthesis of highly active accelerators dithio-carbamates were employed in conjunction with amino-containing compounds. The article lists a number of synthesized compounds, which were tested in standard rubber mixtures based on natural rubber and industrial glues used in the manufacture of dipped goods. The

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80500

S/138/60/000/01/08/010

Organic Accelerators for Continuous Vulcanization of Dipped Rubber Goods

rubber mixture had the following composition (weight parts): natural rubber 100, sulfur 3, Captax 0.7, zinc oxide 5, stearic acid 0.5. Industrial glues of the No. 252 and No. 252-1 types were used. The results of the physico-mechanical tests of the samples of rubber, obtained on the base of a standard rubber compound with the addition of amino or dialkyl-dithio-carbamic acids are shown in Table 1. As can be seen the synthesized salts of the dialkyl-dithio-carbamic acids are effective accelerators for vulcanization of dipped articles in an air medium. Optimum vulcanization is achieved in much less time as compared with control compounds with Captax accelerator. Experiments have revealed the possibility of vulcanizing dipped articles in an atmosphere of hot air of 100-115°C without pressure with the aid of the following compounds: dibutyl-dithio-carbamate of dibutylamine, dibutyl-dithio-carbamate of triethylamine, dibutyl-dithio-carbamate of tributylamine, diiso-amyl-dithio-carbamate of tri-ethylamine, diiso-amyl-dithio-carbamate of di- and tri-isoamyl-amine, di-ethyl-dithio-carbamate of di- and tri-ethylamine, hexa-methylene-dithio carbamate of hexa-methylene-amine. The solubility of these com-

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S/138/60/000/01/08/010

Organic Accelerators for Continuous Vulcanization of Dipped Rubber Goods

pounds in gasoline permits individual dipping of articles in sulfurous and in accelerator glues<sup>0</sup> to be carried out, as well as the continuous vulcanization of dipped articles. There are 3 tables and 1 reference. ✓

ASSOCIATIONS: Kiyevskiy zavod "Krasnyy rezinshchik" (Kiyev Plant, "Red Rubber Workers") Dnepropetrovskiy khimiko-tehnologicheskii institut (Dnepropetrovsk Chemical Technological Institute)

Card 3/3

BLOKH, G. A.

83279

S/021/60/000/001/009/013  
A158/A029

15.9130

AUTHORS: Ovcharenko, F.D., Corresponding Member of the AS UkrSSR; Blokh, H.  
A.; Hudovich, H.V.; Yoffe, A.I.

TITLE: Activated Diatomite - a New Rubber Filler 15

PERIODICAL: Dopovidni Akademiyi nauk Ukrayins'koyi Radyans'koyi Sotsialistychnoyi Respubliki, 1960, No. 1, pp. 54 - 59

TEXT: In his other work (Ref. 2) the first author showed that pyrophyllite can be used in the manufacture of rubber cables, yet the strength of rubber obtained with its use is relatively low (60 kg/cm after 30 - 60 min of vulcanization at 145°C), which calls for a strengthening of such fillers through activation. The authors used the following activating agents: 1) alcamon OC-2 (OS-2), an activated Crimean diatomite (a quarternary salt of diethylamino-methylglycolic ether) that increases the strength criteria by 50 - 60% as compared to unactivated fillers during a short period (only 4 - 10 min instead of 30 - 60 min and more) and accelerates the process of vulcanization; 2) carbazolin, a quarternary salt of imidazole derivatives; 3) equalizer A, a preparation of mixed cation-active and non-ionogen types. The Crimean diatomite consisted of (in %): SiO<sub>2</sub> 65.38;

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Activated Diatomite - a New Rubber Filler

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A158/A029

CaO 2.00; Al<sub>2</sub>O<sub>3</sub> 15.43; MgO 2.43; Fe<sub>2</sub>O<sub>2</sub> 5.82; SO<sub>3</sub> 1.20; (K, Na) Cl 0.5. Even when alcamon OS-2 was introduced directly on the rollers into a rubber mixture filled with natural diatomite, strengthening of the rubber and acceleration of vulcanization were observed. The indicated positive results should be explained as a change in the chemical nature of the diatomite surface into an organophillic surface, and by the peculiarities of the structure of natural diatomite, which is capable of interacting with the structure of rubber. Table 1 shows chemico-mechanical properties of rubbers obtained with the use of pyrophyllite and diatomite. Table 2 shows the percentage of activating substances in rubbers at various regimes of vulcanization. Table 3 gives the results of the adding alcamon to rubber (in %) under various conditions of vulcanization. There are 3 tables and 3 Soviet references. X

ASSOCIATION: Instytut zagal'noyi ta neorganichnoyi khimiyi AN UkrSSR ta Dnipropetrovs'kyi khimiko-tehnologichnyy instytut (Institute of General and Inorganic Chemistry of the AS UkrSSR and the Dnepropetrovsk Chemico-Technological Institute)

SUBMITTED: August 31, 1959

Card 2/2

BLOKH, G.A., kand.tekhn.nauk, dotsent; PODOSINNIKOV, N.N., inzh.;  
CHEREMYUK, I.P., inzh.

Investigating the action mechanism of zinc-containing accelerators  
of rubber vulcanization. *Izv.vys.ucheb.zav.; tekhn.prom.*  
no.3:50-66 '60. (MIRA 13:8)

1. Dnepropetrovskiy khimiko-tehnologicheskii institut.  
Rekomendovana kafedrami tekhnologii reziny i fiziki.  
(Vulcanization)

S/138/60/000/008/010/015/XX  
A051/A029

AUTHORS: Blokh, G.A.; Melamed, Ch. L.; Sakhnenko, I.A.

TITLE: A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair

PERIODICAL: Kauchuk i Rezina, 1960, No. 8, pp. 30 - 32

TEXT: The present method used in the Soviet Union for automobile casing repair was found to be impractical, requiring excessive work and equipment. In this method a non-vulcanized tread is applied to the casing being repaired and the latter vulcanized in ring-shaped individual vulcanizers at a temperature of 140 - 150°C for 1.5 - 2 hours. In 1957 the Rubber Department of the Dnepropetrovskiy khimiki-tehnologicheskii institut (Dnepropetrovsk Institute of Chemical Technology) in cooperation with the Dnepropetrovskiy shinoremontnyy zavod (Dnepropetrovsk Tire Repair Plant) began investigating the possibility of using pre-vulcanized treads in casing repair. A study was made of: 1) the application of adhesives having special compositions and used to fasten the pre-vulcanized tread to the casing, 2) the use of laminated non-vulcanized mixtures capable of co-vulcanizing with the pre-vulcanized tread and tire casing at room or low temperatures

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S/138/60/000/008/010/015/XX  
A051/A029

## A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair

(80°C). A number of adhesives with various compositions were found to have adhesion indices of 0.5 to 0.6 kg/2.5 cm both at room and elevated temperature (100°C) which do not satisfy the OCT(GOST) standard of 3.5 kg/1 cm. Adhesives containing oxidation-reduction systems were also found to have insufficient adhesion indices. Adhesives based on natural rubbery CK5 (SKB) and CKC-30 (SKS-30) and containing various oxidation-reduction systems were investigated under rubber-doubling conditions: duration 3 - 5 hours, temperature 50 - 70°C. The obtained data are listed in Table 2. A third method using a rapidly-vulcanizing laminated mixture (Table 3) was investigated. Best results were obtained at 80 - 90°C using a natural rubber layer, containing cymate and also a combination of cymate and ΔΦΓ (DFG). The strength of adhesion was 17.5 kg/2.5 cm, the thickness of the layer was 0.7 - 1 mm. Based on these results, experimental 6.00 - 16 tire casings were produced, repaired at a temperature of 80 - 90°C applying a pre-vulcanized tread based on laminated rubber. Service tests, performed by the Taxi depot revealed the tires to have a run capacity of 5,000 - 15,000 km. Their destruction eventually took place not as a result of side or casing rupture, but rather from exfoliation of the casing surface. Other tire casings, repaired with pre-vulcanized treads and

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A051/A029

A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair

fastened to the casing with steel bands followed by subsequent heating in a vat at 80°C had a run capacity of 6,000 km. Studies of rubber mixtures and adhesives containing amino-salts of alkyldithiocarbamate acids and sulfur, zinc oxide and zinc stearate (Table 4) showed that dibutyldithiocarbamate dibutylamine and dibutyldithiocarbamate triethylamine used as accelerators in adhesives and layers based on natural rubber ensure a high strength of adhesion, when the rubber is vulcanized at low temperatures (about 20°C) and the vulcanization process at this temperature is completed in 3 - 4 days. It is recommended that the pre-vulcanized tread be made in the form of a bracelet rather than a band to ensure a strong bond at the jointed end of the tread that the adhesive be applied on the internal surface of the tread bracelet and the external surface of the casing, and between these a quickly-vulcanizing mixture be added. Pressure in the running compartment would secure the contact between the tread and the casing. Two types of rubber mixture and the corresponding adhesive should be manufactured with sulfur and no accelerator or without sulfur and an accelerator to avoid scorching during storage. The authors stress the fact that low-temperature vulcanization could be of value to the rubber article and cable-manufacturing industries, especially where multi-layer rubber products, including thermoplasts (polyethylene, etc.) are produced. There

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S/138/60/000/008/010/015/XX  
A051/A029

A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair  
are 4 tables, and 3 Soviet references.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut, im. F.E. Dzerzhinskogo i Dnepropetrovskiy shinoremontnyy zavod (Dnepropetrovsk Institute of Chemical Technology, imeni F.E. Dzerzhinskiy and Dnepropetrovsk Tire-Repair Plant)

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S/138/60/000/008/010/015/XX  
A051/A029

A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair

Table 2:

Strength of Adhesion of Rubber to Rubber Using Adhesives, Containing Oxidation-Reduction Systems

Characteristics of the System	Strength of Adhesion, kg/2.5cm width of the sample		
	Natural Rubber	SKB	SKB-30
benzoyl peroxide-benzoin-iron naphthenate	4.0 - 5.0	1.3 - 2.0	3.5 - 4.0
iron naphthenate-benzoin	2.8 - 3.5	0.9 - 1.1	2.3 - 3.5
benzoyl peroxide-benzoin	4.4 - 5.0	0.7 - 1.4	3.0 - 3.2
isopropyl hydrogen peroxide-benzene-diphenyl guanidine-dibenzothiazoldisulfide	4.7 - 5.0	1.0 - 1.6	4.0 - 5.0
isopropyl hydrogen peroxide-benzene-mercaptobenzothiazol	3.2 - 4.0	1.3 - 2.0	2.3 - 4.0
benzoyl peroxide-iron naphthenate-polyethylene amines	3.7 - 6.0	1.7 - 2.2	3.2 - 4.2

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A051/A029

A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair

Table 3:

Strength of Adhesion of the Tread Rubber to the Casing Using a Laminated Quickly-Vulcanizing Mixture

Composition of the Laminated Mixture	Doubling Con- ditions		Strength of Adhesion kg/2.5 cm width of sample
	duration min,	temperature, °C	
NR+zinc butylxanthogenate and paratoluidine	60	80 - 90	1.6
NR+zinc dimethyldithiocarbamate (zimate)	60	80 - 90	more than 17.5
NR+zinc dimethyldithiocarbamate (zimate) diphenyl guanidine (1:1)	20	80 - 90	more than 17.5
chloroprene rubber+zinc dimethyldithiocarbamate	60	80 - 90	6.0
NR+benzoyl peroxide + iron naphthenate + benzoin	180	50 - 70	3.5

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A051/A029

A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair

Table 3:

Strength of Adhesion of the Tread Rubber to the Casing Using a Laminated Quickly-Vulcanizing Mixture

Composition of the Laminated Mixture	Doubling Con- ditions		Strength of Adhesion kg/ /2.5 cm width of sample
	duration min,	temperature °C	
NR+isopropyl benzene hydrogen peroxide + DFG+altax	180	50 - 70	4.5
The same, based on SKS-30	180	50 - 70	5.0
NR + benzoyl peroxide + iron naphthenate + polyethylene amines	180	50 - 70	6.0
The same, based on SKS-30	180	50 - 70	5.2

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S/138/60/000/008/010/015/XX  
A051/A029

A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair

Table 4:

Effect of Amino-Salts of Dialkyldithiocarbamate Acids on the Strength of Adhesion Between the Tread and Casing Rubbers

Accelerator	Vulcanization Duration at 18°C, hours	Strength of Adhesion, kg/2.5 cm width of sample
Dibutyldithiocarbamate dibutylamine $(C_4H_9)_2NC(S)SH.HN(C_4H_9)_2$	24	6.0
	72	11.0
	144	18.0
Dibutyldithiocarbamate triethylamine $(C_4H_9)_2NC(S)SH.N(C_2H_5)_3$	24	6.0
	96	10.5
	144	17.0

Card 8/9

S/138/60/000/008/010/015/XX  
A051/A029

## A New Method of Applying the Vulcanized Tread in Automobile Tire Casing Repair

Table 4:

Effect of Amino-Salts of Dialkyldithiocarbamate Acids on the Strength of Adhesion Between the Tread and Casing Rubbers

Accelerator	Vulcanization Duration at 18°C, hours	Strength of Adhesion, kg/2.5cm width of sample
Dibutyldithiocarbamate tributylamine (C <sub>4</sub> H <sub>9</sub> ) <sub>2</sub> NC(S)SH.N(C <sub>4</sub> H <sub>9</sub> ) <sub>3</sub>	24	3.5
	96	4.5
	144	5.0
Diethyldithiocarbamate diethylamine (C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> NC(S)SH.N(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub>	72	4.5
	240	5.0

Card 9/9

S/110/60/000/009/002/008  
E021/E455

AUTHORS: Ovcharenko, F.D., Corresponding Member AS UkrSSR,  
Blokh, G.A., Candidate of Technical Sciences,  
Ol'shanbkaya, L.A., Engineer and  
Gudovich, N.V., Candidate of Chemical Sciences

TITLE: Pyrophyllite - A New Filler for Cable Rubbers

PERIODICAL: Vestnik elektropromyshlennosti, 1960, No.9, pp.5-8

TEXT: The pyrophyllite found in the Ukraine was studied as a possible dielectric filler for cable rubber. Physico-chemical tests showed that it consisted of 85% finely dispersed pyrophyllite with 15% quartz and a trace of talc. The optical constants are close to those of talc. Experiments were carried out on the rubber KC-50 (KS-50) which contains 24.2% talc and 49% chalk. It was shown that replacing either or both talc and chalk by pyrophyllite had no effect on the electrical characteristics. After five days soaking in water they were practically unchanged. Similar results were obtained when pyrophyllite was substituted for fillers in other rubbers. Experiments were also carried out  
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E021/E455

Pyrophyllite - A New Filler for Cable Rubbers

on the rubber KS-50 to find the effect on the physico-mechanical properties of the use of pyrophyllite instead of the other fillers. In particular, the stability after prolonged ageing at 12°C was investigated. Very similar results were obtained by using pyrophyllite. Thus, using pyrophyllite in quantities up to 50 to 60% results in satisfactory properties of the insulating rubber. The presence of rich sources of pyrophyllite in the Ukraine have, therefore, a substantial technical and economic value. There are 6 tables and 2 Soviet references.

SUBMITTED: May 5, 1960

Card 2/2

S/110/60/000/011/006/012  
E194/E484

AUTHORS: Blokh, G.A., Candidate of Technical Sciences,  
Ol'shanskiy, L.P., Engineer and Kolobenin, V.N., Engineer

TITLE: The Low-Temperature Vulcanization of Tough Rubber Cable  
Sheaths

PERIODICAL: Vestnik elektropromyshlennosti, 1960, No.11, pp.56-61

TEXT: The comparative characteristics of rubber, polyethylene and polyvinylchloride, given in Table 1, show that if polyethylene cable is sheathed with PVC full advantage is not taken of the low temperature properties of the polyethylene. The cable is accordingly not sufficiently resistant to frost. Accordingly a television signal cable was developed in which the cores were insulated with polyethylene and the sheath was made of natural or chloroprene rubber. A photograph of the cable is given in Fig.1 and the main characteristics in Table 2. As the polyethylene softens at a temperature of 100 to 110°C the vulcanization temperature of the sheath could not exceed 80 to 90°C. The most effective method was found to be hot pressing in a screw press with subsequent vulcanization in a lead sheath. The lead sheath ensured good heat transmission and uniform temperature during  
Card 1/4 ✓

S/110/60/000/011/006/012  
E194/E484

## The Low-Temperature Vulcanization of Tough Rubber Cable Sheaths

vulcanization. New formulations of rubber were used containing higher contents of plasticizers. Tests were made on the vulcanization of mixtures based on natural rubber. A number of ultra-accelerators were studied and are named, the most important being dimethyl dithiocarbamate of zinc, rubber containing from 2 to 3% of dimethyl dithiocarbamate of zinc is effectively vulcanized at a temperature of 80°C in six hours or at 85°C in four hours. For tough rubber sheaths the optimum content of zinc stearate ranges from 4 to 6% and of zinc oxide from 3 to 5% based on the rubber. Rubbers of this formulation meet the requirements of standard **ГОСТ 2068-54 (GOST 2068-54)** for rubber type **ПШМ (RShM)** in respect of frost resistance and ageing stability. Compounds uniting the properties of dithiocarbamates and amines were found to be very effective accelerators for vulcanization of sheath rubbers at a temperature of 75°C, see data given in Table 3. It will be seen from the data of Table 3 that compounds based on dialkyl-dithiocarbonimic acid and alkyl amines worked individually and in combination with dimethyldithiocarbamate at a temperature

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S/110/60/000/011/006/012  
E194/E484

The Low-Temperature Vulcanization of Tough Rubber Cable Sheaths

of 75°C. Fig.3 shows curves of the influence of storage time at 25°C on the plasticity and strength of various rubber mixtures and it is shown that certain of the compounds can be fully vulcanized without heating during 3 to 5 days storage at room temperature. The vulcanization of mixtures based on polychloroprene rubber is then considered. The tests were made on standard sheath mixture type RShM to standard GOST 2068-54 containing 50% of rubber. The combinations of oxides of zinc and magnesium which are usually the best vulcanizing groups for these rubbers cannot ensure vulcanization at temperatures of 75 to 85°C in a reasonable time. Vulcanization tests were accordingly made with a number of substances and their combinations of which the most promising were pyrocatechin zinc chloride, diphenylguanidin, thiuram and hydroquinone. The results of the tests are given in Table 4 and it will be seen that rubbers containing 0.5 to 1% of pyrocatechin have good physical and mechanical properties. The effects of the other additives are discussed. When 0.5% zinc chloride is used in combination with 0.3 to 0.5 pyrocatechin the rubber is of good

Card 3/4

S/110/60/000/011/006/012  
E194/E484

The Low-Temperature Vulcanization of Tough Rubber Cable Sheaths

mechanical strength. Vulcanizers containing 0.75 to 1% of hydroquinone have good mechanical characteristics and wide range of vulcanization, see Fig.5, and such rubbers are recommended for use. During the course of the work it was found that if the rubbers did not contain Captax or diphenylguanidin they vulcanized in 5 or 6 hours at a temperature of 80°C without the addition of active accelerators of vulcanization. Mechanical properties of rubber vulcanized in this way were good. On the basis of the formulations that have been developed it is possible to sheath polyethylene insulated cables with rubber, and the rubbers developed can also be used for repairing rubber cable sheaths. There are 5 figures and 4 tables. ✓

Card 4/4

BLOKH, G.A.

Low-temperature vulcanization of rubber. Ukr. khim. zhur. 26 no.6:  
781-786 '60. (MIRA 14:1)

1. Dnepropetrovskiy khimiko-tehnologicheskii institut im. F.E.  
Dzerzhinskogo.

(Vulcanization)

OVCHARENKO, F.D.; BLOKH, G.A., kand.tekhn.nauk; OL'SHANSKAYA, L.A.,  
inzh.; GUDOVICH, N.V., kand.khimicheskikh nauk

"Pirofillit", a new filler for cable rubber. Vest. elektropram.  
31 no.9:5-8 S '60. (MIRA 15:5)

1. Chlen-korrespondent AN USSR (for Ovcharenko).  
(Electric cables)  
(Electric insulators and insulation)

BLOKH, G.A., kand.tekhn.nauk; OL'SHANSKIY, L.P., inzh.;  
KOLOBENIN, V.N., inzh.

Vulcanization of rubber cable coatings at low temperatures. Vest.  
elektroprom. 31 no.11:56-60 N '60. (MIRA 13:12)  
(Electric cables) (Vulcanization)



BLOKH, G.A., kand. tekhn. nauk

"The structure of mechanisms" by M.V. Semenov. Reviewed by G.A. Blokh.  
Vest. mash. 40 no. 11:82-83 N '60. (MIRA 13:10)  
(Mechanical movements)

25160

15.9130

S/021/61/000/004/012/013  
D213/D303

AUTHORS: Ovcharenko, F.D., Corresponding Member AS UkrSSR,  
Blok, G.A., Hudovych, N.V., and Shchychko, Z.V.

TITLE: Use of activated diatomite for strengthening rubber

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 4,  
1961, 504 - 507

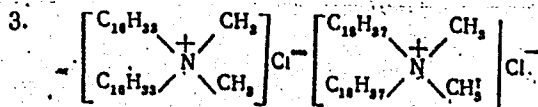
TEXT: This paper describes the effects of small additions of amines on the tensile strength of rubber. The following amines were used: 1)  $R_2NH$  (Armine-2HT), where R is the residue of margaric ( $C_{16}H_{33}COOH$ ) or nonadecanoic ( $C_{18}H_{37}COOH$ ) acids. This is a white waxy substance melting at  $53^\circ C$  and soluble in benzene; 2)  $RNHCH_2CH_2CH_2NH_2$  (Diamine S), where R is a mixture of residues of penta-decanoic ( $C_{14}H_{29}COOH$ ) and margaric ( $C_{16}H_{33}COOH$ ) acids. This is a yellow waxy substance melting at  $29-30^\circ C$ , and soluble in isoamyl  
Card 1/4

25160

Use of activated diatomite ...

S/021/61/000/004/012/013  
D213/D303

alcohol and methanol; 3)



(Arquade-2HT), a yellow substance melting at 69-70°C, and soluble in benzene and dichloroethane; 4) C<sub>17</sub>H<sub>33</sub>CONH<sub>2</sub> (Armide-0), a white waxy substance insoluble in water but soluble in organic solvents, melting at 68-69°C. The experimental results are given in Table 2. A second set of experiments was conducted by mixing the amines directly into the raw rubber preparation. The results obtained showed a considerable improvement in the tensile strength of the rubber and twofold acceleration in reaction time. Comparison of results shows that the activity of the amines deposited on the diatomite is less than the activity of the directly admixed amines. The reduced activity in the case of the activated diatomites can be explained

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Use of activated diatomite ...

S/021/61/000/004/012/013  
D213/D303

by the elementary structure of the diatomite and the active additive. Apparently one of the amino groups of these compounds combines with the structure of the diatomite, thus reducing the availability of these groups for the formation of aminopolysulphide complexes which on decomposition produce active sulphur. The greater activity of the directly admixed amines is, therefore, simply explained by the greater concentration of the active amines which also help to accelerate the reaction. The action of the amines is to give the diatomite surface a greater affinity for the rubber. This tends to distribute the diatomite better through the mass of the rubber thus further increasing its strength. There are 3 tables and 3 Soviet-bloc references.

ASSOCIATION: Instytut zahal'noyi ta neorhanichnoyi khimiyi AN URSR, Dnipropetrovs'kyi khimiko-tekhnologichnyy instytut (Institute of General and Inorganic Chemistry, AS UkrSSR, Dnipropetrovsk Institute of Industrial Chemistry)

SUBMITTED. December 26, 1960  
Card 3/4

1966

S/081/62/000/008/055/057  
B158/B101

15.9300

AUTHORS: Blokh, G. A., Karpov, V. L., Malinskiy, Yu. M., Ol'shanskiy,  
L. P., Khloppliyankina, M. S.

TITLE: The action of ionizing radiation on cable rubbers

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 8, 1962, 602, abstract  
8P357 (Vestn. elektroprom-sti, no. 8, 1961, 52-58)

TEXT: The effect of direct ionizing radiation on different cable structures was studied as well as on insulating and hose rubbers subjected to irradiation in air, in vacuum, in water and at high temperatures. The insulating and hose rubber was irradiated separately and in replicate with  $Co^{60}$  over a wide range of doses up to 500 Mrad, intensity 0.3 Mrad/hr. Ionizing radiation causes deterioration in the physico-mechanical and dielectric properties of the cable rubbers. With increase in the radiation dose  $>50$  Mrad, an abrupt fall in the specific elongation and an increase in hardness were observed. The rubbers maintain satisfactory durability, do not possess elasticity. In regard to a number of indices

Card 1/2

The action of ionizing radiation ...

S/081/62/000/008/055/057  
B158/B101

the electrical insulating properties of all the rubbers (starting from 50 Mrad) do not comply with the requirements of ГОСТ (GOST). Up to 50-100 Mrad irradiation in water or in vacuum, changes in the properties of the rubbers are considerably smaller. Rubbers from natural rubber or СКБ (SKB) are more stable to the simultaneous action of heating and irradiation than those from nairit. [Abstracter's note: Complete translation.]

Card 2/2

S/153/61/004/005/005/005  
E134/E485

AUTHORS: Blokh, G.A., Melamed, Ch.L., Ol'shanskiy, L.P. and  
Levitin, Zh.N.

TITLE: Heat and moisture-resistant resins for electrical  
insulation

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i  
khimicheskaya tekhnologiya. v.4, no.5, 1961, 847-853

TEXT: The paper deals with the problem of insulating materials which have the required electrical and mechanical properties as well as high heat- and moisture-resistance. The present investigation is specifically concerned with insulating resins subjected to simultaneous heating and cooling on opposite sides (140°C and 20°C). The ageing tests were carried out on rubber tubing, the outside of which was maintained at 140°C whilst water was passed through the inside, the tubing was subsequently cut into sample pieces for physical tests. The usual ageing method of heating samples in a humidity cabinet by means of warm air proved unsuitable, because under normal conditions the heat transfer between air and rubber is less than that between water and rubber. Electric resistance heating of the tube surface, thermostatically  
Card 1/73

Heat and moisture-resistant ...

S/153/61/004/005/005/005  
E134/E485

controlled by a thermocouple, was therefore employed for each individual sample. A sketch of the apparatus with some constructional details is given (see figure). The resins based on the following rubbers were investigated: styrene-butadiene CKC-30 (SKS-30), silicone CKC-30ABC (SKS-30ABS), CKC-30AMBC (SKS-30AMBS) obtained by the method developed by A.P.Pisarenko and his associates (Ref.1: Kauchuk i rezina, no.2, 6, (1957)), carboxylated styrene-butadiene SKS-30 obtained by the method developed by B.A.Dolgoplosk and his associates (Ref.2: Kauchuk i rezina, no.6, 1 (1957)), butadiene-methyl vinyl pyridine and butyl rubbers. They were also investigated in combination with each other and with natural rubber, and with chalk, talc, pyrophyllite and powdered silica gel as fillers. The composition of the tested resins is given in detail. The results of the tests are given in Table 2. The best insulating properties were obtained from styrene-butadiene resins. Compounds based on methyl vinyl pyridine and butyl rubber showed insufficient heat- and moisture-resistance as well as unsatisfactory electrical properties. There are 1 figure, 3 tables and 3 references: 2 Soviet-bloc and 1 Russian translation from non-Soviet-bloc Card 2A3



Heat and moisture-resistant ...

S/153/61/004/005/005/005  
E134/E485

publication.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut  
im. F.E.Dzerzhinskogo i Berdyanskiy zavod "Azovkabel"  
Kafedra tekhnologii reziny (Department of Rubber  
Technology, Dnepropetrovsk Institute of Chemical  
Technology im. F.E.Dzerzhinskiy and  
Berdyansk "Azovkabel'" Plant)

SUBMITTED: May 21, 1960

Card 3/13

S/138/61/000/012/008/008  
A051/A126

AUTHOR: Blokh, G.A.

TITLE: Conference on chemistry and technology of raw and synthetic rubber

PERIODICAL: Kauchuk i rezina, no. 12, 1961, 52

TEXT: The All-Union Scientific and Technical Conference on Chemistry and Technology of Raw and Synthetic Rubber was convened on September 26-30, 1961, in Dnepropetrovsk at the initiative of the Dnepropetrovsk Regional Department of the All-Union Chemical Society im. D.I. Mendeleev and the Dnepropetrovsk Chemico-Technical Institute im. F.E. Dzerzhinskiy. All scientific institutes involved in problems of rubber production of various kinds were represented, as well as the main institutes for the training of personnel for the rubber industry, research institutes of the UkrSSR Academy of Sciences; representatives of the Tire and Rubber-Commercial Industry and Synthetic Leather participated. 36 papers were presented. D.M. Savich, of the UkrSSR State Plan, spoke on the forthcoming plans for developing the rubber industry in the UkrSSR, within the next 10 - 15 years. G.A. Blokh

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s/138/61/000/012/008/008  
A051/A126

Conference on chemistry and technology....

(Dnepropetrovsk) reported on "Radiation of rubber-polyethylene, rubber-polystyrene systems"; B.A. Dogadkin (Moscow) - on "Interaction of sulfur with polymers under the action of ionizing radiation"; V. Yurkevich (Moscow) - on "Radiation vulcanization of rubber in latex". L.N. Ganyuk (Kiyev) spoke on "Free radicals in carbon blacks and strengthening of rubber". N.V. Gudovich (Kiyev) - on "Activation of light fillers of rubber". T.R. Gendler (Dnepropetrovsk) spoke on "The chemical interaction of activated silica gel with rubber". The paper of V.N. Kolobenin (Dnepropetrovsk) dealt with "Cable rubber based on carboxylic, silicate and other raw rubbers". V.Ye. Bresler (Leningrad) described "The application of butyl rubber". Ye.P. Kopylova (Yaroslavl') spoke on "The features of vulcanizates based on methylvinylpyridine rubbers". N.I. Tynyanaya (Leningrad) gave a paper on "The application of methylvinylpyridine rubber in motor tire treads. D.B. Boguslavskiy (Dnepropetrovsk) spoke on "The effect of the composition of carcass mixtures on the bond strength of cord-adhesive-rubber". G.M. Ronkina (Moscow) referred to "Boiling chambers of butyl rubber". N.L. Sakhnovskiy (Moscow) spoke on "The dependence of the wear resistance of tread rubbers on the composition and properties". The subject of using synthetic resins in rubber mixes for the

Card 2/4

Conference on chemistry and technology....

S/138/61/000/012/008/008  
A051/A126

production of rubbers with a high complex of physico-mechanical properties was dealt with by: A.G. Shvarts (Moscow) "Development of heat-resistant rubbers based on butyl rubber, vulcanized with alkylphenolformaldehyde resins". A.A. Chekhanovskiy (Yaroslavl') "Synthesis and testing of various copolymers as intensifiers of rubber mixes", A.D. Morosova (Yaroslavl') "Static and dynamic properties of rubber, containing synthetic resins". The paper of M.M. Reznikovskiy and G.I. Brodskiy (Moscow) dealt with "The mechanism of wear and laboratory evaluation method of wear resistance of tire rubbers". Ch.L. Melamed (Dnepropetrovsk) spoke on "Accelerators of low-temperature vulcanization". R.Ya. Shilo (Dnepropetrovsk) spoke on "Isotope exchange of sulfur atoms in the presence of anti-scorchers". A.S. Drozdovoy (Dnepropetrovsk) on "Vulcanization of rubber in the presence of sulfur-containing Omsk furnace carbon black ПМ-70 (PM-70)". Z.N. Tarasova (Moscow) spoke on "The action of phenothiazine on the thermomechanical stability of rubbers". L.S. Fel'dshteyn (Moscow) reported on "The aging of rubbers in a tense state". "An investigation of the law sequence of rubber shrinkage during vulcanization" was the subject of N.M. Novikov's paper (Moscow). V.F. Bocharov (Dnepropetrovsk) dealt with "The anti-corrosion protection of metal surfaces by means of synthetic latexes". B.A. Safraya (Moscow) spoke on "The new microporous rubbers in industry".

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S/138/61/000/012/008/008  
A051/A126

Conference on chemistry and technology....

A.D. Chugaya (Kiyev) on "The fight against static electricity in the rubber industry". L. Boychenko (Kiyev) referred to "The rubberizing of fabrics with synthetic latexes". M.A. Vas'kovskiy (Dnepropetrovsk) spoke about "The tetramethylthiurammonosulfide accelerator of vulcanization". "Rubber compensators for underground gas lines" was the subject of Yu.Ye. Chervinskiy (Donetsk). The Kiyev Rubber Recovery Plant, in cooperation with the Department of Rubber Technology at the Dnepropetrovsk Chemico-Technical Institute, have developed an experimental batch of gas-resistant rubberized fabric-covered compensators to replace the lens metal ones. S.A. Mironov, V.V. Arkhipov, B.Ye. Mandel'shtam, representatives of the Omsk NIKTI, reported on "Modern mechanization and automation of rubber mix production". V.D. Zaytsova discussed new methods for express control of rubber mixes using the ФТ-2 (FT-2) photometer.

Card 4/4

S/844/62/000/000/099/129  
D234/D307

AUTHORS: Blokh, G. A., Karpov, V. L., Malinskiy, Yu. M., Ol'shanskiy, D. P. and Khloplyankina, M. S.

TITLE: The effect of ionizing radiations on cable rubbers and structures

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 581-588

TEXT: Specimens were irradiated by a  $Co^{60}$  source. Up to a dose of 50 megarad the properties of rubbers changed relatively little. At higher doses, relative elongation decreases to less than a third and strength diminishes. Above 100 megarad complete destruction of rubberized fabric in cables is observed. In insulating rubbers strength decreases considerably, especially with 200 megarad. An increase of the dose to 350 megarad increases the strength again. In hose rubber UM-40 (ShN-40) strength drops by 25 - 30% with 50 - 100 megarad, but between 100 and 300 megarad it became higher than

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S/844/62/000/000/099/129  
D234/D307

The effectio of ionizing  $\gamma$ .

initial strength. Hardness increased with the dose. Relative elongation was below GOST (GOST) standards for doses higher than 50 megarad. Properties of rubbers placed in water or in vacuum (with 50 - 100 megarad) change much less than those of rubbers placed in air, which indicates the participation of oxygen in the processes caused by irradiation. Insulation rubber TC-35 (TS-35) was more stable than hose rubber ShN-40 when subjected simultaneously to 70°C and 0.7 megarad/hour during 70 hours. Electrical insulating properties of all rubbers were below GOST standards beginning with 50 megarad. There are 3 figures and 3 tables.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut im. F. E. Dzerzhinskogo (Dnepropetrovsk Institute of Chemical Technology im. F. E. Dzerzhinskiy), Fiziko-khimicheskii institut im. L. Ya. Karpova, Zavod "Azovkabel" (Physico-Chemical Institute im. L. Ya. Karpov, "Azovkabel" Factory)

Card 2/2

8/081/62/000/023/113/120  
B117/B186

AUTHORS: Bocharov, V. F., Blokh, G. A.

TITLE: Ion deposition of rubber film from synthetic latexes

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 23, 1962, 764, abstract  
23P592 (Izv. vyssh. uchebn. zavedeniy. Tekhnol. legk.  
prom-sti, no. 1, 1962, 22 - 28)

TEXT: The cross-linking and drying of 1.5-mm film coatings at ~ 200C was studied using 20% solutions of  $MgCl_2$ ,  $ZnCl_2$ , and their mixtures as fixing agents. The cross-linking of the gel was determined after swelling the samples in m-xylene and the moisture of the coating after 12 hrs drying at 70 - 800C. Initial and radiation-vulcanized latexes were examined: Nairit N-7 (L-7), ККС-50ПГ (SKS-50PG), and carboxylate ККС-30-1 (SKS-30-1). To accelerate ion deposition, L-7 was mixed with HCOH to pH 7, and 40% paraffinate K (1 ml per 40 ml latex) was added for additional stabilization. Fixing agents of mixed  $ZnCl_2$  and  $MgCl_2$  solutions effect a slower deposition than those of individual substances. Coatings with the Mg

Card 1/2



Ion deposition of rubber...

S/081/62/000/023/113/120  
B117/B186

fixing agent contain more moisture and dry more slowly as a result of basic salts being formed which have the composition  $Mg(OH)OOCR$  with carboxylic acid on the globule surface. With all these fixing agents, the maximum of swelling decreases in parallel with drying of the coating. Unlike L-7 latex, the coating from SKS-30-1 was subject to cracking. Adding 10 - 15% by volume of 40% paraffinate K to SKS-30-1, formed non-cracking coatings with the Zn fixing agent and cracking coatings with the Mg fixing agent. These coatings cannot be vulcanized. Noncracking stable gels were obtained from SKS-30-1 and L-7 at a volume ratio of 1:1. The same conditions prevail in the case of radiation-vulcanized SKS-30-1 (20 Mrad) but cross-linking occurs under irradiation. Introduction of hexamethylene diamine in L-7 causes its gelatinization, probably due to formation of salts  $(RCOOH \cdot H_2N)_2(CH_2)_6$  where  $RCOOH$  are carboxylic acids on two different globules. Triethanol amine retards the deposition and does not accelerate the cross-linking. [Abstracter's note: Complete trans-  
✓

Card 2/2

BLOKH, G.A.

36275  
S/021/62/000/004/012/012  
D299/D302

1.1800  
AUTHORS:

Bocharov, V.F., and Blokh, H.A.

TITLE:

A hexamethylenediamine fixator for the ionic deposition of synthetic latex on a metal

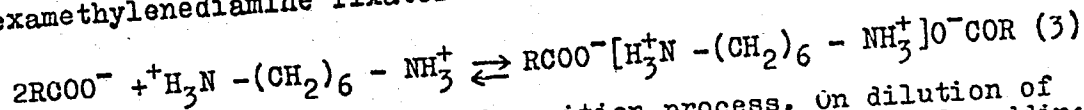
PERIODICAL: Akademiya nauk UkrRSR. Dopovidi, no. 4, 1962, 513-515

TEXT: The problem is considered of developing protective coatings for metals by ionic deposition of synthetic latex. For this purpose, it is suggested to use a hexamethylenediamine fixator. The fixator has an alkaline medium and does not corrode the metal. The kinetics of ionic deposition are illustrated in a figure. On dilution, the deposition decreases. On alkalization, the deposition decreases, too. On adding 40 % potassium parafinate, the deposition decreases and then stops altogether. A table shows the effect of alkalization of the latex, on the deposition. Another table shows the effect of deposition time on the structure formation of the coating. It was found that this process terminates faster in the case of thin films. The reaction

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S/021/62/000/004/012/012  
D299/D302

A hexamethylenediamine fixator ...



lies at the basis of the ionic deposition process. On dilution of the latex, desorption of soap takes place on the surface. On adding triethanolamine, the deposition decreases initially, and then increases. The vulcanizing effect of diamines on rubber, (described in the references), was corroborated by the present investigation. There are 2 figures, 2 tables and 5 references: 4 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Dnipropetrovs'kyi khimiko-tekhnolohichnyy instytut  
(Dnipropetrovs'k Chemical-Engineering Institute)

PRESENTED: by Academician F.D. Ovcharenko, AS UkrRSR

SUBMITTED: August 7, 1961

Card 2/2

S/138/62/000/005/000  
A051/A126

15.9.120

AUTHORS:

Blokh, G.A.; Kogan, M.S.; Bogdanovich, N.A.; Glavina, V.S.;  
Krokhina, M.V.; Belozerova, T.V.

TITLE:

On the interaction of organic accelerators with the ingredients of  
rubber mixes

PERIODICAL:

Kauchuk i rezina, no. 5, 1962, 22 - 25

TEXT:

The authors investigated the amount of accelerator consumed during  
the process of vulcanization and the role of the adsorption-bound accelerator in  
its reaction. The content of the organic accelerators was determined quantita-  
tively by the colorimetric method using the ФЭК - М (FEK-M) colorimeter and ac-  
cording to the NIIRP method. Experimental data showed that in simple mixing of  
the accelerator with various other powdery ingredients at room temperature, in-  
tense binding of the accelerators follows. The experiment to determine the  
strength of the bond between the accelerator and the ingredients showed that in  
additional extraction the bound captax was hardly extracted, especially from the  
carbon black mixtures. In cold extraction the captax obtained was less than

On the interaction of organic accelerators with ....

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that extracted by the hot method. Experimental data further revealed that over 50% of the captax and diphenylguanidine are already bound with the ingredients in the mixing stage and cannot be detected in the free state. The authors conclude that sulfur, zinc oxide and various types of carbon black (gaseous, channel, thermal, jet and lamp) retain on their surface considerable quantities of accelerators, if mixed without heating. Upon heating of the powdery mixture of accelerators and sulfur, zinc oxide or carbon blacks, not only adsorption, but also chemical interaction of the accelerators with the ingredients of the rubber mix is noted. Thus, the accelerators are already used up during the mixing stage. The accelerator bound to the carbon black can also participate in reactions leading to the formation of free radicals and to the occurrence of sulfur fragments as a result of exchange reactions of the sulfur atoms. It determines the structurizing of the rubber within a shorter period of time.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut im. F.E. Dzerzhinskogo i Yaroslavskiy zavod rezinovykh tekhnicheskikh izdeliy (Dnepropetrovsk Institute of Chemical Technology im. F.E. Dzerzhinskiy and Yaroslavl' Plant of Rubber Commercial Articles)

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On the interaction of organic accelerators with ....

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A051/A126

SUBMITTED: At the Conference of Chemical Analysts of the Rubber Industry, January 17, 1961, in Moscow

Card 3/3

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BLIKH, G.A.; SHCHICHKO, Z.V.

Amine-containing organic accelerators of rubber vulcanization.  
Kauch.i rex. 21 no.7:11-15 J1 '62. (MIRA 15:7)

1. Dnepropetrovskiy khimiko-tekhnologicheskoy institut imeni F.E.  
Dzerzhinskogo.  
(Vulcanization)

S/079/62/032/009/003/011  
I048/I242

AUTHORS: Blokh, G.A., Shilo, R.Ya, Tsipenyuk, E.V., and  
Yeroshkina, Ye.A.

TITLE: The effect of benzoic acid, phthalic anhydride, and  
maleic anhydride on the isotopic exchange of sulfur  
atoms

PERIODICAL: Zhurnal obshchey khimii, v. 32, no. 9, 1962, 2800-2803

TEXT: The rate of isotopic exchange of S atoms between S and 2-mercaptobenzothiazole in the system 2-mercaptobenzothiazole - radioactive S - diphenylguanidine (1 : 2 : 1) was studied either in the presence or in the absence of benzoic acid, phthalic anhydride, or maleic anhydride, in an attempt to determine the relationship between the anti-scorching effect of the above acids and anhydrides in the vulcanization of rubber and the rate of exchange of S atoms between the elemental S and some S-containing accelerators used in the process. The experiments were carried out at 125 or 145°C; the activity of the 2-mercaptobenzothiazole was measured after 30-180

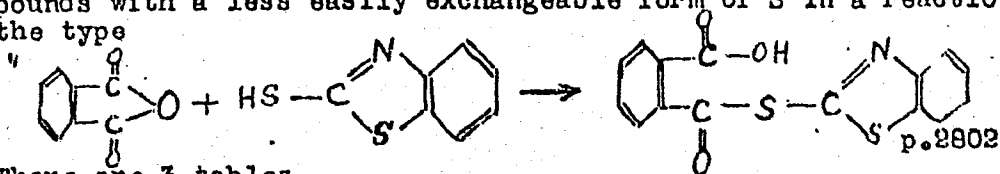
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I048/I242

The effect of benzoic acid...

min from the start of the reaction by counting the soft- radiation in an end-window counter. At 125°C the rate of exchange in the presence of the organic acids (or anhydrides) was much slower than in their absence; in some cases, e.g., in the 120-min experiments with phthalic anhydride, the fraction of S-atoms exchanged in the absence of the anhydride was twice as large as that exchanged in its presence. The anticorcorching effect of the above acids is attributed to their interaction with the 2-mercaptobenzothiazole to form compounds with a less easily exchangeable form of S in a reaction of the type



There are 3 tables.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskii institut  
(The Dnepropetrovsk Institute of Chemical Technology)SUBMITTED: August 7, 1961  
Card 2/2

NEYMARK, I.Ye., doktor khimicheskikh nauk, prof.; CHUYKO, A.A., inzh.;  
BLOKH, G.A., doktor khimicheskikh nauk, prof.; GENDLER, T.R.,  
inzh.; CHUGAY, A.D., inzh.

Use of organic silica as a rubber filler. Izv.vys.ucheb.zav.;  
tekh.leg.prom. no.2:60-67 '62. (MIRA 15:5)

1. Institut fizicheskoy khimii AN USSR (for Neymark, Chuyko).
2. Dnepropetrovskiy khimiko-tehnologicheskiy institut imeni Dzerzhinskogo (for Blokh, Gendler).
3. Kiyevskiy zavod "Krasnyy rezinshchik" (for Chugay). Rekomendovana kafedroy tekhnologii reziny Dnepropetrovskogo khimiko-tehnologicheskogo instituta.

(Rubber)

(Silica)

S/153/62/005/005/007/011  
E075/E436

AUTHORS: Vas'kovskaya, M.A., Blokh, G.A.

TITLE: The vulcanizing action of di-2-benzothiazolyldisulphide (altax) in rubber mixtures filled with chalk, talc or kaolin

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, v.5, no.5, 1962, 815-820

TEXT: In view of the importance of the problem of the vulcanization of rubber mixtures free from sulphur and carbon black, a detailed study was conducted of the effect of altax on the vulcanization of natural and synthetic rubbers (butadiene-styrene and sodium-butadiene) filled with chalk, talc, kaolin or lamp black. Altax vulcanizes butadiene-styrene rubber, the process being more effective for the mixtures containing lamp black than in those containing the light coloured fillers. For the rubbers without altax the greatest resistance to rupture and the smallest tendency to swell were obtained after 70 to 90 minutes. For the mixtures containing 5 and 6 parts by weight of altax this time was extended to 150 - 180 min and 120 - 140 min respectively. The strength of  
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The vulcanizing action ...

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E075/E436

the rubbers containing only altax is considerably below that of the vulcanizates obtained with 2 parts by weight of sulphur and 1 part of altax. Altax also vulcanizes effectively sodium-butadiene rubber filled with chalk and kaolin and natural rubber filled with talc. In the latter case the increase of altax concentration from 6 to 9 parts by weight decreases the time of attainment of satisfactory physico-chemical properties. Thus the use of altax would permit to produce light coloured rubbers suitable for the rubber, cable and light industries. There are 3 figures and 2 tables.

ASSOCIATION: Kafedra tekhnologii reziny  
Dnepropetrovskiy khimiko-tekhnologicheskii institut  
im. F.E.Dzerzhinskogo (Department of Rubber Technology,  
Dnepropetrovsk Chemical Technological Institute imeni  
F.E.Dzerzhinskiy)

SUBMITTED: June 26, 1961

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