L 44211-66

ACC NR: AP5021189

atmosphere. Analysis of the problem of light scattering by the particle
system is also making progress from the poing of view of electrodynamic.
Two new scientific and practical problems have begun to attract attention
recently: particular features of the propagation of laser radiation in
the atmosphere and interpretation of the optical and radiation data
of the earth's artifical satellites. Since the problem of atmospheric
transparency has important practical applications, many researchers
have paid particular attention to the quantitative characteristics which
determine the general decrease in the intensity of radiation propagted
in the atmosphere.
[JJ]

SUB CODE: 04, 20 / SUBM DATE: 16Jul65

Card   2/2   JS

L 09372-67   EWT(1)/FCC   RO/GW

ACC NR: AP6023407   SOURCE CODE: UR/0139/66/000/003/0007/0013

AUTHOR: Zuyev, V. Ye.; Sokolov, V. V.; Tvorogov, S. D.

ORG: Siberian Physicotechnical Institute im. V. D. Kuznetsov (Sibirskiy fiziko-tekhnicheskiy institut)

TITLE: Aerosol component of spectral transparency of atmospheric haze in the 0.5 - 14 micron wavelength range

SOURCE: IVUZ. Fizika, no. 3, 1966, 7-13

TOPIC TAGS: aerosol, atmospheric transparency, particle distribution, atmospheric optics, atmospheric water vapor

ABSTRACT: The author analyzes the behavior of the relative aerosol attenuation coefficient as a function of the wavelength, the meteorological distance, the propagation distance of the radiation, the particle-dimension distribution function, and the minimum and maximum radii of the particles. Both horizontal and oblique propagation of radiation in haze are considered. The various factors entering in the expression for the attenuation coefficient are gathered from the literature, and tables of the attenuation coefficient and of its spectral components are presented. The data obtained are sufficient to calculate the spectral transparency of the aerosol component of attenuation of radiation by atmospheric haze in the lower 5-km layer of the atmosphere for different relative placements of the receiver and of the source. Some practical plots of the spectral transparency variations are presented. Although the

Card 1/2

L 09372-67
ACC NR: AP6023407   O

calculations are made for homogeneous spherical droplets, the results are applicable
to two-layer particles of irregular shape. It is pointed out in the conclusion that
a rigorous theoretical solution of the problem of attenuation of particles of ir-
regular form cannot be obtained at present because of lack of data on the shape and
chemical composition of particles of the atmospheric aerosol. Orig. art. has: 6
figures, 15 formulas, and 2 tables.

SUB CODE: 20, 04/   SUBM DATE: 15Jul64/   ORIG REF: 002/   OTH REF: 005

Card   2/2 /C

L 04685-67   FSS-2/EWT(1)/FCC   TT/GW

ACC NR: AP6001666   SOURCE CODE: UR/0051/65/019/006/0994/0994

AUTHOR: Zuyev, V. Ye.; Tvorogov, S. D.

ORG: none

TITLE: Conference on the spectral atmospheric transparency

SOURCE: Optika i spektroskopiya, v. 19, no. 6, 1965, 994

TOPIC TAGS: atmospheric transparency, IR spectroscopy, light scattering

ABSTRACT: A scientific conference on spectral transparency of the atmosphere in
the visible infrared range of spectrum, organized by the schools of higher education,
was held from June 29 to July 1, 1965 in Tomsk. In this conference 127 representatives
from 15 towns participated; 45 reports were presented and discussed. 11 of these
reports were devoted to different aspects of the problem of absorption function. The
discussions showed that at present two methods developed for calculating the absorption
function: the utilization of a spectrum model and the approximation of the experimental
data determined by the standard formulas. Also there are two ways of approach to the
problem of absorption function in case of an inhomogeneous medium: the method of
reduced mass and the method of weighted mean pressure. The problems of spectroscopy
of the absorbing components of atmosphere (water vapor, carbon dioxide, ozone, oxygen)
were discussed on 8 conferences. The main attention was focused by the authors on

Card 1/3

L 04685-67

ACC NR: AP6001666   7

the obtaining of quantity data on the state, intensity and halfwidth of the absorption line of atmospheric gases, and on the analysis of the contour of line in a strong electromagnetic field. In 8 reports some theoretical problems associated with the light dispersion in atmosphere were investigated. Modern problems included the attempt to interpret the transport equations from the point of view of electrodynamics and the analysis of the transport equations for unresolved absorption bands. 10 reports were devoted to the discusion of results of experimental study of the light scattering by aerosols. 3 reports contained the data on the transparency of atmosphere in various sections of spectrum and for different meteorological conditions. The description of the measuring instruments was given in 2 reports. A summary of the analysis of modern experimental and theoretical material about individual characteristics of the absorption lines of the main absorbing components of atmosphere was presented by V. Ye. Zuyev (SFTI, Tomsk). K. Ia. Kondrat'yev, I. Ya. Badinov, S. D. Andreyev, D. V. Andreyev (Leningrad, LGU), informed about the basic results of the ground and high level investigations of the transparency of atmosphere. A. P. Ivanov (IF AN BSSR, Minsk), submitted for discussion the experimental material on the optical properties of dispersing model atmosphere gathered by him. The conference showed that the following trends are successfully developing: the theoretical and experimental study of the absorption function for various spectral ranges, the methods for solving the transport equations in a dispersing medium for different geometries and the estimation of the polarization effects at dispersion, the analysis of the connection between the optical and microphysical characteristics of aerosoles, the investigation of the instrument

Card 2/3

L 04685-67

ACC NR: AP6001666

coefficient of light attenuation in a dispersing medium, the determination of the
content of absorbing atmospheric components by a spectroscopic method, the methods
for solving the inverse problems of scattering, the study of the propagation of
waves in a turbulent atmosphere. Recently are very intensively developing two
new important trends: the interpretation of the optical and radiation data of the
artificial earth satellite and the investigation of the propagation of laser radiation
in atmosphere. The second problem is especially closely linked with the problem of
atmospheric transparency. The features of laser emission require a wide application
of molecular spectroscopy, analysis of the problem of light dispersion by a system
of particles from the point of view of electrodynamics and a thorough study of the
fluctuations of local optical properties of atmosphere.

SUB CODE: 04, 20 / SUBM DATE: none

Card 3/3 fv

L 09362-67   EWT(l)/FCC   GW

ACC NR: AP6023419   SOURCE CODE: UR/0139/66/000/003/0121/0125

AUTHOR: Zuyev, V. Ye.; Koshelev, B. P.; Tvorogov, S. D.; Khmelevtsov, S. S.   42

ORG: Siberian Physicotechnical Institute im. V. D. Kuznetsov (Sibirskiy fiziko-tekhnicheskiy institut)

TITLE: Spectral transparency and microstructure of artificial fogs. III. Comparison of calculated and experimental data.

SOURCE: IVUZ. Fizika, no. 3, 1966, 121-125

TOPIC TAGS: atmospheric transparency, atmospheric water vapor, aerosol, fog, atmospheric cloud, light absorption

ABSTRACT: In the first two parts (Izv. vuzov SSSR, Fizika, nos. 2 and 3, 1964) the authors determined the transparency and attenuation coefficients of artificial and natural fogs for a wide range of microstructure parameters. The present article describes the concluding investigations and presents a summary of the results, which cover more than 800 samples containing in all some 500,000 drops, and more than 2000 spectral measurements. The theoretical values of the attenuation coefficient of the aerosol components of clouds and fogs, calculated by the method proposed in the earlier papers, is compared with experimental results obtained in an artificial fog chamber. The optical density of the investigated fogs ranged between 0.06 and 2.7, the attenuation coefficient at 0.42 μ wavelength was 0.02 - 0.9 m^{-1}, and the ratio of the attenuation coefficient at other wavelengths to that at 0.42 μ ranged from 0.37 to 1.41, de-

Card 1/2

L 09362-67

ACC NR: AP6023419   O

pending on the microstructure parameters. The measurements were made at a large number of wavelengths from 1 to 14.0 μ. The rms drop diameters ranged from 3.3 to 22.5 μ. The measured and calculated relative attenuation coefficients were in good agreement except for the wavelengths 6.0 and 6.5 μ, but the absolute attenuation coefficients did not agree, the discrepancy being by as much as a factor of 8 in some cases. The only possible explanation for the discrepancy may be inaccurate determination of the fog droplet concentration in the trap. Experiments aimed at checking this accuracy are now under way. Orig. art. has: 4 figures, 4 formulas, and 2 tables.

SUB CODE: 20, 04/   SUBM DATE: 26Oct64/   ORIG REF: 002/   OTH REF: 001

Card 2/2

L 42072-66   EWT(1)   RO/GW

ACC NR: AP6013466   SOURCE CODE: UR/0139/66/000/002/0143/0150

AUTHOR: Zuyev, V. Ye.; Tvorogov, S. D.,

ORG: Siberian Physicotechnical Institute im. V. D. Kuznetsov (Sibirskiy fiziko-tekhnicheskiy institut)

TITLE: The effect of microstructure parameters of water clouds and fogs on their spectral transmittance in the 0.5-14 micron region

SOURCE: IVUZ. Fizika, no. 2, 1966, 143-150

TOPIC TAGS: atmospheric cloud, fog, cloud physics, distribution function, atmospheric refraction, optic transmission, optic spectrum

ABSTRACT: The averaged efficiency factor for radiation attenuation by water clouds and fogs is analyzed by considering their true polydispersion and their complex refractive index. The aerosol coefficients of water clouds and fogs are also examined.

    The averaged efficiency factor (F) for radiation attenuation by water clouds and fogs is defined as the ratio of the attenuation coefficient of the aerosol component of the atmosphere to the particle cross section in a unit volume. By considering some special properties of the drop-size distribution function, which can be determined from logarithmically normal and gamma-distribution relations, several formulas are derived

Card 1/7

L 42072-66

ACC NR: AP6013466

for calculating F. These expressions are then used to analyze qualita-
tively the dependence of F on the microstructure characteristics of water
clouds and fogs.

The behavior of function F is analyzed for various values of β
and μ, where β is the phase angle and μ is the parameter character-
izing the distribution half-width. It is found that with increased β
the maximum of F is decreased. This maximum varies with decreased
μ, but only for small values of β. Thus, the maximum of F appears
to be narrower the smaller the distribution half-width. This indicates
that calculations of the spectral transmittance of water clouds and fogs
made without considering their microstructure and complex refractive
index will not yield reliable results.

Bearing this fact in mind, the aerosol attenuation coefficients $a(\lambda)$
are also calculated and analyzed for various values of μ and r, where r
is the most probable particle distribution radius.

The results of the calculations are illustrated in Figs. 1-6. The
data presented in these figures cover practically all the different micro-
structure characteristics encountered in the atmosphere of liquid clouds
and fogs.

Card 2/7

L. 42072-66

ACC NR: AP6013466

    An analysis of the results yields the following conclusions:

In the visible region of the spectrum $\alpha(\lambda)$ and, consequently, the spectral transmittance of clouds and fogs are independent of wavelength.

In the 10.5—12.2 micron region, cloud and fog transmittance is always higher than it is in the visible region. Depending on the parameters of the microstructure, the ratio $\alpha(0.5)/\alpha(10.5-12.2)$ assumes values from 1 to 5. With increased distribution half-width (decreased μ) or increased r, the transmittance maximum shifts toward the longer wave region, but does not go beyond 10—12 microns.

In the 1—5 micron region, cloud and fog transmittance for any microstructure characteristics is lower than it is in the visible region. The ratio $\alpha(\lambda)/\alpha(0.5)$ reaches its maximum of 1.76 at $\lambda = 3.5$ microns, $\mu = 10$, and r = 2 microns.

In the spectral regions of 5—10.5 and 12.2—14 microns, transmittance can either be higher or lower, depending on microstructure parameters.

The spectral behavior of the aerosol attenuation coefficients of clouds

Card 3/7

L 42072-66

ACC NR: AP6013466

0

and fogs in the 3—4 and 10—12 micron regions is determined chiefly by the complex refractive index. In the entire range of wavelengths investigated, $\alpha(\lambda)$ depends essentially on microstructure parameters μ and r. The maximum difference in values of $\alpha(\lambda)$ is observed in the case of small-drop clouds and fogs at $\mu = 10$. In large-drop clouds with a large distribution half-width (r = 8—10 microns, $\mu = 1$—2), the behavior of the aerosol attenuation coefficients is practically independent of wavelength.

The results obtained illustrate the futility of numerous attempts to establish by purely empirical means a correlation between the transmittance and one of the wavelengths in the infrared region or in the visible region. The results, however, can be used to determine this correlation uniquely, provided parameters r and u are given.
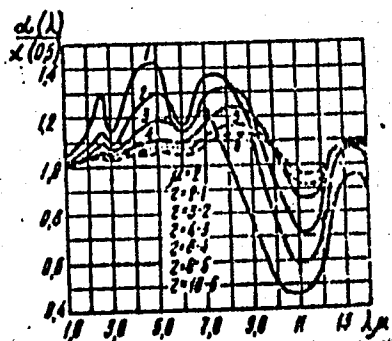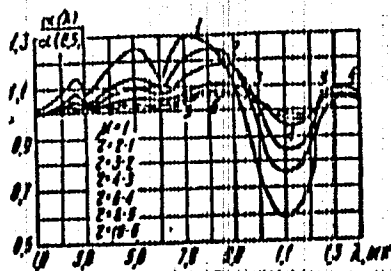
Card 4/7

L 42072-66
ACC NR: AP6013466
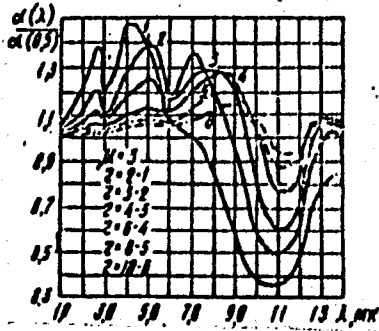

Fig. 1.

Fig. 2.

Card 5/7

L 42072-66
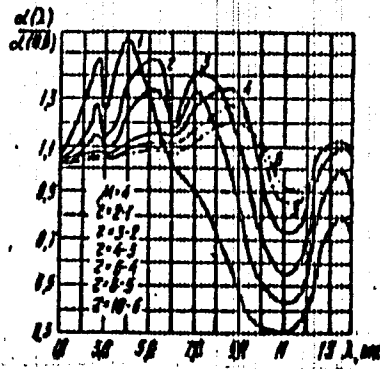ACC NR: AP6013466

Fig. 3.   Fig. 4.

Card 6/7
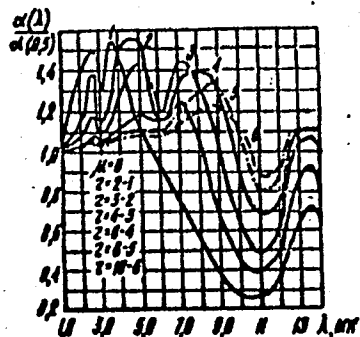
L 42072-66

ACC NR: AP6013466
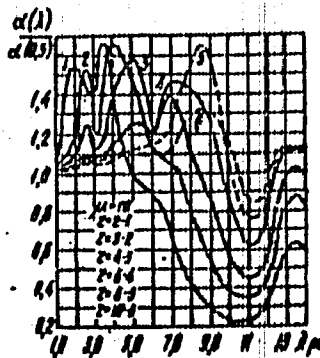

Fig. 5.

Fig. 6.

Orig. art. has: 14 figures and 14 formulas. [FSB: v. 2, no. 7]

SUB CODE: 04, 02 / SUBM DATE: 15Jul64 / ORIG REF: 014 / OTH REF: 004

Card 7/7   af

AUTHOR: Zuyev, V.Z.   SOV/121-58-9-15/21

TITLE: A Drilling Machine for Mobile Repair Shops
          (Sverlil'nyy stanok dlya peredvizhnykh remontnykh masterskikh)

PERIODICAL: Stanki i Instrument, 1958, Nr 9, p 40 (USSR)

ABSTRACT: A drilling head mounted on a sleeve sliding along the drill
             column which has the spindle and driving motor on opposite sides
             of the column is described. The round worktable is
             arranged as a vice. The largest drill diameter is 18 mm.
             There are 3 figures.

Card 1/1

ZHUCHKEVICH, Vadim Andreyevich, kand.geograf.nauk; MALYSHEV, Andrey
    Yakovlevich, kand.geograf.nauk; ROGOZIN, Neofid Yermolayevich,
    .kand.geograf.nauk; ZUYEV, Ye.M., red.; VOROBEY, P.S., tekhn.red.

    [Cities and villages of the White Russian S.S.R.: historical
    and geographical outlines] Goroda i sela Belorusskoi SSR:
    instoriko-geograficheskie ocherki. Minsk, Gos.uchebno-pedagog.
    izd-vo M-va prosv. BSSR, 1959. 278 p.   (MIRA 12:8)
                    (White Russia)

KOLOKOLOV, A.A.; SHCHETININ, N.V.; MIRONOV, N.I., inzh., retsenzent;
    ZUYEV, Yu.F., inzh., retsenzent; KRAYNOV, B.P., inzh.,
    retsenzent; BRAYLOVSKIY, N.G., inzh., red.; VOROTNIKOVA,
    L.V., tekhn. red.

[Internal combustion engines for refrigerator rolling stock]
Dvigateli vnutrennego sgoraniia izotermicheskogo podvizhnogo
sostava. Moskva, Transzheldorizdat, 1963. 219 p.
                                        (MIRA 16:7)
            (Internal combustion engines)
                (Refrigerator cars)

ZUYEV, Yu.G.

Latent respiratory insufficiency in surgical patients. Vest. khir. 93 no.8:28-32 Ag '64. (MIRA 18:7)

1. Iz gospital'noy khirurgicheskoy kliniki (zav. - prof. S.P.Vilesov) i kafedry normal'noy fiziologii (zav. - prof. O.A.Vaksleyger) Orenburgskogo meditsinskogo instituta (rektor - prof. S.S.Mikhaylov).

L 00680-67

ACC NR: AP6005315   SOURCE CODE: UR/0413/66/000/001/0050/0050

AUTHOR: Zuyev, Yu. M.

20

ORG: none

B

TITLE: A marine electric drive. Class 21, No. 177508

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 1, 1966, 50

TOPIC TAGS: electric propulsion, marine engine, ship component

ABSTRACT: This Author Certificate explains an application of a screw drive direct current electric motor to a marine electric drive. The drive has twin synchronous generators which rotate at a constant speed. One of the generators is unregulated and is series-connected in phase with the other generator which is regulated. The power supply of the ship system is delivered by the single unregulated generator. The screw electric drive of the ship is provided by the two generators through a rectifier. This is done to increase the speed regulation range of the drive motor.

SUB CODE: 21/ SUBM DATE: 30Mar64

Card 1/1   fv   UDC: 621.316.718.5.077.3:629.12.014

RYZHKOV, O. A.; DAVLYATOV, Sh. D.; YEKSHIBAROV, S. V.; ZUYEV, Yu. N.

"Tectonic features of oil and gas territories in Uzbekistan."

report submitted for 22nd Sess, Intl Geological Cong, New Delhi, 14-22 Dec 1964.

RYZHKOV, O.A.; KHAIMOV, R.N.; VITCHINKIN, M.M.; ZUYEV, Yu.N.

Paleozoic oil of Uzbekistan and adjacent territories. Sov.
geol. 7 no.8:95-107 Ag '64.   (MIRA 17:10)

1. Institut geologii i razrabotki neftyanykh i gazovykh
mestorozhdeniy AN UzSSR.

STAROBINETS, I.S.; KHAIMOV, R.N.; ZUYEV, Yu.N.; LYASHKEVICH, D.P.

Oil potential of the Paleozoic deposits of Central Asia.
Dokl. AN Uz.SSR 21 no. 10:46-49 '64   (MIRA 19:1)

1. Institut geologii i razrabotki neftyanykh i gazovykh
mestorozhdeniy Gosudarstvennogo geologicheskogo komiteta
SSSR. Submitted March 27, 1963.

ZUYEV, Yu. S.

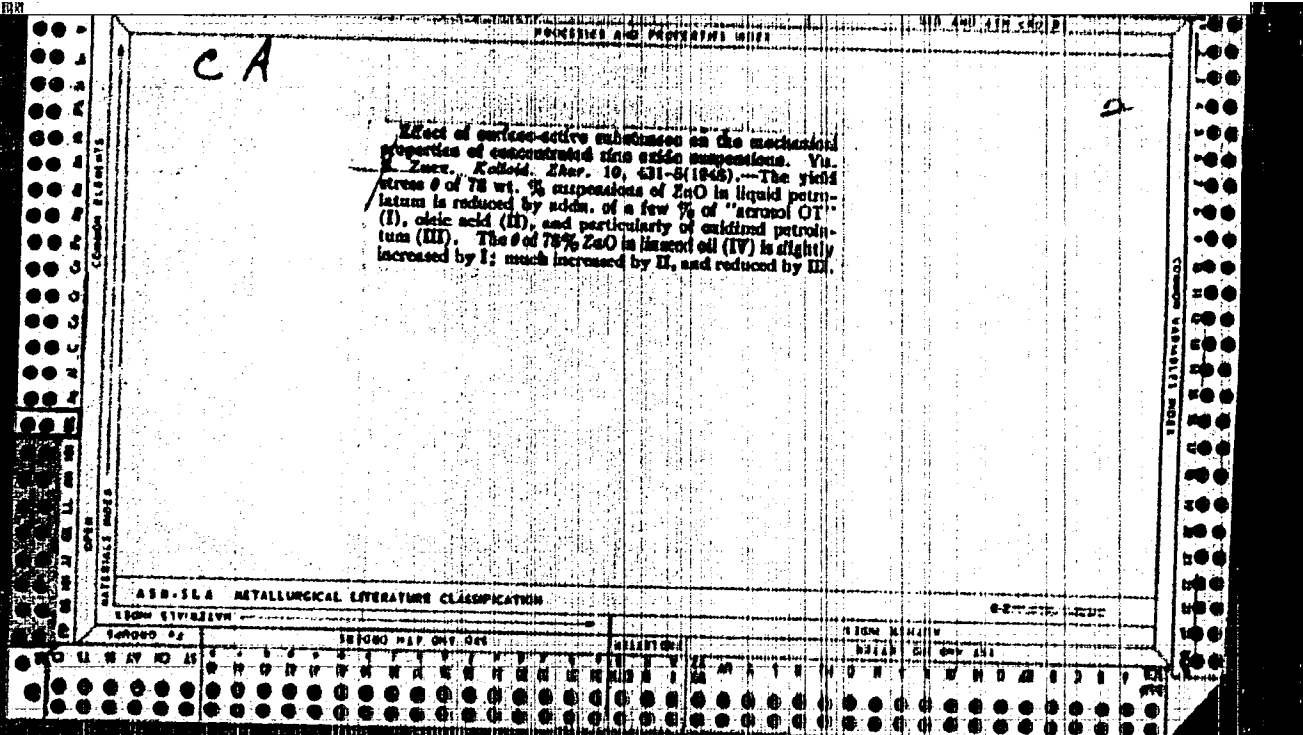Mbr., Sci. Res. Inst. Chem., Dept. Colloidal Chem. -1942-; Mbr., Lab.

Colloidal Chemistry, Moscow Order Lenin State Univ. -1947-. M. V. Lomonosov

"On the Kinetics of Development of Individual Grains of a Photographic Emulsion,"

Acta. Phys., 16, Nos. 5-6, 1942; "Determinining the Adhesive Power of Particles

in Suspension Sediments," Kolloid. Zhur, 10, No. 4, 1948.

C A

Effect of surface-active substances on the mechanical properties of concentrated zinc oxide suspensions. Yu. M. Zuev, Kolloid. Zhur. 10, 431-5(1948).—The yield stress θ of 78 wt. % suspensions of ZnO in liquid petrolatum is reduced by addn. of a few % of "aerosol OT" (I), oleic acid (II), and particularly of oxidized petroleum (III). The θ of 78% ZnO in linseed oil (IV) is slightly increased by I; much increased by II, and reduced by III.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PA 13/49П10

USSR/Chemistry - Suspensions   Jul/Aug 48
       Chemistry - Adhesiveness

"Determining the Adhesive Power of Particles
in Suspension Sediments," In. S. Zayev, Lab of
Colloidal Chem, NIIK, Moscow State U, 8 pp

"Kolloid Zhur" Vol X, No 4

Studies the sedimentation of a suspension of zinc
oxide in benzene as well as effect of addition of
surface-active substances. Cites method of
estimating adhesive power of particles relative
to slip, which consists of determining the
limiting slip stress of the suspension sediments
and is apportioned among contact points per square
                                                    13/49П10

USSR/Chemistry - Suspensions (Contd)   Jul/Aug 48

centimeter of slip surface. Loss of adhesive
power between particles of suspension due to
addition of surface-active substances is relative
to decrease of particle size and change of free
surface energy.

13/49П10

L 1856-66   EWT(m)/EPF(c)/EWP(j)   RM

ACCESSION NR: AP5022091

UR/0118/65/000/008/0012/0016

678.048:541.124

AUTHOR: Zuyev, Yu. S.; Koshelev, P. F.; Otopkova, M. A.; Mikhaleva, S. B.

TITLE: Effect of antiozonants on the ozonization of rubbers at different temperatures

SOURCE: Kauchuk i rezina, no. 8, 1965, 12-16

TOPIC TAGS: vulcanizate, ozonization, antiozonant, natural rubber, isoprene rubber

ABSTRACT: The effect of temperature on the ozonization of rubbers in the presence of antiozonants has been studied to clarify the mechanism of action of antiozonants and for technical purposes. Experiments were conducted at 16 to 46C with stressed and unstressed unfilled vulcanizates of natural (pale crepe) and nonstabilized isoprene (SKI-3) rubbers. N-phenyl-N'-isopropyl-p-phenylenediamine (4010NA) and N,N'-diphenyl-p-phenylenediamine (DFFDA) were used as the antiozonants. The ozone concentration during the experiments was maintained at $1-1.5 \times 10^{-3}$ vol%; stressed rubbers were subjected to a deformation approaching the critical value of 20%. The experiment consisted of the determination of ozone-consumption and crack-growth kinetics. Investigation of the respective kinetic curves showed that the 4010NA antiozonant slows down ozone crack growth in natural and isoprene rubber by reacting

Card 1/2

L 1856-66

ACCESSION NR: AP5022091

both with ozone and the polymer; the effectiveness of the 4010NA antiozonant is partly due to promotion of the catalytic decomposition of ozone. Increasing the ozonization temperature of vulcanizates in the vicinity of critical deformations usually increases the ozone consumption but slows down the destruction and increases the life of vulcanizates. In the initial stages, the ozonization process of un-stressed natural and isoprene rubbers does not differ from that of stressed rubbers in respect to the values of the activation energy, but has a much slower rate. In the absence of antiozonants, ozonization of SKI-3 proceeds somewhat faster than that of natural rubber due to the presence of traces of SKI-3 polymerization catalysts. This difference disappears in the presence of an antiozonant. The results of the study indicate that ozone cracking cannot be attributed to chemical processes alone, and that the physical conditions of the process must also be taken into account. Orig. art. has: 4 figures.   [BO]

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry)

SUBMITTED: 00	ENCL: 00	SUB CODE: MT, GC
NO REF SOV: 011	OTHER: 005	ATD PRESS: 4087

Card 2/2

C A

Some problems of thixotropy. Yu. B. Zhury (Univ. Moscow). Kolloid. Zhur. 12, 36-40(1930); cf. C.A. 43, 7777i.—The yield stress P of a gel can be measured by placing a steel ball (wt. = P) in a horizontal test tube partly filled with the gel and tilting the tube until the ball starts penetrating into the gel; if this tilt is a and the ball surface is S, then $P = (bP \sin a)/S$. The const. b was independent of the ball radius between 0.04 and 0.3 cm. when a 0.80% AlCl₃ gel was tested in a tube 0.8 cm. in diam. at 18°. It is assumed that $P = An^s$, A the shearing strength of a contact, and n is the no. of contacts per cc. From the literature data, the increase of n with time is more important than the increase of A for thixotropic setting whereas the increase of A is more important for nonthixotropic setting. 17 references.   J. J. B.

CA

2

Effect of adding electrolytes and surface active substances on the structure-mechanical properties of concentrated suspensions of alumina in water. Yu. S. Zuev (Univ. Moscow). *Kolloid. Zhur.* 13, 114-21(1951).— C.A. 43, 7777i.—The yield stress P g. wt./sq. cm. of Al_2O_3 paste in H_2O was 1.1. It was raised to 10 by adding ... of colloidal Al_2O_3 (Cram) (I). Small addns. of HCl or KOH did not alter P, but it was about 4 in 0.1 N HCl or KOH and zero in N HCl or KOH. $PbCl_2$ and $AlCl_3$ raised P to a max. (5 or 12) in 0.1 N soln.; in N soln. P was zero. The adsorption of H^+, OH^-, Cl^-, and Al^{+++} by Al_2O_3 was detd., and it was concluded that the max. of P was due to moderate peptization of Al_2O_3 wherein complete peptization lowered P to zero. $Na_4P_2O_7$ and saponin lowered P to zero at the concns. of 0.02 and 0.04%, resp.; when the paste contained also 1% I, P became almost zero at about 0.8% $Na_4P_2O_7$ or saponin. Addn. of 0.07% K oleate or oleic acid (II) raised P to 2, and 0.2% lowered it to zero; in the presence of 1% I the max. P was 13 at 0.8% II. "Aerosol OT" (III) gave $P = 0.2$ at 0.1% and $P = 1$ at 0.4%; this min. of P is connected with micelle formation in III. Al_2O_3 paste in 0.1 N $AlCl_3$ had $P = 8$, and 3.4% II raised it to 18. Saponin, $Na_4P_2O_7$, HCl, $AlCl_3$, and $FeCl_3$ are suitable peptizers for industrial application. The Al_2O_3 used contained 2% CaO and 0.2% Fe_2O_3; when dispersed in H_2O, its most frequent radius r was 1.5 μ, whereas r in 0.1 N HCl was 0-2.5 and in 0.1 N KOH 4 μ.   J. J. Biberman

The problem of high-elastic strain. ... S. Zuev, Dublady Akad. Nauk S.S.S.R. 73, 735-7(1950).—Re-binder's (C.A. 43, 7770c; 44, 6230e) model and the formula $\sigma_0 = \sigma_1 E_1/(E_1 + E_2)$, (where σ_0 = initial, σ_1 = equil. stress, E_1 = conventional instantaneous modulus, E_2 = modulus of elasticity) is confirmed for 3 kinds of rubber. by the constancy of σ_0/σ_∞ in the relative elongation range 10-160%: natural rubber σ_0/σ_∞ = 1.13, Na butadiene rubber 1.02, polychloroprene 1.00. The empirical formula of Sokolov and Krotova (C.A. 35, 2301a), relating the high-elasticity strain ϵ at the time $t \geq t_0$ and the strain ϵ_0 — at $t_0 > 0$, $\epsilon = \sigma_0(t/t_0)^m$, gives for the strain ϵ_0 developing during the time $(t - t_0)$, $\epsilon = \sigma_0(t/t_0)^m - \sigma_0$. This combined with the relation $(t - t_0)$, $\sigma = \sigma_0(t/t_0)^m - \sigma_0$. This combined R. model $(E_0$ = high-elasticity equil. modulus, ϕ = instant of elastic after-action = η/E_0, with η = internal action viscosity), gives $\sigma_0 = \eta/E_0$, with η = internal $(E_\infty - E_0)t/[t(t/t_0)^m - E_0/[t(t/t_0)^m - 1]$ and $\phi = (E_\infty - E_0)t/[t(t/t_0)^m - 1]$, i.e. ϕ passes through a min. at $(t/t_0) = (1 - m) = 1$.

N. Thon

C h

Change in the mechanical properties of sodium butadiene rubber under the action of ozone. Yu. S. Zuev, *Doklady Akad. Nauk S.S.S.R.* 74, 947-9(1950). The effects of treatment of samples ~100 μ thick with O_3 contg. 0.015 O_3, at room temp., are characterized by changes in the magnitudes of the initial modulus of high elasticity E_0, the equil. high-elasticity modulus $E_∞$, the period of elastic aftereffect $θ$, and the viscosity of elastic aftereffect, $η$, based on Rehbinder's model (*C.A.* 43, 7779c; 44, 6236a) and defined by $η = E_0/[(l/l_0)^n-1]$ and $θ = (E_0/E_∞)t/[(l/l_0)^n-1]$. The progressive structure formation with increasing length of ozonization $t(6-42$ hrs.) is expressed by a sharp increase of E_0, $E_∞$, and $η$; $θ$ passes through a min. and $E_∞$ increases approx. proportionally to t^4, which indicates self-acceleration of the process of structure formation. These effects are marked only in very thin foils; they decrease with increasing thickness, and are unobservable with thick foils of the order of 2 mm. The presence of an inhibitor also reduces the effects; with 0.3-0.6% phenyl-β-naphthylamine, no change in the mech. properties was observed even after 110 hrs. of ozonization. The self-acceleration and inhibition are indicative of a chain nature of the process.   N. Thon

ZUYEV, Yu. S.

Aging of rubbers and resins by the action of light ozone, and other
factors. Vsesoyuz.Khim. Obshchestvo im. D.I. Mendeleyeva, Vysoko-
molekul. Soedineniya No.11, 40-50 '51.
(CA 47 no.14:7247 '53)

Alteration of the mechanical properties of sodium-buta-diene rubber caused by light. Yu. S. Zuev and A. S. Kuz'minskii. Kolloid. Zhur. 13, 450-4X(1951); cf. C.A. 45, 2226.—Na-butadiene rubber (I) films, about 0.01 cm. thick, were extended by loads which diminished when the films stretched so that the real stress σ remained const. Log ε (ε = deformation) increased linearly with log t (t = time) and the coeff. of proportionality m was independent of σ when this varied from 200 to 450 g./sq. cm. Illumination of I in N (app. is pictured) lowered m (e.g., from 0.28 to 0.10 within 1 hr.) and increased the viscosity η of the after-effect (e.g., from 38 X 10⁹ to 100 X 10⁹ poises) and the initial high η of elastic modulus of elasticity (E') (e.g., from 0.5 to 2.4 kg./sq. cm.). Interception of light shorter than 2967 A. by a glass screen retarded these changes; e.g., m = 0.10 was reached within 8 hrs. and η after 1 hr. was 30 X 10⁹. Addn. of 1% phenyl-α-naphthylamine retarded the changes in full light, but in some cases accelerated them in light < 2967 A.; thus η after 1 hr. was 150 X 10⁹ and 82 X 10⁹, resp. In all conditions, m/E' first decreased and then increased during illumination.

J. J. Bikerman

Role of carbon black in the action of light on rubber. Yu. S. Zuev. *Doklady Akad. Nauk S.S.S.R.* 82, 935-8 (1952).—The rate of elongation of polybutadiene rubber films, kept at const. temp. (25° ± 0.1°), under const. tensile stress is increased by simultaneous illumination; more strongly when the rubber contains C black (I). With polyisobutylene rubber, without I, the rate of deformation is the same in the presence or absence of light, but with I illumination increases the rate considerably. The effect of I is not specific: 1% of the dye Sudan black in Butyl rubber and 2% in polybutadiene rubber are even more effective than I. There is no simple relation between the amt. of I incorporated (0.2-25%) and the increase of the elongation. The effectiveness of such small amts. as 0.2% I, and of the black dye, indicate that their action is linked with absorption of light and not with a sepn. of chains by the filler. This viewpoint is borne out by the observation that continuous illumination across a colloidal soln. of I, or of black glass, slows down rather than accelerates the deformation of the rubber. The effect of the light is thus due to its absorption by the I or the black dye in the rubber. This is true not only for illumination with near ultraviolet but also visible light filtered through a 0.1 N soln. of FeCl₃, transmitting wave lengths over 4046 A., which are absorbed by I; this light has an effect only on rubber films contg. I. In contrast to illumination during the deformation, preliminary exposure to light is ineffective. Further proof of the

absence of chain destruction by I is the constancy of the viscosity of soln. of polyisobutylene rubber without and with I. Possibly local absorption of light produces local temp. rises which, without destroying the chains, locally increases their mobility. Under const. illumination of polyisobutylene rubber contg. I, at 25°, the rate of elongation is greater than without I at 71°. Above 71°, illumination causes actual destruction of the chains, as evidenced by a decrease of the viscosity.

N. Thon

— 'ᴸᵛ, Ⴟu. Ɔ.

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, 9786

Author : Zuyev, Yu. S. and Kuz'minskiy, A. S.
Inst   : Not given
Title   : On the Aging of Vulcanized Rubber Under Atmospheric
          Conditions

Orig Pub: Sb.: Stareniye i utomleniye kauchukov i rezin i
          povyshenye ikh stoykosti, Leningrad, Goskhimizdat,
          1955, 157-184

Abstract: See also RZhKhim, 1955, 35967

Card 1/1

ZUYEV, Yu. S.

Category: USSR/Chemistry of High-Molecular Substances

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30902

Author : Zuyev Yu. S.
Inst   : Academy of Sciences USSR
Title   : Photovulcanization of Butyl Rubber and SKB.

Orig Pub: Dokl. AN SSSR, 1956, 110, No 1, 101-104

Abstract: On irradiation of films (200μ) of butyl rubber (molecular
          weight 42,000, unsaturation 1%), containing 0.05-2.5% S, by
          means of a PRK-7 lamp, through a pyrex glass light filter and
          distilled water, there is observed from 25 cm an optimum
          of photo-vulcanization as concerns change in modulus with dura-
          tion of illumination and change in rate of photovulcanization
          with concentration of S. Occurence of an optimum is attributed
          to increasing intensity of destruction as a result of increased
          light absorption and decreasing intensity of structuration as
          a result of decrease in concentration of free S. On irradiation
          of photovulcanizate, up to the optimum, with light filtered thru

Card   : 1/3   -13-

Category: USSR/Chemistry of High-Molecular Substances

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30902   F.

rubber on an increase of concentration from 0.5 to 2.5% and
change in modulus at the optimum, depending upon concentration
according to a curve showing a maximum.

Card   : 3/3

-15-

ZUYEV, Yu. S.

USSR/Chemistry - Rubber

"The Disintegration of Stretched Rubber Under the Influence of Ozone," Yu. S.

Zuyev, A.S. Kuz'minskiy, Sci-Res Inst of Rubber Industry

DAN SSSR, Vol 89, No 2, pp 325-328

Investigated surface cracking of rubber when stretched in an atm containing a

small amount of ozone. The rubbers investigated were SKB (polybutadiene), SKS-30

(Divinylstyrene), SKN-26 (divinylnitrilacrylic), and NK (natural rubber). The 3

conditions apparently necessary for cracks to appear on rubber as a result of the

action of ozone are: (1) presence of centers of reactivity in the rubber (double

bonds), (2) the presence of definite, directed stresses (stretching but no com-

pression), and (3) specific nature of the chemical reaction between the rubber

and the ozone, leading to a rupture of hydrocarbon chains with formation of an

inelastic surface film if solid ozonides are present and characterized by the
(over)

ZUYEV, IU. S.

USSR/Chemistry - Vulcanizers   21 Jun 53

"Some Characteristics of the Light-Aging of Vulca-
nizers," Yu. S. Zuyev and A. S. Kuz'minskii, Sci-
Res Inst of the Rubber Industry

DAN SSSR, Vol 90, No 6, pp 1063-1066

Studied the effect of phenyl-β-naphthylamine (I) on
the light-aging of vulcanizers at different temps,
different concs of (I), and with the introduction of
light-filtering substances. At 25° (I) sensitizes
the vulcanizer to light, but at 80° sensitization
by I decreases. Raising the concn of I, results in
the sensitizing action passing through a mix.

269T7

Addition of a light-filtering substance, especially
carbon black, has a strong effect on the relation-
ship between aging by light and by heat. Presented
by Acad P. A. Rebinder 21 Apr 53.

Protection of rubber from ozone-cracking. Yu. S. Zuev. *Doklady Akad. Nauk S.S.S.R.* 98, 453-6(1954).—The methods that might be employed for protection of rubber from destructive action of O_3 are discussed. It is pointed out that the state of tension is an important factor in the action of O_3 on rubber. Composition greatly stabilizes rubber against ozonic destruction, as does swelling by hot chem. reagents (triethanolamine; castor oil). The latter effect is temporary and disappears after 2-3 days (after diffusion of the swelling agent into the interior.

G. M. Kosolapoff

10-12-54

ZUYEV, YU. S., AND RATNER, S. B.

Application of Mechanical Models for the Investigation of Changes in the
Structure of Rubbers and Resins

The authors enumerate the equilibrium and kinetic constants which
make possible a description of the highly elastic properties of high
polymers. They describe mechanical models used for visual presentation
of the deformation processes of high polymers. They give examples of
the application of these models in the quantitative determination of the
above-mentioned constants for several different types of rubber. (Rzh-
Mekh, No. 6, 1955) Tr. n.-i. in-ta Rezinovoy Prom-Sti, No. 1, 1954, 32-52.

SO: Sum. No. 744, 8 Dec 55 - Supplementary Survey of Soviet Scientific
     Abstracts (17)
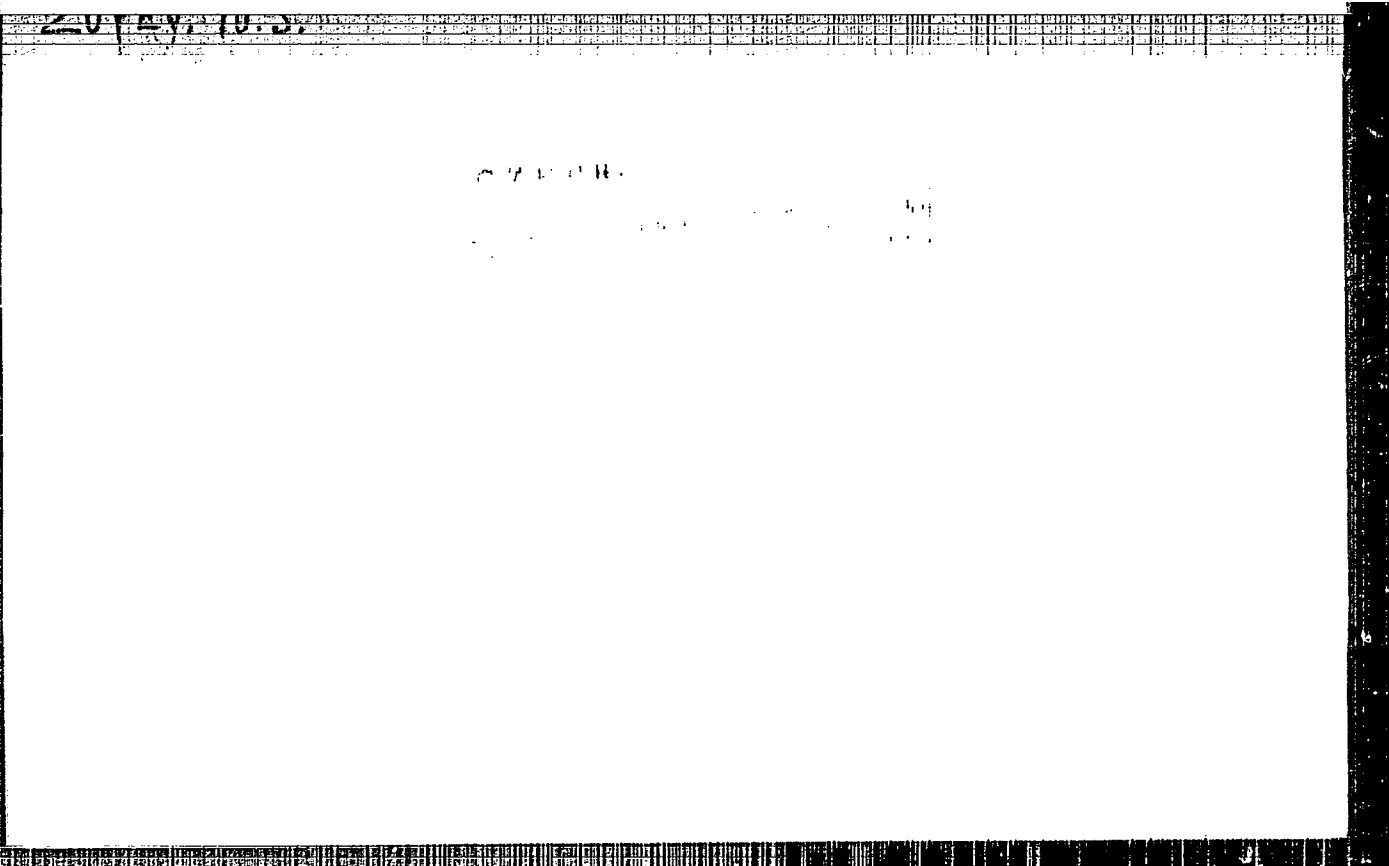
USSR/Chemistry - Elastomers

Card 1/1   : Pub. 50-24/25

Author   : Yu. S. Zuyev

Title   : A new rubber-like polymer synthesized on the basis of polyethylene
                   (Review of foreign publications)

Periodical   : Khim. prom., No 8, pp 503-6 (55-58), Dec 1954

Abstract   : Reviews foreign work on the preparation, properties, and uses of the
                   elastomers obtained by treating polyethylene with sulfur dioxide and
                   chlorine or with sulfuryl chloride. Twenty seven references, 2 of
                   them USSR (both since 1940).

Institution   :

Submitted   :

SOV/81-59-9-33456

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 9, p 563 (USSR)

AUTHORS: Zuyev, Yu.S., Kuz'minskiy, A.S., Postovskaya, A.F.

TITLE: Some Peculiarities of the Light Aging of Rubbers and Vulcanizates

PERIODICAL: Tr. N.-i. in-ta rezin. prom-sti, 1956, Nr 3, pp 102 - 113

ABSTRACT: The action of light on rubber differs from the action of a high
                 temperature. In the action of light on vulcanizates the role of the
                 optical properties of ingredients is essential, it is necessary there-
                 fore to separate the optical and chemical action of the age resistors
                 for establishing an interconnection between the chemical structure of
                 these substances and their chemical light-protective action. Some
                 age resistors and dyestuffs cause a photosensitization in the
                 vulcanizates. The suppression of the sensitizing action and the
                 manifestation of the efficiency of the sensitizers can be obtained
                 using vigorously light-absorbing ingredients.

Card 1/1   V. Glagolev

SOV/81-59-9-33457

Translation from: Referativnyy zhurnal. Khimiya, 1959, Nr 9, p 563 (USSR)

AUTHORS: Zuyev, Yu.S., Pravednikova, S.I.

TITLE: A Method for Objective Determining the Kinetics of Ozone Cracking
              of Rubbers

PERIODICAL: Tr. N.-i. in-ta rezin. prom-sti, 1956, Nr 3, pp 114 - 122

ABSTRACT: The degree of ozone cracking of rubbers is characterized by a decrease
              in the nominal equilibrium tension in the samples during their ozoniza-
              tion, which is connected with macroscopic changes in a limited zone of
              the sample. The entire kinetics of the process is determined on one
              sample and the tension measurements are carried out without taking it
              from the testing chamber. A device for determining the kinetics of the
              widening of the cracks has been described. The design of the device
              permits the tension to be exactly measured on every sample. Experimental
              data obtained on the device are cited. Using the results of the periodic
              determination of the nominal tension, the average efficient depth of the
              cracks and their growth rate are calculated.

Card 1/1   V. Glagolev

Zuyev, Yu. S.,

Call Nr: AF 1154947

AUTHORS: Kuz'minskiy, A.S., Lezhnev, N.N., Zuyev, Yu.S.

TITLE: Oxidation of Natural and Vulcanized Rubbers (Okisleniye kauchukov i rezin)

PUB.DATA: Gosudarstvennoye nauchno-tekhnicheskoye izdatel'stvo khimicheskoy literatury, Moscow, 1957, 319 pp., 5,000 copies

ORIG.AGENCY: None given

EDITORS: Babushkina, S.I.; Tech. Ed.: Lur'ye, M.S.

PURPOSE: The monograph is intended for scientific and engineering personnel of the rubber industry, and for specialists in allied fields of chemical technology.

Card 1/10

Oxidation of Natural and Vulcanized Rubbers (Cont.)   Call Nr: AP 1154947

COVERAGE: The book discusses aging of natural and vulcanized rubbers
caused by oxygen, ozone, high temperature, light, mechanical
stress and catalysts. Methods of studying aging and preven-
tion of aging are reviewed. Personalities mentioned include:
Angert, L.G., Belitskaya, R.M., Degteva, T.G., Lyubchan-
skaya, L.I., Mayzel's, M.G., Peschanskaya, R.Ya., Popova, Ye.B.,
Postovskaya, A.F., Khitrova, N.G., Shamastina, Ye.V.,
Shokhin, N.A., Shanin, L.L., Kargin, V.A., Medvedev, S.S.,
Dogadkin, B.A., Dolgoploskiy, B.A., Rebinder, P.A.,
Slonimskiy, G.L., Bartenev, G.M., Abkin, A.D., Reyt-
linger, S.A. There are 42 references, 19 USSR, 20 English,
2 German, 1 French. There is a bibliography at the end
of each chapter.

Card 2/10

Call Nr: AF 1154947

Oxidation of Natural and Vulcanized Rubbers (Cont.)

TABLE OF CONTENTS

Card 3/10

Oxidation of Natural and Vulcanized Rubbers (Cont.)

Card 5/10

Oxidation of Natural and Vulcanized Rubbers (Cont.)

Card 6/10

Oxidation of Natural and Vulcanized Rubbers (Cont.)

Card 7/10

Oxidation of Natural and Vulcanized Rubbers (Cont.)

Card 8/10

Call Nr: AP 1154957

Oxidation of Natural and Vulcanized Rubbers (Cont.)

Card 9/10

Oxidation of Natural and Vulcanized Rubbers (Cont.)

ZUYEV, Yu.S.; BORSHCHEVSKAYA, A.Z.

[Methods for protecting rubber goods from ozone cracking] Metody
zashchity rezinovykh izdelii ot ozonnogo rastreskivaniia. Moskva, 1957.
39 p. (Moscow. Nauchno-issledovatel'skii institut rezinovoi
promyshlennosti. Obzory, no 1) '57.   (MIRA 11:7)
                         (Rubber goods)

ZUYEV, Yu.S.

ZUYEV, Yu.S.

Modernizing the apparatus for light and ozone aging of rubbers.
Kauch. i rez. 16 no.6:34-36 Je '57.   (MIRA 10:10)

1.Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti.
            (Rubber) (Ozone) (Photochemistry)

ZUYEV, Yu.S.

AUTHORS: Zuyev, Yu.S., Pravednikova, S.I.   76-11-33/35

TITLE: On the Article by N.N. Znamenskiy "On the Kinetics of the Inter-
               action Between Ozone and Rubber" (Po povodu stat'i N.N.Znamenskogo
               "K voprosu o kinetike vzaimodeystviya ozona s rezinoy")

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1957, Vol. 31, Nr 11, pp. 2586-2588
               (USSR)

ABSTRACT: The article is criticised, and faults are pointed out one by one
               and dealt with in form of a summary; it is contented that
               Znamenskiy's method for an accurate investigation of the kinetics
               of bursting under the influence of ozone is not to be used in
               practice, that it is too complicated for mass-experiments, and
               that it is not provided with the necessary equipment and devices.
               For these purposes it is necessary to employ methods in which,
               during the test, the deformation, the average value of tension,
               and other factors remain constant [Ref. 14]. There are 3 fig-
               ures and 14 references, 11 of which are Slavic.

Card 1/2

76-11-33/35

On the Article by N.N.Znamenskiy "On the Kinetics of the Interaction Between Ozone and Rubber

ASSOCIATION: Moscow Institute for the Rubber Industry (Institut rezinovoy promyshlennosti, Moskva)

SUBMITTED: November 3, 1956

AVAILABLE: Library of Congress

Card 2/2

_ZUYEV, Yu.S.

20-5-26-48

AUTHORS: Zuyev, Yu. S., Pravednikova, S. I.

TITLE: Influence of the Degree of Deformation on the Formation of Cracks in Rubber Caused by Ozone (Vliyaniye stepeni deformatsii na ozonnoye rastreskivaniye rezin).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 5, pp. 813-816 (USSR)

ABSTRACT: At first several previous works are mentioned. The authors investigated in detail the influence mentioned in the title of this work and calculated the velocity of growth of the cracks by means of an objective method (reference 8) from the effective depth of the cracks. The kinds of rubber investigated are mentioned. This investigation showed the following:

1.) With all coutchoucs a qualitatively equal dependence of the time passing till the formation of cracks on the intensity of deformation is observed. With growing deformation this time gradually decreases to zero.

2.) The velocity of growth found for the steady range of the kinetic curve initially increases with growing deformation, passes a maximum within the range of small deformations and then decreases again. With all coutchoucs,

Card 1/3

Influence of the Degree of Deformation on the Formation   20-5-26/48
of Cracks in Rubber Caused by Ozone.

and independent from their characteristics the period passing
till the crack occurs passes a minimum within the range of
critical deformation and a maximum within the range of great
deformations if there is a change of the deformation within
the range of critical deformation. The results obtained
show the following:

1.) The strength of the rubbers in the case of multiple
   regularities obeys to the same regularity as with the
   formation of cracks by ozone. With all rubbers we observe
   a minimum of strength too. The destruction (formation
   of cracks) of deformed rubber by means of chemical
   interaction with ozone develops analogously with the
   process of static fatigue although the velocities of
   these processes differ by many orders. From this
   follows the principal possibility of the accelerated
   investigation of the static fatigue of rubber,
   especially within the range of small deformations, by
   means of the formation of cracks dependent on ozone.

2.) Very small nominal deformations (of the order of 10 %)
   change the degree of orientation of structural units
   at the end of the cracks. A sensitive indicator of

Card 2/3

Influence of the Degree of Deformation on the   20-5-26/48
Formation of Cracks in Rubber Caused by Ozone.

these changes is the resistance of rubber against destruction
in ozone. This phenomenon can principally be used as basic
for the investigation of the orientation of rubber. There
are 4 figures, 1 table, and 11 references, 5 of which are
Slavic.

ASSOCIATION: Scientific Research Institute of Rubber Industry (Nauchno-
               issledovatel'skiy institut rezinovoy promyshlennosti).

PRESENTED: June 6, 1957, by P. A. Rebinder, Academician

SUBMITTED: November 22, 1957.

AVAILABLE: Library of Congress

Card 3/3

ZUYEV. Yu. S.

AUTHORS: Malofeevskaya, V. F., Zuyev, Yu, S.   62B-2-8/8

TITLE: Elastomer Kel-F and Some Other Phosphorus-Containing
             Polymers. (Elastomer Kel-F i nekotoryye drugiye
             ftorsoderzhashchiye polimery).

PERIODICAL: Kauchuk i Rezina, 1958, Nr.2. pp. 35 - 40. (USSR).

ABSTRACT: This literature review article covers the preparation,
             vulcanisation and properties as well as uses of Kel-F
             and other phosphorus-containing polymers. There are
             24 References, 13 English, 1 German and 10 Russian.

AVAILABLE: Library of Congress.

Card 1/1   1. Elastomers-Preparation   2. Elastomers-Properties 3. Elastomers-
              Test results   4. Polymers-Preparation   5. Polymers-Properties
              6. Polymers-Test results   7. Vulcanization   8. Phosphorous-
              Applications

                                                        USCOMM-DC-54712

SOV/138-58-9-8/11

AUTHORS: Zuyev, Yu. S; Parshina, Ye. A; Gridunov, I. T.

TITLE: Method of Accelerated Ageing of Rubber-Coated Materials
             (Metodika uskorennogo stareniya prorezinennykh materiy)

PERIODICAL: Kauchuk i Rezina, 1958, Nr 9, pp 27 - 32 (USSR)

ABSTRACT   Under atmospheric conditions, ageing of rubber articles
             is due to ozone and light. It can, therefore, be assumed
             that ageing of rubber coated fabrics and fibres would be
             caused by the same factors. Few results of t e s t s
             on the effect of ozone on rubber coated fibres have been
             published so far, and the authors investigated the effect
             of ozone and light and the character of tensioning on the
             ageing of these materials. They also found a method of
             quantitative evaluation of the efficiency of rubber
             coated materials.
             The efficiency was evaluated by estimating the water-per-
             meability. The tested materials differed according to
             the types of rubbers employed (1a and 2B), and also accor-
             ding to the composition of the gaseous layer (1a,2a D3,
             2aA, 2aDE). The action of ozone and the simultaneous
             interaction of ozone and light on material 1a, subjected
Card 1/4   to stretching along the warp (100 kg/m) and along the

Method of Accelerated Ageing of Rubber-Coated Materials.   SOV/138-58-9-8/11

weft (50 kg/m) is shown in Table 1. The gas-permeability
of the rubber-coated material 2a during ageing under the
influence of various tensioning under atmospheric con-
ditions is given in a graph (Fig.1a). These results indi-
cate that an increase in the two-dimensional tensioning
causes a decrease in the ageing stability of the rubber-
coated materials. Fig.2: changes in the gas-permeability
of material 1a during ageing under atmospheric conditions
when 1- and 2-dimensional tensioning is applied. It can
be observed that under the action of two-dimensional ten-
sioning the material ages much faster than when one-
dimensional tensioning is applied. The effect of tension-
ing on the rate of ageing of materials 1a and 2a under
accelerated light-ozone ageing, when concentration
of ozone equals 1×10^{-3}% for material 1a and 1×10^{-2}%
for material 2a, is given in Fig.3. The rate of ageing
depends to a considerable extent on the intensity of
sunlight radiation. The unit of "equivalent summer days"
(ELS) was adopted. The coefficients depending on the
magnitude of sunlight radiation were defined by experi-
ments (Figs. 4 and 5). The concentration of the atmos-
pheric ozone is considerably lower in the inner layer

Card 2/4

SOV/138-58-9-8/11

Method of Accelerated Ageing of Rubber-Coated Materials

    of the rubber than in the surrounding atmosphere. This
    is to be taken into account when evaluating the effic-
    iency of the rubber-coated materials (Figs. 6 - 8).
    The ageing stability of rubber-coated materials to age-
    ing under atmospheric conditions, was quantitatively
    estimated at $50^{o}C$, and the intensity of the light was
    approximately twice that of sunlight. The tests were
    carried out at room temperature (Figs. 9 and 10). The
    required concentration of ozone was found to be 3.7 x
    $10^{-7}\%$ for material 1a and 1 x $10^{-9}\%$ for material 2a.
    Comparative results of accelerated and natural ageing
    of various rubber-coated materials are tabulated (Table
Card 3/4 2). This method can also be used in industry. There

SOV/138-59-9-2/11

Method of Accelerated Ageing of Rubber-Coated Materials

are 2 Tables, 10 Figures and 6 References: 1 English and 5 Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti (Scientific Research Institute of the Rubber Industry)

Card 4/4

SOV/76-32-7-

AUTHORS: Zuyev, Yu. S., Pravednikova, S. I.

TITLE: A Kinetic Study of the Ozone Cracking of Rubber (Issledovaniye kinetiki ozonnogo rastreskivaniya)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 7, pp. 1457- (USSR)

ABSTRACT: Rubber being in the state of tension or cracking. A systematic investigation in the presence of ozon is subjected to cracking. Kinetics of this process does not exist with the exception of the of a few papers dealing with this subject, among them those of Buckley and Robison (Ref 7), as well as N.N.Znamenskiy (Ref 8. The present investigations were carried out according to a new method, which is characterized by a reduction of the stress which causes the constant deformation of the at the occurrence of cracks and their increase. The kinetics of the increasing of the cracking layer can be calculated ac- cording to this decrease, as can the proportional value of the mean effective depth of the crack. In the investigations the authors used an apparatus which made it possible to carry out periodical stress measurements with 10 samples during ionization without changing the extent of deformation and

Card 1/4

AUTHORS: Zuyev, Yu. S.,   Pravednikova, S. I.   SOV/76-32-7-3/45

TITLE: A Kinetic Study
               Rubber (Issledovaniye kinetiki ozonnogo rastreskivaniya rezin)   of the Ozone Cracking of

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 7, pp. 1457-1465
               (USSR)

ABSTRACT: Rubber being in the state of tension in the presence of ozone
               is subjected to cracking. A systematic investigation of the
               kinetics of this process does not exist with the exception
               of a few papers dealing with this subject, among them those
               of Buckley and Robison (Ref 7), as well as N.M.Znamenskiy (Ref 8).
               The present investigations were carried out according to a
               new method, which is characterized by a reduction of the
               stress which causes the constant deformation of the sample
               at the occurrence of cracks and their increase. The kinetics
               of the increasing of the cracking layer can be calculated ac-
               cording to this decrease, as can the proportional value of
               the mean effective depth of the crack. In the investigations
               the authors used an apparatus which made it possible to carry

Card 1/4   out periodical stress measurements with 10 samples during
               ozonization without changing the extent of deformation and

A Kinetic Study

of the Ozone Cracking of Rubber   SOV/76-32-7-3/45

the concentration of ozone. The kinetic curves of the increase of the cracks according to the cross section of the sample may be divided into 4 sections: The induction period within which no visible decrease of the stress takes place. The section in which the velocity of the growth of cracks increases continuously. The steady section which is characterized by a constant velocity of the increase of the cracks, and finally the rapid rupture of the sample. It was observed that the stages of the second and third section last longest, and that of the last shortest. A comparison of the experimental data for the purpose of investigating the process showed that also in rubber which contains no ozone protecting substance a retardation, as in polymethyl methacrylates is found in the case of ozone cracking. The observations made in the experiments on the influence exerted by the thickness of the sample on the kinetics of the reaction are explained by the fact that the process of ozone cracking takes place gradually in the surface layer and the openings of the cracks. In the explanations of the results obtained the authors mention that the presence of the second, unsteady section of the reaction

Card 2/4

Study of the Ozone Cracking of Rubber

SOV/76-32-7-3/45

kinetics with a superstress and its increase in the openings of the cracks may be explained according to the extent of their depth; this is also explained by the different charac- ter of the function of time taken until the occurrence of cracks and the time until the cracking - versus the de- formation. The strong increase of the velocity of the process after the third stage is explained by the fact that in the undestroyed part of the sample an accumulation of inner de- fects by the static fatigue proceeds, and that in the pene- tration of the crack to this part it increases rapidly. There are 5 figures, 3 tables, and 28 references, 12 of which are Soviet.

ASSOCIATION: Institut rezinovoy promyshlennosti, Moskva (Moscow Institute of Rubber Industry)

SUBMITTED: January 12, 1957

Card 3/4

. A Kinetic Study of the Ozone Cracking of Rubber   SOV/76-32-7-3/45

1. Rubber--Mechanical properties   2. Ozone--Chemical effects   3. Rubber--Stresses
4. Rubber--Fatigue

Card 4/4

5(4)
AUTHOR: Zuyev, Yu. S.   SOV/76-32-10-13/39

TITLE: On the Separation of the Photochemical and Light Filtering
                   Effects, and on Latent Photosensitization (O razdelenii foto-
                   khimicheskogo i svetofil'truyushchego deystviya i o skrytoy
                   fotosensibilizatsii)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 10, pp 2308-2314
                   (USSR)

ABSTRACT: The measurements were carried out by N. F. Shokhina. Investi-
                   gations of the type mentioned in the title had already been
                   carried out by B. A. Dogadkin (Ref 1) and Bondi (Ref 2). Of
                   late, detailed investigations have been carried out by Yu. S.
                   Zuyev and A. S. Kuz'minskiy (Ref 3) in connection with the
                   characteristic feature of the light protecting effect of di-
                   butyl and diethyl dithiocarbamates of nickel. The effect of
                   these substances on the aging due to light action of the
                   vulcanizate SKB and of butyl rubber were investigated. To de-
                   termine the intensity of the aging process the kinetics of the
                   change of the static modulus in the illumination of thin sample
Card 1/3   films was measured. The illumination was arranged by an Hg

SOV/76-32-10-13/39

On the Separation of the Photochemical and Light Filtering Effects, and on
Latent Photosensitization

quartzlamp PRK-2 through a polyisobutylene film. Two parallel
experiments were carried out: on the one hand the rubber film
with the substance to be investigated (adsorbent) was irradiated
through a pure film of the light filter, and on the other hand
a film of the pure rubber was irradiated through a film of the
light filter containing the substance to be investigated. The
measurements were carried out taking into account certain con-
ditions a little different from those in the previous paper
(Ref 3). According to the equations for the calculations mention-
ed it was found that an exact separation of the light filtering
and chemical effect can be obtained only with monochromatic
light. The observation made in an earlier paper (Ref 4) that the
increase in concentration of ZnO in the vulcanisate SKB hampers
a change in the static modulus of SKB in the case of aging by
light is explained by a latent sensitization. Since a quanti-
tative separation of the light filtering and chemical effects
has to be obtained for a direct determination of the latent
sensitization the appropriate experiments were carried out. The
following substances were introduced into sodium butadiene rubber,
and then were investigated: Nickel dibutyl dithiocarbanate,

Card 2/3

SOV/76-32-10-13/39

On the Separation of the Photochemical and Light Filtering Effects, and on
Latent Photosensitization

phenyl-β-naphthylamine, and copper phthalocyanate. The illumi-
nation was carried out with monochromatic light of the wave
lengths 365 and 578 mμ. In illuminating the SKB and copper
phthalocyanate with a light of $\lambda = 365\mu$ it was found that cop-
per phthalocyanate exerted a latent sensitization. There are
6 figures, 1 table, and 9 references, 8 of which are Soviet.

ASSOCIATION: Institut rezinovoy promyshlennosti, Moskva (Institute of Rubber
               Industry, Moscow)

SUBMITTED: May 4, 1957

Card 3/3

SOV/138-59-3-6/16

AUTHOR: Zuyev, Yu. S.

TITLE: Methods of Accelerated Light (Atmospheric) Ageing of
          High Polymers (K voprosu o metodakh uskorennogo
          svetovogo (atmosfernogo) stareniya vysokopolimerov)

PERIODICAL: Kauchuk i rezina, 1959, Nr 3, pp 23 - 26 (USSR)

ABSTRACT: Accelerated ageing tests for polymers are in two categ-
          ories: either the daily or annual cycles of conditions
          are simulated, or one or several particular factors causing
          ageing are simulated in an intensive form. The relation-
          ships found between time of ageing and intensity of a
          given factor enable extrapolation to be made to the value
          of maximum intensity of the ageing factor in natural
          conditions and at the most unfavourable time of the year.
          The "weatherometer" is an apparatus widely used for
          artificial exposure testing. Samples are exposed to the
          light of carbon arc lamps at elevated temperatures and
Card 1/4 are sprayed periodically with water. Also mercury-quartz

SOV/138-59-3-6/16

Methods of Accelerated Light (Atmospheric) Ageing of High Polymers

lamps are used, when the temperature can be varied from $20°$ to $80°C$ and the relative humidity from 65% to 100%. Different values are accepted fpr the energy flux of natural sunlight varying from 43 to 49.2 cal/cm^2 per hour. The amount of sunlight varies according to locality, and for any given amount of sunlight ageing will vary according to the associated humidity and ultra-violet content. Among the existing sources of light only the krypton-xenon lamps give a radiation spectrum that is close to that of natural sunlight, but these are dangerous and difficult to use and have low power, consequently carbon arc and mercury tungsten lamps with correcting light filters are normally employed for weatherometers. Ageing effects depend both upon the light source and the optical properties of the exposed material. The effect of a dark pigment may be completely reversed in a weatherometer test under high intensity as compared with natural exposure. The heating effect through absorption by dark material may cause rapid ageing under artificial conditions, whereas the dark pigment would give protection from penetration of ultra-violet under natural conditions. As a general

Card 2/4

SOV/138-59-3-6/16

Methods of Accelerated Light (Atmospheric) Ageing of High Polymers

rule a photochemical reaction proceeds at a rate proport-
ional to the square root of the light intensity, and
usually reaches a maximum which does not change by further
increase of intensity. Photo-oxidation and photolysis
may proceed simultaneously causing gas evolution and deg-
radation of the structure, and increased light intensity
accelerates photolysis. Usually interrupted exposure
produces greater ageing effect than equivalent continuous
exposure. Increasing temperature in the range 25° to 80°C
produces disproportionately higher light ageing effect in
rubbers than at temperatures of 100° and more. Elevated
temperatures may produce lower light ageing effects on
account of decreased photosensitization due to the presence
of anti-oxidants in rubbers. Increasing humidity from 30
to 100% R.H. is known to accelerate discolouration of dyes
severely, and the effect of humidity on light ageing of

Card 3/4   rubbers is probably bound up with its influence on the

SOV/138-59-3-6/16

Methods of Accelerated Light (Atmospheric) Ageing of High Polymers

photo-sensitivity of any colouring matter present. A
table is given for values of annual light intensities
(kcal/cm^2 per year), relative humidity, and average air
temperature for temperate, sub-tropical and tropical
climates from which appropriate parameters for ageing
tests can be established. It is found that there is
practically no light ageing effect under Arctic condit-
ions. The article concludes with remarks on methods of
measuring changes in the properties of polymers on ageing,
including a change in reflectivity and loss of transpar-
ency at different wavelengths of light, and a change in
physical and mechanical properties, particularly static
elastic modulus, which need not be a destructive test.
It is suggested that weathering tests shoudl be run at
constant light intensity and that temperature and humidity
factors should be varied. From the curves so obtained extra-
polation should be possible to any given natural condition.
Card 4/4   There is 1 table and 40 references of which 21 are Soviet
and 19 English.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promysh-
    lennosti (Scientific Research Institute for the Rubber Industry)

5(4), 15(9)

SOV/20-124-3-34/67

AUTHORS: Zuyev, Yu. S.,   Borshchevskaya, A. Z.

TITLE: On the Static Fatigue of Some Deformed Materials in Corrosive
              Cracking (O dlitel'noy prochnosti nekotorykh deformirovannykh
              materialov pri ikh korrozionnom rastreskivanii)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 3, pp 613-616 (USSR)

ABSTRACT: Reference is made to earlier papers dealing with this sub-
              ject. The present paper intends to disclose new cases of the
              corrosive cracking of rubbers and to determine the influence
              exercised by the chemical activity of the aggressive agent
              upon this process. Analysis of experimental results shows
              that cracking of the various types of rubber occurs whenever
              distinctly marked destructive processes of the space lattice
              elements develop in connection with interaction with the ag-
              gressive agent. Several photographs show the outer appearance
              of rubbers after corrosive cracking in various media
              (nitrogen-oxide, HCl, HNO_3, NaOH, O_3, CH_3COOH). First, the
              influence exercised by deformation and by the concentration
              of the aggressive agent upon phenomena occurring before crack-
Card 1/3   ing is dealt with. The cracking processes of rubber under

On the Static Fatigue of Some Deformed Materials in Corrosive Cracking

SOV/20-124-3-34/67

the influence of various aggressive media are similar to one another. Experimental results also indicate common regularities in corrosive cracking and in the static fatigue of rubbers, metals, and other substances. The next part of the paper deals with the dissociation constant of acids: The reduction of time elapsing until cracking of the samples occurs is undoubtedly a sign that the rate of corrosive crack- ing increases with an increase of the concentration of the acids. For the purpose of explaining the part played by adsorption, corrosive cracking was investigated also in aqueous solutions of inorganic acids (HCl, HNO$_3$), in aqueous and alcoholic solutions of fatty acids of the homogeneous series, as well as in vapors of acids. Acceleration of the cracking process can be explained only by increased adsorp- tion of acids on the rubber and by the hereby caused decrease of strength. In conclusion, the relative influence exercised by the concentration of the acids and their adsorption capacity (wetting capacity) is discussed. The rate of corrosive cracking of rubbers depends on the tension and concentration of the aggressive medium, and, besides, on the activity and the adsorption capacity of the aggressor. There are 3 figures,

Card 2/3

SOV/20-124-3-34/67

On the Static Fatigue of Some Deformed Materials in Corrosive Cracking

1 table, and 20 references, 17 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti
(Scientific Research Institute of the Rubber Industry)

PRESENTED: September 26, 1958, by P. A. Rebinder, Academician

SUBMITTED: September 4, 1958

Card 3/3

TSUKERBERG, S.M.; ZAKHAROV, S.P.; MENAKHOV, B.V.; ABRAMOVA, E.Ye.;
    ZUYEV, Yu.S., red.; KUPERMAN, F.Ye., red.; SEPERANSKAYA, A.A.,
    tekhn.red.

    [High-roadability tires for motor vehicles] Shiny dlia avtomo-
    bilei povyshennoi prokhodimosti. Moskva, Gos.nauchno-tekhn.izd-vo
    khim.lit-ry, 1960. 71 p.   (MIRA 14:4)
                (Motor vehicles--Tires)

15.9300

AUTHORS: Zuyev, Yu. S., Pravednikova, S. I.

TITLE: Effect of ozone concentration on crackiness of rubbers

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 13, 1961, 652, abstract
             13П330 (Tr. N.-i. in-ta rezin. prom-sti, sb. 6, 1960, 3-15)

TEXT: The authors studied the crackiness of rubber from CKC-30 (SKS-30)
and nairit as dependent on the ozone concentration over a wide range of
deformations. They determined the time before cracking τ_0, the growth
rate of cracks on a steady section V, and the time of full destruction of
the specimen τ_1. The dependence of τ_0, τ_1, and V on the concentration of
O_3 (c) has the form $\log \tau = \log K - n \log c$, where K and n are coefficients
dependent on the deformation (ε); n~1 with exception of cracking of nairit
rubber at $+6^\circ C$ and $-8^\circ C$. Under these conditions, n grows up to 2.5 and
5.8. This is connected with the change in kinetics of the chemical
reaction of O_3 with the polymer at low temperature if each process of
Card 1/2

26881
S/081/61/000/013/021/028
Effect of ozone concentration on ...   B117/B203

destruction comprises a great number of processes of interaction of O_3
with the polymer double bond. The dependence of τ_0, τ, and V on ε retains
the same character with a change of c between 0.15 and 0.0002%. ε(crit)
is also independent of c. It is convenient to determine the relative
stability of various rubbers to cracking dependent on the ozone concentra-
tion for different ε (if possible, for ε(crit)), and to characterize it
by the values of c at which equal τ_1 are attained for all rubbers.

[Abstracter's note: Complete translation.]

Card 2/2

26884
S/081/61/000/013/024/028
B117/B203

15.9380

AUTHOR: Zuyev, Yu. S.

TITLE: Light-protecting action of some salts of dialkyl dithio
            carbamic acids in rubbers

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 13, 1961, 653, abstract
            13П333 (Tr. N.-i. in-ta rezin. prom-sti, sb. 6, 1960, 16-26)

TEXT: The aging due to light of vulcanizates of СКБ (SKB), СКС-30А (SKS-30A),
НК (NK), and butyl rubber containing diethyl dithio carbamate (I) and di-
butyl dithio carbamate of Ni (II) was characterized by the relative change
of the conventional modulus (hardness coefficient). The light-protecting
action of antioxidants was determined by their chemical activity, their
light-filtering capacity, and their solubility in rubbers. When separating
the optical effect of antioxidants from the chemical one, the author found
a strong chemical activity of dibutyl dithio carbamate of Zn, as compared
with (II), and equal light-filtering capacity of (I), (II), and dimethyl
dithio carbamate of Ni (III). The decrease in light-protecting action in
the order (III)<(I)<(II) may be explained by the reduction in the same

Card 1/2

26884

S/081/61/000/013/024/028

Light-protecting action of some salts ...   B117/B203

order of the solubility of these (II) in rubber. The increase in total
concentration of antioxidants in rubber prolongs the period until the
beginning of intense hardening. Besides slowing down the aging due to
light of vulcanizates, the chemical activity of (I) and (II) also resulted
in crosslinking and inhibition of oxidation of SKB at high temperatures,
(I) and (II) show favorable effects on the dynamic fatigue of SKB and
SKS-30 rubbers. [Abstracter's note: Complete translation.]

Card 2/2

ZUYEV, Yu.S., kand.khimicheskikh nauk ; MALOFEYEVSKAYA, Y.F.

Chemistry of the ozone cracking of rubbers, and the effect
of agents inhibiting ozone-aging. Trudy NIIRP no. 6:27-
53 '60.   (MIRA 13:12)
         (Rubber--Testing)   (Ozone)

S/138/60/000/010/007/008
A051/A029

AUTHORS: Zuyev, Yu.S., Bukhanova, N.N., Dorfman, T.I.

TITLE: An Automatic Instrument for the Investigation of Creep and Static
Fatigue of High Polymers Under a Constant Tension

PERIODICAL: Kauchuk i Rezina, 1960, No 10, pp.44-45

TEXT: Instruments for testing the deformation of high polymers under a
constant tension of either expansion or compression, designed both in the USSR
and abroad, are classified into four groups according to their design: 1)
Devices in the form of a shaped load submerged into the liquid with the expan-
sion of the sample (Ref 1,6). 2) Devices changing the direction of the applied
force with the expansion of the sample (Ref 3,7,10-12). 3) Lever device of
the scale type (Ref. 9,13-15). 4) Devices in the shape of an oblique plane (Refs.
4,5,8) along which the load moves, which expands the sample (in the expansion
of the sample the angle of the inclined plane changes). The shortcomings are
listed as follows: the instruments described in Ref.1,6,7,9-12,15 are designed
for a deformation of 50-100%, but the deformation of high-elastic polymers
reaches 1,000%. Instruments listed in Ref. 4,5,8,13,14 do not maintain the
given tension constant automatically. The "Ulitka" (Ref. 3,7,11,12) is suggest-
ed as being the most appropriate in large deformations, where the constant

Card 1/6

S/138/60/000/010/007/008
A051/A029

An Automatic Instrument for the Investigation of Creep and Static Fatigue of High Polymers Under a Constant Tension

tension is maintained automatically. The shortcomings in this device designed at the Leningradskiy fiziko-tekhnicheskiy institut (Leningrad Physico-Technical Institute) are: larger dimensions (0.4 x 0.4 x 1.5 m); the need of each sample for an automatically-recording and thermostatic device. The authors further describe the two design variants which they developed: a compact instrument (40 cm in diameter), where one automatic recorder and one thermostatic device serves four samples in the first variant and eight samples in the second variant. The basic instrument shown in Fig. 1 is described as having a body consisting of an upper (1) and lower (2) disk fastened with metal rods (3). The disk (1) is a panel for the attachment of four working units with the same design and one rod (4) with a platform (5), on which the four lower clamps (6) are placed. Disk (2) serves as the base of the instrument; three spheres are fitted onto the base which enables the instrument to be moved about easily. Stands (7) are fastened to the disk with bearings pressed into them (8). An axle (9) rotates inside the bearings on which the "Ulitka" is attached (10), also a dial graduated in degrees (11), a roller (12) for the counterweight (13) and a flywheel (14). The stress from load (15) suspended from the "Ulitka" is

Card 2/6

S/138/60/000/010/007/008
A051/A029

An Automatic Instrument for the Investigation of Creep and Static Fatigue of
High Polymers Under a Constant Tension

transmitted by the flywheel to a steel band or wire (16) and further through
the upper clamp (17) to the sample (18). The lower part of the sample is
fastened to the stationary clamp, the initial position of which is regulated
by a screw. The samples are placed into the thermostatic container, filled
with a specific medium. The system of counterweights is used for maintained
the working unit in a state of indifferent equilibrium. The counterweight (19)
balances the "Ulitka". The counterweight (13,20) balances the upper clamp and
the nib. The recording device consists of an exchangeable drum (21) rotating
by means of a clock mechanism or by the motor on the axis which is the con-
tinuation of the rod (4) and the nib (22). Drums with different rates of
rotation are used depending on the length of the experiment. The "Ulitka"-
type is designed for a length of the working rectangular section of the sample
equal to the distance between the clamps. Samples in the form of two spades
are suggested for use instead of samples of rectangular shape, since the latter
tear the clamps when working in the region of large deformations. The authors
checked the constancy of the tension during the deformation process using a
dynamometer and determined the strength transferred to the sample at various
positions of the Ulitka. The results of the check showed that a constant

Card 3/6

S/138/60/000/010/007/008
A051/A029

An Automatic Instrument for the Investigation of Creep and Static Fatigue of
High Polymers Under a Constant Tension.

tension is upheld in the deformation process for the selected form of the
samples when using self-tightening clamps. The mean square error in determin-
ing the constancy of the tension value produced from loads of 500, 1,000, and
1,500 (up to deformations of about 1,000% on the "Ulitkas" determined for a
distance of 20 mm between the clamps) is equal to 2.2% and from loads of 300,500
and 700g(to a deformation of about 450% on the "Ulitkas" determined for a
distance of 40 mm between the clamps) 1%. There is one diagram and 15 referen-
ces: 5 Soviet, 10 English.
ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti
            (Scientific Research Institute of the Rubber Industry).

Card 4/6

S/138/61/000/001/007/010
A051/A029

AUTHORS: Zuyev, Yu. S., Pravednikova, S. I.

TITLE: Methods of Testing Rubber for Stability to Ozone Cracking

PERIODICAL: Kauchuk i rezina, 1961, No. 1, pp. 30-32

TEXT: The authors point out that the existing methods for ozone crack-
ing stability used in testing newly processed rubbers can prove erroneous,
since a definite correpondence between the working capacity of the article
and its characteristics for this type of testing in new rubbers can be lacking.
The following two characteristics of ozone cracking are said to be accepted
to-day: time until the appearance of cracks (Refs. 1 - 5) and degree of
cracking (Ref. 3). It is stressed that τ_i, the time prior to the appearance
of the cracks, cannot completely characterize the stability of the rubber to
ozone, since this factor only reflects the resistance of the rubber to ozone
during the stage of crack formation and does not reflect its properties at
the stage of crack growth until complete destruction. It is further stressed
that τ_t, the time prior to tear should be considered the main index and
should determine the working capacity of the majority of articles, both in-

Card 1/5

S/138/61/000/001/007/010
A051/A029

Methods of Testing Rubber for Stability to Ozone Cracking

dices should be used, however, to characterize the rubber. The conditions under which the test is conducted, such as nature of deformation, ozone concentration, temperature, are important for a correct evaluation of the ozone stability. The change in the critical deformation varies for various rubbers within the limits of 5 to 80 % and depends on the method of the test (Refs. 7, 14). When introducing anti-ozone-aging agents, the relative change of the ozone resistance also depends on the value of deformation (Fig. 2). In order to get a more accurate picture of the working capacity of the article, the tests should be carried out at deformations close to working conditions. Depending on the used concentrations of ozone, the relative stability of the various rubbers can be different (Refs. 18, 19), i. e., a rubber can be stable at a higher concentration and prove to be less stable under atmospheric conditions; thus the results of rapid tests can be false even qualitatively. The area of the critical deformation of the given rubber hardly depends on the value of the ozone concentration (Ref. 19). It is still unknown how to treat in rapid tests the rate of diffusion of the anti-ozone-aging agents and waxes on the rubber surface. It is considered expe-

Card 2/5

S/138/61/000/001/007/010
A051/A029

Methods of Testing Rubber for Stability to Ozone Cracking

dient, both from the point of view of cutting down the testing time and of obtaining more accurate results, to conduct the tests at a few comparatively high concentrations of ozone. The rubber tests on ozone cracking stability are carried out at various temperatures. With a change in the temperature the region of the critical deformation shifts. The same temperature range, at which the rubbers work, should be used for testing to obtain more accurate results. There are 2 graphs and 21 references: 8 Soviet, 13 English.

ASSOCIATION: Nauchno-issledovatel'skiy institut rezinovoy promyshlennosti
              (Scientific Research Institute of the Rubber Industry)

Card 3/5

S/138/61/000/001/007/010
A051/A029

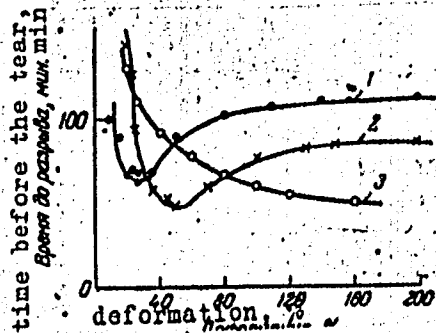Methods of Testing Rubber for Stability to Ozone Cracking

Figure 1:

Relationship of the time before the tear
to the content of ceresin and magnitude
of the deformation of the CKC-30 (SKS-30,
vulcanizate filled with 30 w.p. of
channel carbon black (ozone concentration
0.0012 %):

1 - without ceresin,
2 - 2 w.p. ceresin,
3 - 5 w.p. ceresin.

Card 4/5

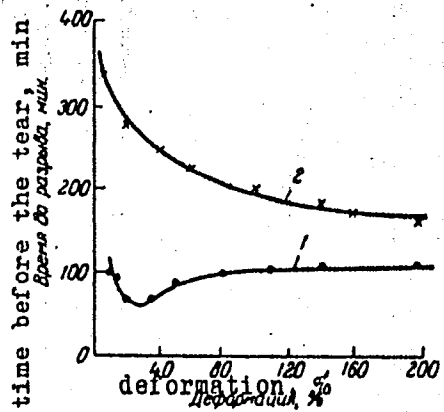Methods of Testing Rubber for Stability to Ozone Cracking

Figure 2:

Relationship of time before the tear to the content of anti-ozone-aging agent and magnitude of the deformation of the SKS-30 vulcanizate filled with 30 w.p. of channel carbon black (concentration of ozone 0.0017 %):

1 – without anti-ozone-aging agent,
2 – 5 w.p. UOP-88.

Card 5/5

S/138/61/000/011/004/007
A051/A126

AUTHORS: Zuyev, Yu. S., Pravednikova, S. I., Kotel'nikova, G. V.

TITLE: The effect of fillers and softeners on the rubber resistance to ozone cracking at various deformations

PERIODICAL: Kauchuk i rezina, no. 11, 1961, 15 - 21

TEXT: An investigation was made of the effect of active and non-active fillers (channel black, silica gel, chalk) on the ozone cracking resistance of rubbers based on NR, CKБ (SKB), CKC -30 (SKS-30), CKH-40 (SKN-40) and nairite. The effect of the softener (dibutylphthalate) was also investigated in rubbers based on SKN-40 and nairite. It was found that fillers and softeners, under conditions of equal deformations decrease the τ_u and τ_p of the rubbers, the more so, the higher their dosage. (τ_u - length of time till appearance of ozone cracking, τ_p - length of time prior to destruction). In conditions of equal tensions with an increase in the dosage of the active filler, τ_u and τ_p increase in the range of low tensions and τ_p decreases at high tensions. An increase in the dosage of the non-active filler (chalk) decreases the τ_p in the range of tensions from 5 to 25 kg/cm^2. τ_u is much less than τ_p for the investigated thicknesses of the samples

· Card 1/3