"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

ACCESSION NR: AP5003828

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 43099-65 EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4 RPL WW/RM

[illegible]

[illegible]

[illegible]

[illegible] nated [illegible]

[illegible] yedineniya, [illegible]

TOPIC TAGS [illegible] polymerization, ozone, vulcanizer, resin, SKI vulcanizer, [illegible] vulcanizer, [illegible] vulcanizer, SKB vulcanizer, [illegible]

[illegible]

[illegible] during [illegible] show properties [illegible]

Card 1/3

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

The authors postulate that the vulcanizate particles are bound chemically with the polyacrylate ester molecules, forming a composite three-dimensional polymer structure. Orig. art. has: 3 figures.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhno[illegible] of Fine [illegible]

SUBMITTED: 06May64 ENCL: [illegible] SUB CODE: [illegible]

NO REF SOV: 003 OTHER: 000

Card 2/3

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

AUTHOR: Shershnev, V. A.; Sidnev, V. A.; Dogadkin, B. A.

TITLE: A method for vulcanizing rubber. Class 39, No. 171568

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 11, 1965, 78

TOPIC TAGS: rubber vulcanization, thiourea

ABSTRACT: This Author's Certificate introduces a method for vulcanizing rubber [illegible] Volatility and nonuniformity in mix [illegible] using a complex compound of hexa[illegible]

ASSOCIATION: [illegible]

SUBMITTED: 19Mar64 ENCL: 00 SUB CODE: MT, GC

NO REF SOV: 000 OTHER: 000

Card 1/1

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 62834-65 [illegible]
ACCESSION NR: [illegible]

AUTHOR: Dontsov, A. A., Farka, P.; Yermilova, G. A.; Dogadkin, B. A.

[illegible]

[illegible] certificate introduces a [illegible]

[illegible]

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 56671-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM

ACCESSION NR: AP5017844

UR/0286/65/000/011/0079/0079
678.7.028.294.044
547.563.3

AUTHOR: Ginzburg, L. V.; Shershnev, V. A.; Shvarts, A. G.; Dogadkin, B. A.; Neratova, T. N.

TITLE: A method for vulcanizing rubber. Class 39, No. 171570

SOURCE: Byulleten' zobreteniy i tovarnykh znakov, no. 11, 1965, 79

TOPIC TAGS: rubber vulcanization, vulcanization acceleration

ABSTRACT: This Author's Certificate introduces a method for vulcanizing rubber using alkylphenol formaldehyde resins in the presence of accelerators. [illegible] tert-butylphenol as the halide-containing [illegible]

ASSOCIATION: none

SUBMITTED: 19Mar64 ENCL: 00 SUB CODE: MT, GC

NO REF SOV: 000 OTHER: 000

Card 1/1

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

GINZBURG, L.V.; SHERSHNEV, V.A.; PSHENITSYNA, V.P.; DOGADKIN, B.A.

Reaction of unsaturated elastomers with alkyl phenol-formaldehyde derivatives under vulcanization conditions. Vysokom.soed. 7 no.1: 55-62 Ja '65. (MIRA 18:5)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

AL'TZITSER, V.S.; GUL', V.Ye.; TUTORSKIY, I.A.; SHERSHNEV, V.A.
DOGADKIN, B.A.

Copolymerization of ozonized pulverized vulcanizates with polyester acrylates. Vysokom. soed. 7 no.3:417-419 Mr '65. (MIRA 18:7)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

TUTORSKIY, I.A.; BOYKACHEVA, E.G.; POL'SMAN, G.S.; SHABADASH, A.N.; DOGADKIN, B.A.

Structures of cyclic isomers of polyisoprenes. Vysokom. soed. 7 no.8:1394-1399 Ag '65. (MIRA 18:9)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

VASILEV, A.I.; TUTORSKIY, I.A.; DOGADKIN, B.A.

Influence of carbon black vulcanization accelerators and softeners on the kinetics of the copolymerization of vulcanizates with styrene. Kauch. i rez. 24 no.6:4-7 Je '65. (MIRA 18:7)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V. Lomonosova i Nauchno-issledovatel'skiy institut kauchuka i plastmass, Bolgariya.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

Card 1/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

ACCESSI[illegible]

of wh[illegible] influence the mechanical properties of the fi[illegible]
1 figure.

ASSOCIAT[illegible] [illegible] tonkoy khimicheskoy tekhnologii im. L[illegible]
[illegible]

SUBMITTED [illegible] [illegible]

NO REF [illegible] [illegible]

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 42133-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM

ACCESSION NR: AP5008900 S/0069/65/027/002/0182/0185

AUTHORS: Dogadkin, B. A.; Kuanyshev, K. G.; Gul', V. Ye.

TITLE: The effect of vulcanization structures and strain conditions on the static and dynamic strength of vulcanizates

SOURCE: Kolloidnyy zhurnal, v. 27, no. 2, 1965, 182-185

TOPIC TAGS: vulcanization, butadiene, styrene, isoprene, rubber/ SKS 30 ARM rubber, SKI rubber

ABSTRACT: The authors have investigated the effect of vulcanization structures on the static and dynamic strengths of vulcanizates under various conditions of [illegible]ing. They studied pure vulcanizates of butadiene styrene rubber (SKS-30-ARM) and cis-isoprene rubber (SKI), obtained by vulcanizing hexachloroethane, tetrachloroquinone, [illegible], and tetramethyl thiuram sulfide [illegible] [illegible] vulcanizates with different [illegible] [illegible] sulfenamide and [illegible] vulcanizates with different structures [illegible] strain conditions. At about 20C and a strain rate of 500 mm/min, vulcanizates containing thermally stable bonds possess lower static strength [illegible]

Card 1/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 42133-65
ACCESSION NR: AP5008900

containing polysulfide bonds. At 1200 and a rate of 1 mm/min, the [illegible] resistance of vulcanizates [illegible] tension is greater the [illegible] stress does not [illegible] is exceeded, the reverse [illegible] structures affect [illegible] and [illegible]

Orig. art. has [illegible] figures and 1 table.

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii [illegible] of Fine Chemical Engineering)

SUBMITTED: 28Dec63 ENCL: 00 SUB CODE: MT

NO REF SOV: 003 OTHER: 002

Card 2/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 37728-65 EWT(m)/EPF(c)/EPR/EWP(j) Pc-4/Pr-4/Ps-4 RM/WW
ACCESSION NR: AP5008901 S/0069/65/02[illegible]

AUTHOR: Kuleznev, V. N.; Shvarts, A. G.; Klykova, V. [illegible]; Dogadkin, B. A.

TITLE: Physical and mechanical properties of micro[illegible] mixtures of incompatible polymers. Polybutadiene-[illegible]

SOURCE: Kolloidnyy zhurnal, v. 27, no. 2, 1965, [illegible]

TOPIC TAGS: incompatible rubber, polybutadiene rubber, [illegible] rubber, gum blend, covulcanizate

ABSTRACT: In order to verify the validity of the generally accepted concept that mixtures of incompatible polymers exhibit poorer mechanical properties than their constituents, a study has been made of the properties of mixtures of two typical incompatible [illegible] as exemplified by polybutadiene (SKD) and nitrile [illegible] Raw rubbers were mixed on laboratory mills to homogeneity [illegible] ance. After the required amounts of curing agents [illegible] mixtures, the compounded stocks were covulcanized at [illegible] 30 min. Filled covulcanizates were made with 30 parts by weight [illegible]

Card 1/5

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 37728-65
ACCESSION NR: AP5008901

channel black. The experiments consisted in the measurement of the viscosity of raw uncompounded SKD and SKN-18 mixtures and in the determination of the cohesive energy density, mechanical properties, and scattering of the strength values of the covulcanizates. It was shown that: 1) for any rubber ratio, the Mooney viscosity [illegible] ra- unfilled SKD and SKN-18 mixtures is below the additive va[illegible] mixtures have a lower cohesion energy; 3) the mechanical [illegible] ties of the covulcanizates depend on the rubber ratio [illegible] the Enclosure; 4) the filler impairs the mechanical [illegible] the covulcanizates; 5) covulcanizates exhibit a higher [illegible] strength than the SKD or SKN-18 vulcanizates (Fig. 2), [illegible] scattering of the strength values in covulcanizates is not greater than that in SKD or SKN-18 vulcanizates; 7) the microheterogeneous structure (the result of incompatibility) of polymer mixtures is not necessarily a shortcoming. In some instances, the covulcanizates exhibit better mechanical properties than the vulcanizates of the constituents. Orig. art. has: 5 figures.

Card 2/5

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 37728-65

ACCESSION NR: AP5008901

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M. V. Lomonosov (Moscow Institute of Fine Chemical Technology); Nauchno-issledovatel'skiy institut shinnoy promyshlennosti (Research Institute of the Tire Industry)

SUBMITTED: 19Feb64 ENCL: 00 SUB CODE:

NO REF SOV: 009 OTHER: 001 ATD PRESS:

Card 3/5

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 42132-65 EWT(m)/EPF(c)/EPR/EWP(j) Pc-4/Pr-4/Ps-4 WW/RM
ACCESSION NR: AP5008902 S/0069/65/027/002/0224/0231

AUTHORS: Lykin, A. S.; Tarasova, Z. N.; Dogadkin, B. A.

TITLE: Effect of vulcanization network structures on the strength and elastic properties [illegible]. Structural changes in the network [illegible] thermooxidation activity

SOURCE: Kolloidnyy zhurnal, v. 27, no. 2, 1965, 224-231

TOPIC TAGS: degradation reaction, crosslinked polymer, vulcanization, elastic property, thermooxidation, thermal effect

ABSTRACT: The authors' purpose was to investigate experimentally the changes in structures of the vulcanization network in their dependence on the [illegible] parameters, the [illegible] composition, and the [illegible] [illegible] rubber from [illegible] structural changes [illegible] different types of rubber containing various rubber [illegible] thermooxidation, when swollen in solvent, under conditions of [illegible] oxidative stress relaxations, are due to breakdown of chains and [illegible] formation of new, secondary nodes. The degradation rate of molecular chains [illegible]

Card 1/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 42132-65
ACCESSION NR: AP5008902

directly proportional to the distance between nodes. The rate of nodal degradation is independent of the initial concentration. The formation of [illegible] [illegible] is due chiefly to the reaction of [illegible] degradation of the molecular chains. Two new nodes appear as [illegible] [illegible] chain. The [illegible] [illegible] carboxyl-bearing rubber during thermal relaxation [illegible] [illegible] in the content of [illegible] [illegible] of blocks of this constituent in the copolymer chains. Orig. art. [illegible] and 4 tables.

ASSOCIATION: Nauchno-issledovatel'skiy institut shinnoy promyshlennosti, Moscow (Scientific Research Institute of the Tire Industry)

SUBMITTED: 28Aug64 ENCL: 00 SUB CODE: MT

NO REF SOV: 002 OTHER: 001

Card 2/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

[illegible]

AUTHOR: [illegible]; Pavlov, N. N., Dogadkin, [illegible]

TITLE: Some aspects of sulfur vulcanization in the presence of [illegible] peroxide

SOURCE: Kolloidnyy zhurnal, v. 27, no. 3, 1965, 441-445

TOPIC TAGS: rubber mixture, rubber property, dicumyl peroxide, sulfur, diphenyl-guanidine

ABSTRACT. The vulcanization of polyisoprene rubber in the [illegible] oxide, [illegible] guanidine [illegible] determined from [illegible] was [illegible] rubber in the form [illegible] dicumyl peroxide, the [illegible] peroxide in the [illegible] of intramolecular [illegible]

Card 1/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 57081-65

ACCESSION NR: AP5014529

15

es of degradation of the polymer. Diphenylguanidine in[illegible]
[illegible] the decomposition of [illegible]
[illegible] is present [illegible]
[illegible]

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhnologii [illegible]
[illegible] Fine Chemical Technology [illegible]
[illegible]
Republic)

SUBMITTED: 29Sep64 ENCL: 00 SUB CODE: MT

NO REF SOV: 006 OTHER: 007

Card 2/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 63844-65 EWT(m)/EPF(c)/EWP(j) RM

ACCESSION NR: AP5020223

UR/0069/65/027/004/0524/0528
541.182.24 [illegible]

AUTHORS: [illegible], M. N.; Gul', V. Ye.; Dogadkin, B. A.

TITLE: Mechanical properties of carbon black-filled mixtures [illegible]
1. The strength characteristics of carbon black [illegible]

[illegible] Zhurnal, v. 27, no. 4, 1965, 524-28

TOPIC TAGS: carbon black, vulcanizate, butadiene, styrene, [illegible]
SKS 3[illegible] rubber

ABSTRACT: [illegible] was carried out to elucidate the [illegible]
[illegible] and nonvulcanized [illegible]

[illegible]

[illegible] accompanied by an [illegible]
the [illegible] in the glass temperature depends on the [illegible]

Card 1/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 63844-65

ACCESSION NR: AP5020223

carbon black. The strengthening effect of carbon black filler disappears at a certain lowest temperature which is higher than the glass temperature [illegible] and [illegible] graphs.

ASSOCIATION: Moskovskiy institut khimicheskoy tekhnologii im. M[illegible] (Moscow Institute of Chemical Technology); Moskovskiy tekhn[illegible] myas[illegible] myshlennosti Moscow Te[illegible]

[illegible]

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 63845-65 EWT(m)/EWP(j) RM

ACCESSION NR: AP5020235 UR/0066/65/027/[illegible]
539.21[illegible]

AUTHORS: Gul', V. Ye.; Snezhko, A. G.; Dogadkin, B. A.

TITLE: The preparation of films and coatings by mixing aqueous dispersions of thermodynamically incompatible thermoplasts

SOURCE: Kolloidnyy zhurnal, v. 27, no. 4, 1965, 627-628

TOPIC TAGS: polyethylene plastic, vinyl chloride, permeability [illegible] thermoplastic material

ABSTRACT: Physical properties of films made of mixed aqueous [illegible] polymer [illegible] determine the proper way [illegible] The [illegible] of polyethylene containing [illegible]

The [illegible] relationships of their mechanical properties and of [illegible] permeability to their composition are shown in Fig. [illegible] films have a [illegible] water-vapor permeability and [illegible]

Card 1/[illegible]

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 63845-65

ACCESSION NR: AP5020235

values than films made from the initial polymers. Gas permea[illegible]
[illegible]
[illegible]
mechanical characteristics can be obtained for [illegible]
[illegible]

A[illegible] tekhnologicheskiy institut myasn[illegible]
promyshlennosti [illegible] Technological Institute [illegible]
[illegible]

SUBMITTED: 12Jan65 ENCL: 01

NO REF SOV: 003 OTHER: 000

Card 2/3

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 63845-65

ACCESSION NR: AP5020235

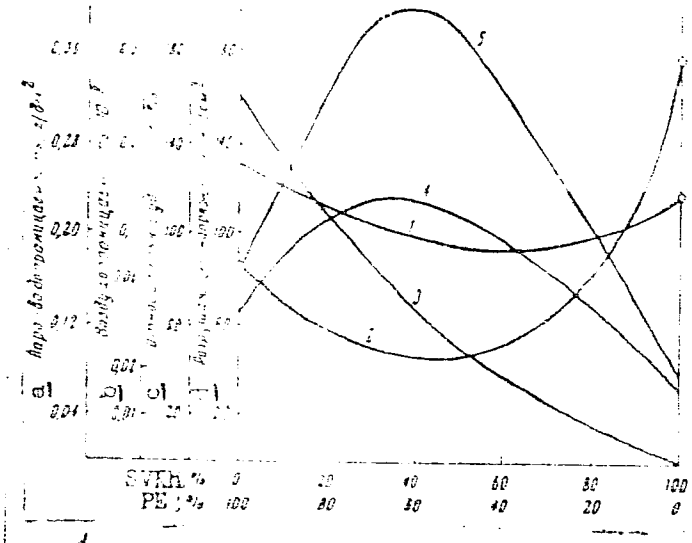

Fig. 1. [illegible] stress [illegible] vapor [illegible] film made from a mixture of aqueous [illegible] polyethylene [illegible]

a. Water vapor [illegible] g dm²

b. Air permeability [illegible]

c. [illegible]

d. [illegible]

Card 3/3

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

EWT(m)/EPF(c)/EWP(j)/T RM

ACCESSION NR: AP5023684 UR/0076/65/039/009/2157/2162

541.124/.128+547.022

AUTHOR: Tutorskiy, I. A.; Novikov, S. V.; Dogadkin, B. A.

44.55 44.55 44.55

TITLE: Some aspects of the mechanism of chemical reactions of diene polymers

SOURCE: Zhurnal fizicheskoy khimii, v. 39, no. 9, 1965, 2157-2162

TOPIC TAGS: natural rubber, bromination, chlorination, polymer structure, chemical bonding

40
37
B

ABSTRACT: Chemical reactions of 1,5-polyene systems are characterized by the fa[illegible] that the products of their reactions are inhomogeneous in composition. [illegible] of polyisoprenes was carried out in an attempt to prepare products [illegible] 20%, etc. of the theoretical bromine content. The structure of [illegible] (films) was inhomogeneous. It was postulated that during [illegible] in addition to products containing almost no bromin[illegible] which the degree of saturation is very high [illegible] quently, these components behave like [illegible] the inhomogeneity of the structu[illegible]

Card 1/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

ASSOCIATION: Moskovskiy institut tonkoy khimicheskoy tekhn...
Lomonosova (Moscow Institute ...

NO REF SOV: ...

OTHER: ...

Card 2/2

L 63797-65 EWT(m)/EPF(c)/EWP(j) RM
ACCESSION NR: AP5018793 UR/0138/65/000/007/0005/0010
678.063:541.68

44
41
B

AUTHOR: Tarasova, Z. N.; Senatorskaya, L. G.; Fedorova, T. V.; Eytingon, I. I.; Kirpichnikov, P. A.; Kavun, S. P.; Dogadkin, B. A.

44,55 44,55 44,55 44,55 44,55 44,55 44,55 44,55 15,44,55

TITLE: Effect of the structure of the vulcanizing network on the fatigue of rubber and ...

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 63797-65

ACCESSION NR: AP5018793

zation accelerator and produces vulcanizates with a lesser sulfide character of the cross links. It does not affect the induction period of the oxidation of rubber and vulcanizates by molecular oxygen, but speeds up the decomposition of cumene hydroperoxide in rubber solutions as a result of the oxidation of sulfur to the corresponding sulfoxides. In contrast to the antifatigue agents and antioxidants commonly used, which do not stabilize the processes of thermal degradation, zinc diisopropyl dithiophosphate has an inhibiting influence on the thermomechanical breakdown of the vulcanizing network. The use of oxidation inhibitors in conjunction with substances stabilizing the thermal cleavage of bonds is an effective means of combating the fatigue of rubbers containing polysulfide bonds at high temperatures. Orig. art. has: 5 figures and 4 tables.

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

SUBMITTED: 00 ENCL: 00 SUB CODE: MT, GC

NO REF SOV: 007 OTHER: 004

Card 2/2

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

KULEZNEV, V.N.; KROKHINA, L.S.; DOGADKIN, B.A.

Cross-linking of solutions of polymers and their mixtures. Koll. zhur. 27 no.5:715-719 S-O '65. (MIRA 18:10)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

TUTORSKIY, I.A.; MARKOV, V.V.; FEDYUK, O.I.; VITSNUDEL', M.B.; DOGADKIN, B.A.

Kinetics of the cyclization of natural and synthetic polysoprenes induced by phosphorus pentoxide. Vysokom. soed. 7 no.6:953-957 Je '65. (MIRA 18:9)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V.Lomonosova.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

POTAPOV, Ye.E.; TUTORSKIY, I.A.; KHODZHAYEVA, I.D.; DOGADKIN, B.A.

Structure of the product of reaction of resorcinol with hexamethylenetetramine. Kauch. i rez. 24 no.12:19-21 '65. (MIRA 18:12)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V. Lomonosova.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

VASILEV, A.I.; TUTORSKIY, I.A.; DOGADKIN, B.A.

Properties and structure of the products of vulcanizate reaction with styrene. Kauch. i rez. 24 no.10:23-26 '65. (MIRA 18:10)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V. Lomonosova i Nauchno-issledovatel'skiy institut kauchuka i plastmass, Bolgariya.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

TOLMACHEVA, M.N.; GUL', V.Ye.; DOGADKIN, B.A.

Mechanical properties of carbon-black stock at low temperatures. Part 1: Strength characteristics of carbon black-extended uncured rubber. Koll. zhur. 27 no.4:524-528 Jl-Ag '65. (MIRA 18:12)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V. Lomonosova i Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti. Submitted March 24, 1964.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

DOGADKIN, B.A.; DONTSOV, A.A.

Structure-forming and degradation processes in the interaction of polyethylene with sulfur. Vysokom. soed. 7 no.11:1841-1847 N '65. (MIRA 19:1)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii. Submitted November 16, 1964.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

GUL', V.Ye.; SNEZHKO, A.G.; DOGADKIN, B.A.

Preparation of films and coatings by mixing aqueous dispersions of thermodynamically incompatible thermoplasts. Koll. zhur. 27 no.4:627-628 Jl-Ag '65. (MIRA 18:12)

1. Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti i Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V. Lomonosova. Submitted January 12, 1965.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 20377-66 EWT(m)/EWP(j)/T RM

ACC NR: AP6006543 (A) SOURCE CODE: UR/0191/65/000/011/0028/0031

AUTHORS: Dontsov, A. A.; Farka, P.; Yermilova, G. A.; Dogadkin, B. A. 35

ORG: none

B

TITLE: Investigation of reaction products from the reaction of atactic polypropylene with sulfur and dibenzothiazyldisulfide as potential polymer stabilizers 15

SOURCE: Plasticheskiye massy, no. 11, 1965, 28-31

15

TOPIC TAGS: polypropylene, polymer, oxidation inhibition, sulfur, chemical stability

ABSTRACT: It was the object of this investigation to synthesize high-molecular-weight stabilizers by the interaction of atactic polypropylene (APP) with sulfur or dibenzothiazydisulfide (DBTD) and to study their inhibiting ability in the thermooxidative destruction of polymers. The kinetics of the addition of sulfur and (DBTD) to (APP) were studied (see Fig. 1), and the inhibiting action of the synthesized compounds on the thermooxidative destruction of (APP) was determined. The induction periods for oxidation were determined after Yu. A. Shlyapnikov, V. B. Miller, M. B. Neyman, Ye. S. Torsuyeva, and B. A. Gromov (Vysokomolek. soyed.

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L 20377-66

ACC NR: AP6006543

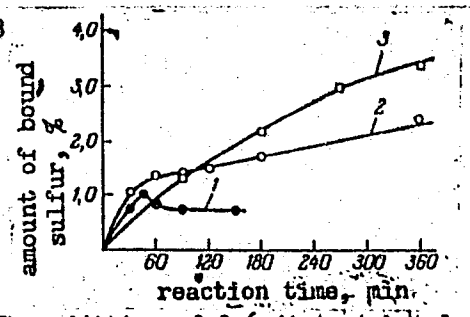

Fig. 1. Kinetics of the addition of DBTD to APP at 200C (1) and sulfur to APP at 230C in mixtures containing 6 wt parts of sulfur (2) and 10 wt parts of sulfur (3).

2, 1409, 1960). The addition of 2,6-di-tert-butyl-4-methylphenol (ionol) to the product of the interaction of (APP) with sulfur was also determined, and the experimental results are presented graphically. It was found that the inhibiting activity of the interaction products of (APP) with sulfur and (DBTD) depends on the extent of reaction, the initial products being more active than the final products. The inhibitors are equal in their inhibiting activity to the inhibitor phosphite P-24. Addition of ionol to the mixture of interaction products of (APP) with sulfur yields an inhibitor of enhanced antioxidant properties (correlated action). Orig. art. has: 1 table and 8 graphs.

SUB CODE: 07,11/ SUBM DATE: none/ ORIG REF: 005/ OTH REF: 002

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APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 27338-66 EWT(m)/EWP(j)/T/ETC(m)-6 IJP(c) RM/WW

ACC NR: AP6008960 SOURCE CODE: UR/0190/65/007/011/1841/1847

AUTHORS: Dogadkin, B. A.; Dontsov, A. A.

ORG: Moscow Institute of Fine Chemical Technology (Moskovskiy institut tonkoy khimicheskoy tekhnologii)

TITLE: Vulcanization and degradation processes occurring during reaction of polyethylene with sulfur

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 11, 1965, 1841-1847

TOPIC TAGS: vulcanization, polyethylene plastic, reaction mechanism

ABSTRACT: The relationship between vulcanization and degradation processes at various stages of reaction of polyethylene (I) with sulfur (II) has been investigated by measuring the degree of swelling of the reaction products in boiling toluene. The reaction and measurements were conducted by the methods described earlier by B. A. Dogadkin and A. A. Dontsov (Vysokomolek. soyed., 3, 1746, 1961; Kolloidn. zh., 23, 346, 1961). It was established that both processes, occurring without additives as well as in the presence of dicumene peroxide at 190--230C (as illustrated in Fig. 1), result from the reaction of I with II. Vulcanization takes

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 27338-66

ACC NR: AP6008960

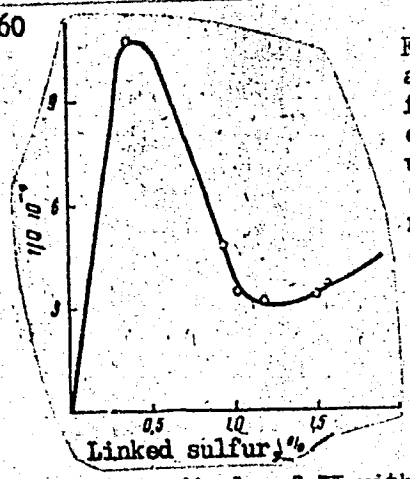

Fig. 1. Degree of vulcanization as a function of the amount of sulfur fixed during the reaction of polyethylene with sulfur (5 parts by weight) and dicumene peroxide (3 parts by weight) at 230C. 1/Q - reciprocal of the swelling maximum.

place by interaction of biradicals of II with unchanged molecules of I, while degradation occurs during reaction of II with adjacent methine groups. A mechanism for the latter process is offered. The role of II in vulcanization reversion phenomena occurring in unsaturated elastomers is discussed in general terms. Orig. art. has: 5 figures and 12 equations.

SUB CODE: 07/ SUBM DATE: 16Nov64/ ORIG REF: 006/ OTH REF: 001

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APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

GUL', V.Ye.; SNEZHKO, A.G.; SOLOV'YEV, Ye.V.; DOGADKIN, B.A.

Aqueous dispersions of polypropylene with polyvinyl alcohol as emulsifier. Koll.zhur. 27 no.3:346-348 My-Je '65. (MIRA 18:12)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova i Moskovskiy tekhnologicheskiy institut myasnoy i molochnoy promyshlennosti. Submitted Dec. 28, 1963.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

SLYUSARSKIY, L.K.; PAVLOV, N.N.; DOGADKIN, B.A.

Certain characteristics of sulfur vulcanization in the presence of dicumyl peroxide. Koll.zhur. 27 no.3:441-445 My-Je '65. (MIRA 18:12)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova i Politekhnicheskiy institut, Lodz', Pol'skaya Narodnaya Respublika. Submitted Sept. 29, 1964.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

USTINOVA, Z.M.; FODIMAN, N.M.; GELLER, T.I.; SANDOMIRSKIY, D.M.; DOGADKIN, B.A.

Some particular features of the vulcanization of rubbers as latexes. Part 2: Part played by zinc oxide and by protective substances. Koll. zhur. 27 no.5:773-779 S-O '65. (MIRA 18:10)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova.

APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

TUTORSKIY, I.A.; NOVIKOV, S.V.; DOGADKIN, B.A.

Certain characteristics of the mechanism of chemical reactions of diene polymers. Zhur. fiz. khim. 39 no.9: 2157-2162 S '65. (MIRA 18:10)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni M.V. Lomonosova.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 23532-66 EWP(j)/EWT(m) IJP(c) RM

ACC NR: AF6007855 (A) SOURCE CODE: UR/0138/66/000/002/0015/0018

AUTHOR: Sidnev, V. A.; Anupyl'd, O. L.; Dogadkin, B. A.; Shershnev, V. A. 39

ORG: Institute of Fine Chemical Technology im. M. V. Lomonosov, Moscow (Moskovskiy institut tonkoy khimicheskoy tekhnologii) B

TITLE: Crosslinking of caoutchouc by polyhalide compounds of the aliphatic series

SOURCE: Kauchuk i rezina, no. 2, 1966, 15-18

TOPIC TAGS: rubber, heat resistance, vulcanization, organic synthetic process

ABSTRACT: The use of hexachloroethane and 1,1,1,5-tetrachloropentane as vulcanizing agents made it possible to produce heat-resistant vulcanized rubber having high physico-mechanical properties. The molecular compound of hexachloroethane with tetrachloropentane (15:85), called vulkaton (SSSR Patent no. 165300 of 23 Sept 1963), and combination of tetrachloropentane with DFG (5 and 2 parts by weight respectively) were the most efficient vulcanizing substances. Both chemical and salt crosslinkages were formed during vulcanizing caoutchouc SKS-30-1 with tetrachloropentane. Vulcanization was practically absent at temperatures ≤153C. An addition into the mixture of a small amount of DFG or an increase of temperature to 163C accelerated the vulcanization considerably. Similar results were obtained for caoutchouc of other types. Cross-

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ACC NR: AP6007855

linking in caoutchuk SKS-30-1 was not affected by 1,1.5 trichloropentane-1, (product of the dehydrochlorization of tetrachloropentane). A. N. Nesmeyanov et al. (Usp. khim., 25, vyp. 6, 665, 1956) showed that tetrachloroalkane had a tendency toward dehydrochlorization while forming trichloroalkanes. Therefore, the vulcanizing of chloroalkanes was related to the presence in them of trichloromethyl groups. The fact that N and Cl did not link with caoutchouc during vulcanizing by tetrachloropentane with VFG and that the trichloroalkanes did not vulcanize suggested that vulcanization was related to the liberation of HCl from the tetrachloropentane. Orig. art. has: 3 fig.

SUB CODE: 07,11/ SUBM DATE: 28Oct64/ ORIG REF: 007/ OTH REF: 003

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 41265-66 EWT(m)/EWP(j) IJP(c) JWD/RM

ACC NR: AP6022445 (A) SOURCE CODE: UR/0069/66/028/002/0214/0217

AUTHOR: Dogadkin, B. A.; Skorodumova, Z. V.; Fel'dshteyn, M. S. 30 B

ORG: Scientific-Research Institute of the Tire Industry, Moscow (Nauchno-issledovatel'skiy institut shinnoy promyshlennosti)

TITLE: The influence of carbon black on the interaction of rubber with sulphur and accelerators

SOURCE: Kolloidnyy zhurnal, v. 28, no. 2, 1966, 214-217

TOPIC TAGS: butadiene styrene rubber, dehydrogenation, vulcanization, carbon black

ABSTRACT: Two series of experiments were carried out to define the influence of alkaline carbon blacks in accelerating the attachment of sulphur and improving its maximal combined content, improving the modulus, and lowering peak value of swelling. The first concerned effects of channel black and Philback 0 on dehydrogenation in the butadiene styrene rubber system SKS-30A (100 parts by weight) plus 7 parts di-2benzthiazyldisulfide plus 50 parts carbon black. The second series utilized the same system with an addition of 3 parts sulphur. Dehydrogenation and interaction of rubber and sulphur are both activated by the presence of Philback 0. Channel black promotes attachment of accelerator radicals to molecular chains

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

ACC NR: AP6022445

of the rubber, but suppresses the other named reactions. Experimental results served to clarify modifications of vulcanization kinetics induced by the presence of various types of carbon black. Orig. art. has: 6 figures.

SUB CODE: 07,11/ SUBM DATE: 03May65/ ORIG REF: 007

Card 2/2

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 41029-66 EWT(m)/EWP(j)/T IJP(c) WW/DS/RM SOURCE CODE: UR/0069/66/028/002/0229/0233

ACC NR: AP6022446 (A) 44 42 B

AUTHOR: Igumnova, A. V.; Dogadkin, B. A.; Kulezney, V. N.

ORG: Institute of Fine Chemical Technology im. M. V. Lomonosov, Moscow (Institut tonkoy khimicheskoy tekhnologii)

TITLE: The influence of branched structures on the physical-mechanical properties of vulcanized natural rubber

SOURCE: Kolloidnyy zhurnal, v. 28, no. 2, 1966, 229-233

TOPIC TAGS: natural rubber, gel, solid mechanical property, solid physical property

ABSTRACT: Samples of pale crepe rubber were extracted with hot acetone in darkness for 6 to 18 hr, then dried and plasticized in an environment devoid of free radical acceptors, to induce the formation of an insoluble gel (20 to 30% after 10 min). Also, samples of rubber vulcanized according to two different methods for 5 or 30 min at 143C were deformed on a rupture tester at 500 mm/min. Results indicate that the gel breaks down as plasticizing is [illegible]d and a microgel forms. The latter is capable of spontaneous dissolution. Since the [illegible]ight of the microgel-containing rubber is greater and its intrinsic viscosity [illegible]rce material, the authors conclude that the microgel represents

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L 41029-66

ACC NR: AP6022446

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dense spherical particles of a strongly branched macromolecular spatial lattice. The presence of the microgel minimizes crystallization, so that the strength of the vulcanized rubber is reduced sharply as a result of poor compatibility with linear macromolecules, the deterioration of the peptizing environment and the increase in quantity of free macromolecular ends. In conclusion, the authors express their gratitude to workers of the department of colloidal chemistry N. M. Fodiman and A. N. Kamenskiy for performing the electron-microscopic investigations of the microgel. Orig. art. has: 1 table and 7 figures.

SUB CODE: 07/ SUBM DATE: 03May65/ ORIG REF: 002/ OTH REF: 010

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APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 42987-66 EWT(m)/EWP(j) IJP(c) RM/JWD

ACC NR: AP6013274 (A) SOURCE CODE: UR/0413/66/000/008/0078/0078

INVENTOR: Dogadkin, B. A.; Tutorskiy, I. A.; Shvarts, A. G.; Potapov, Ye. E.; Frolikova, V. G.

ORG: none

30B

TITLE: Method of modifying rubber. Class 39, No. 180790

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 8, 1966, 78

TOPIC TAGS: natural rubber, synthetic rubber, aminophenol, hydroxy compound, aromatic hydroxy compound, rubber modification

ABSTRACT: An Author Certificate has been issued for a method of modifying natural and synthetic rubbers by introducing hexamethylenetetramine and aromatic hydroxy compounds into the mixture. To improve the physical and mechanical properties of the rubber, aminophenols are used as an aromatic hydroxy compound. [Translation] [NT]

SUB CODE: 11,07/ SUBM DATE: 09Jan65/

Card 1/1 hs UDC: 678.4.7.046-9:547.564.4

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 20457-66 EWT(m)/EWP(j)/T LJP(c) RM

ACC NR: AP6017856 (A) SOURCE CODE: UR/0069/66/028/003/0353/0361

AUTHOR: Dogadkin, B. A.; Tarasova, Z. N.; Lykin, A. S.; Kuanyshev, K. G.

ORG: Scientific Research Institute of the Tire Industry (Nauchno-issledovatel'skiy institut shinnoy promyshlennosti); Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov (Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M. V. Lomonosova)

TITLE: Effect of vulcanization crosslinks and network parameters on the strength of vulcanizates

SOURCE: Kolloidnyy zhurnal, v. 28, no. 3, 1966, 353-361

TOPIC TAGS: vulcanizate, crosslink, network parameter, tensile strength

ABSTRACT: A study has been made of the effect of the cross-link type and network parameters on the tensile strength of unfilled vulcanizates of natural, cis-polyisoprene (SKI), cis-polybutadiene (SKD), butadiene-styrene (BSK), and carboxyl-containing (SKS-30-1) rubbers. Various vulcanizing agents were used to obtain vulcanizates with different cross links, and different network parameters, viz., total number of chains ($1/M_c$) and number of active chains ($1/M'_c$) per cm^3 of the vulcanizate; and value of instantaneous molecular weight M_{n_τ} (molecular

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APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1"

"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 28457-66

ACC NR: AP6017856

weight at a given stage of degradation or cross linking). It was shown that: 1) at up to 120C, for a deformation rate of 500 mm/sec, for a given $1/M_c$ and a constant M_{n_T}, tensile strength (P) increases in the following order: Ap 355 (this order can be reversed at higher temperatures and lower deformation rates); 2) with an increase in $1/M_c$ the maximum tensile strength increases in the same order as in 1); 3) tensile strength is a linear function of the content (w_α) is the portion of the network determined from formula $W_\alpha = 1 - M_c/M_{n_0}$, where M_{n_0} is the initial molecular weight; 4) vulcanizates containing an optimum ratio of strong to weak, mobile, and readily rearranging cross-links exhibit high tensile strength; the mobile links dissipate local overstresses and facilitate orientation of the backbones, while the strong crosslinks prevent disintegration of the vulcanizates. Orig. art. has: 9 fig. and 1 table. [BO]

SUB CODE: 07, 11/ SUBM DATE: 29Dec65/ ORIG REF: 010/ OTH REF: 006
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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 02368-67 EWT(m)/EWP(w)/EWP(j)/T IJP(c) WW/RM

ACC NR: AP6032179 SOURCE CODE: UR/0069/66/028/005/0772/0773

AUTHOR: Dogadkin, B. A.;;Panich, R. M.; Fodiman, N. M.

ORG: none

50
B

TITLE: Sixtieth anniversary of S. S. Voyntskiy

SOURCE: Kolloidnyy zhurnal, v. 28, no. 5, 1966, 772-773

TOPIC TAGS: latex, polymer compatibility, plasticization, leather substitute, polymer adhesion, polymer cohesion, chemical personnel, colloid chemistry, macromolecular chemistry

ABSTRACT: Professor, Doctor of Chemical Sciences, S. S. Voyntskiy is a prominent expert in the fields of colloidal chemistry and of the physics and chemistry of high-molecular weight compounds. His studies include the following topics: physics and chemistry of latexes; compatibility and plasticization of polymers; leather substitutes, special cardboards, and paper; and nonwoven filtering materials. His studies on the cohesion and adhesion of polymers resulted in the development of the diffusion theory of adhesion. Voyntskiy is associated with the following institutions: Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov; Institute of Light Industry; and the Scientific Research Institute of Leather Substitutes. [BO]

SUB CODE: 07, 11/ SUBM DATE: none

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 02140-67 EWT(m)/EWP(j)/T IJP(c) WW/RM

ACC NR: AP6035961 SOURCE CODE: UR/0074/66/035/001/0191/0199

AUTHOR: Tutorskiy, I. A., Novikov, S. V. and Dogadkin, B. A., Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov (Moskovskiy institut tonkoy khimicheskoy tekhnologii)

TITLE: Kinetic characteristics of chemical reactions of high molecular compounds

SOURCE: Uspekhi khimii, v. 35, no. 1, 1966, 191-199

TOPIC TAGS: chemical kinetics, macromolecular chemistry

ABSTRACT: The study of the kinetic characteristics of homogeneous macromolecular reactions is attracting the steady attention of researchers. The interest in this area is brought about by the search for ways to control chemical transformations of polymers and to conduct controlled reactions to obtain chemical derivatives with desired properties. Comparing the kinetic parameters of functional groups included in the polymer chain with the analogous parameters of those same groups in low molecular compounds, one can assume a number of factors which reduce the pre-exponential numbers of the Arrhenius equation in the case of large molecules. First, it follows from the kinetic theory that with an increase in the size (mass) of the molecule the Brownian motion rate of the molecule is lowered. Second, the high viscosity of polymeric solutions reduces the number of collisions of reacting groups.

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ACC NR: AP6035961

Third, the steric factor is high because of shielding of functional groups as a result of folding of the polymeric chains. With the regular succession of the functional groups in the polymer chain, the interaction of neighboring groups can reflect the activation energy. This review is devoted to explaining the effect of the factor of including functional groups in the polymeric chain and of the interaction of alternated functional groups on the kinetic parameters of macromolecular reactions. Orig. art. has: 4 tables. /JPRS: 37,177/

SUB CODE: /SUBM DATE: none / ORIG REF: 007 / OTH REF: 041

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

ACC NR: AP7000912 (A) SOURCE CODE: UR/0138/66/000/012/0015/0018

AUTHOR: Kim, I. P.; Yegorov, Ye. V.; Gol'danskiy, V. I. Dogadkin, B. A.; Tarasova, Z. N.

ORG: Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov (Moskovskiy institut tonkoy khimicheskoy tekhnologii); Institute of Chemical Physics AN SSSR (Institut khimicheskoy fiziki AN SSSR); Scientific Research Institute of the Tire Industry (Nauchno-issledovatel'skiy institut shinnoy promyshlennosti)

TITLE: Radiation—induced vulcanization with 20—30 Mev electrons

SOURCE: Kauchuk i rezina, no. 12, 1966, 15-18

TOPIC TAGS: radiation induced vulcanization, fast electron, high energy electron, irradiation vulcanizate, induced radioactivity

ABSTRACT: The radioactivity of rubbers, rubber mixtures, and their ingredients irradiated with 20—30 Mev electrons has been investigated. The study was undertaken because 5—10 Mev electrons, currently used in radiation-induced vulcanization, penetrate only to a small depth (2—4 cm in a substance with a density of 1 g/cm^3) and, therefore, are unsuitable for the vulcanization of large-size products. Theoretical analysis of the problem and experiments showed that: 1) the reactions proceed under the effect of electromagnetic radiation generated as a result of deceleration of fast electrons in the substance; 2) irradiation of rubbers, rubber

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ACC NR: AP7000912

mixtures, and their ingredients with fast, 20—30 Mev electrons forms the radioactive isotopes C^{11}, O^{15} and Zn^{63} as a result of γ, n-type photonuclear reactions; 3) owing to the short halflife (minutes or tens of minutes) of these isotopes, the radioactivity which is induced in the irradiated specimens decays in a matter of hours; 4) rubbers, rubber mixtures, and their ingredients are not activated with secondary neutrons; 5) the use of fast, 20—30 Mev electrons for the vulcanization of large-size rubber products presents no danger for personnel, provided that the irradiated products are held in isolation for one day. Orig. art. has: 2 figures and 2 tables.

SUB CODE: 11,20,18/ SUBM DATE: 12Jul65/ ORIG REF: 005/ OTH REF: 002/ ATD PRESS: 5108

Card 2/2

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 10336-67 EWP(j)/EWT(m) IJP(c) RM

ACC NR: AP6022909 (A) SOURCE CODE: UR/0413/66/000/015/0086/0086

AUTHORS: Dontsov, A. A.; Farka, P. I.; Logunova, R. A.; Yermilova, G. A.; Dogadkin, B. A. 29

ORG: none

TITLE: A method for protecting polyolefins against zonal aging by heat and light. Class 39, No. 184428 [announced by Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov (Moskovskiy institut tonkoy khimicheskoy tekhnologii)]

SOURCE: Izobret prom obraz tov zn, no. 15, 1966, 86

TOPIC TAGS: carbon black, polyolefin, light aging, polypropylene plastic

ABSTRACT: This Author Certificate presents a method for protecting polyolefins against zonal aging by heat and light as described in Author Certificate No. 172033. To increase the stabilizing activity in the case of aging by heat and light, sulfidized polypropylene is applied together with carbon black.

SUB CODE: 11/ SUBM DATE: 16Jul65

Card 1/1 mle

UDC: 678.74.048.4:678.7...

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

L 10338-67 EWT(j)/EWT(m) IJP(c) RM/WW

ACC NR: AP6029912 (A) SOURCE CODE: UR/0413/66/000/015/0087/0087

AUTHORS: Dontsov, A. A.; Farka, P. (Czech. Soc. Rep.); Kagan, G. M.; Yermilova, G. A.; Dogadkin, B. A.

ORG: none

53

TITLE: A method of protecting polyolefins against destruction by heat and acids. Class 39, No. 18.433 [announced by Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov (Moskovskiy institut tonkoy khimicheskoy tekhnologii)]

SOURCE: Izobret prom obraz tov zn, no. 15, 1966, 87

TOPIC TAGS: polyolefin, heat resistance, antioxidant additive

ABSTRACT: This Author Certificate presents a method for protecting polyolefins against destruction by heat and acids by introducing into them a polymer sulfur-containing antioxidant. To increase the effectiveness of the stabilization, a sulfidized polystyrene is employed as the sulfur-containing antioxidant.

SUB CODE: 07/ SUBM DATE: 16Jul65

Card 1/1 mle UDC: 678.74.048.4:678.746.22'6

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

ACC NR: AP7001406 SOURCE CODE: UR/0413/66/000/021/0108/0109

INVENTOR: Dontsov, A. A.; Mikhlin, V. E.; Dogadkin, B. A.

ORG: none

TITLE: A method for vulcanizing synthetic rubbers. Class 39, No. 187995 [announced by Moscow Institute of Fine Chemical Technology im. M. V. Lomonosov (Moskovskiy institut tonkoy khimicheskoy technologii])

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 21, 1966, 108-109

TOPIC TAGS: synthetic rubber, ~~synthetic rubber~~ vulcanization, carboxylate acid, ~~monovalent metal carboxylate~~

ABSTRACT: An Author Certificate has been issued for a method for vulcanizing synthetic rubbers with organic acid derivatives in the presence of radical-type activators. To improve the technological properties of rubber mixtures, salts of monovalent metals of unsaturated carboxylic acids are used as the organic acid derivatives. [BO]

SUB CODE: 11, 07/ SUBM DATE: 16Jul65/ ATD PRESS: 5109

Card 1/1 UDC: 678.7.028.294:547.39-38

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

YAKOVLEV, Yu. V.; DOGADKIN, N. N.

"Use of radioactivation to determine impurities in substances of a high degree of purity."

report presented at IAEA Symp on Radiochemical Methods of Analysis, Salzburg, Austria, 19-23 Oct 64.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

AL'TZITSER, V.S.; SHERSHNEV, V.A.; TUTORSKIY, I.A.; DOGADKIN, V.A.

Chemical modification of vulcanizates. Part 2: Reaction of crushed vulcanizates with p-tert-butylphenyl formaldehyde resin. Vyskom. soed. 5 no.7:1059-1061 Jl '63. (MIRA 16:9)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova i Vsesoyuznyy nauchno-issledovatel'skiy institut plenochnykh materialov i iskusstvennoy kozhi.
(Vulcanization) (Resins,Synthetic)

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CR

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Aqueous dispersions of rubber. B. A. Dogadkin and D. M. Pevzner. Russ. 29,973, June 30, 1931. In the prepn. of aq. rubber dispersions by introducing into an aq. medium masticated mixts. prepd. from rubber, or recovered rubber and various admixts. of the type of fillers, emulsifiers, etc., there are added to the rubber compn. prepared in the usual manner, including the insol. emulsifiers, aq. solns. of a compd. that converts these emulsifiers into sol. substances.

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1ST AND 2ND ORDERS 3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

CA

30

The action of anti-aging agents. II. Dogadkin, J. *Rubber Ind.* (U. S. S. R) 8, No. 6, 11-21(1931); *Chem. Zentr.* 1932, I, 1959.—Attempts were made to develop methods by which some insight could be gained into the mechanism of the stabilization of rubber by means of anti-aging agents. Illumination with the quartz lamp changed the properties of raw rubber by photochem. action. The curves showing the decrease in viscosity of a crepe soln. in toluene for various periods of illumination were plotted. The viscosity of a 1% soln. diminished to a limiting value in 1 hr. Bubbling air through the solns. had no influence on the viscosity curves, which indicates that any oxidation of the rubber is accomplished by the small quantity of O dissolved in the toluene soln. Of the stabilizers used, phenol, stearic acid and cumene were without influence; benzaldehyde accelerated the decompn. of rubber. Further expts. included a phenolic substance with a long side chain and a yellow azo dye (nothing more definite given). In contrast to "aldamin," the stabilizing action of the azo dye was independent of the concn. of the rubber. The action of "aldamin" appears to depend upon both chem. and optical properties. A theory of the mechanism of stabilization, based on the expts., is offered. M. G. Moore

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CA

3

The effect of electrolytes on linseed oil in the production of factice according to the method of Auer. B. Dogadkin and I. Margolina. *J. Rubber Ind.* (U. S. S. R.) 6, No. 10, 152-8(1931); *Chem. Zentr.* 1932, I, 1950(10).—A disadvantage of Auer's method for the production of factice (cf. C. A. 23, 2080) is the use of a high temp. (above 280°) for the soln. of the inorg. salt in the oil. Al oleate dissolves in linseed oil at 140-50°. Previous treatment of linseed oil with Al oleate according to Auer yields a 2-phase product of colloidal nature, whose properties (viscosity, soly., etc.) depend upon its treatment. The oil previously treated with Al oleate combines with much less S in the factice process than the original oil. M. G. Moore

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Bc

a-1

State of [illegible]. II. Influence of [illegible] of solutions of [illegible] and M. [illegible] 742—746).—The [illegible] and xylene solutions of [illegible] (I) [illegible] interval 3—60° for [illegible] higher concn. [illegible] varies inversely with [illegible]. The conclusions are reached that (I) is in mol. [illegible] up to [illegible]%, and in [illegible] dispersion at higher concn. (up to 10%). In still higher concn. the [illegible] phase of the emulsions is (I). R. T.

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

30

The transformation of rubber during "rest." B. Dogadkin and K. Berezan. *J. Rubber Ind* (U. S. S. R.) 6, 198-205(1933).—The extent of recovery of "nerve" in smoked sheet during rest was studied. Smoked sheet milled from 5 to 23 min. was allowed to rest. Samples were taken from each large sample after 0.5 to 16 hrs. and placed at once in C_6H_6 in dark bottles, which were shaken from time to time, soln. taking 4-5 days. The capillary test of Greinert and Behre (cf. *C. A.* 20, 2095) was used with 0.5% C_6H_6 solns. The nerve, expressed as sq. mm. area of filter paper wet by the soln., was 7500 for unrolled sheet, 5000 for sheet rolled 15 min. and 4450 for sheet rolled 23 min. The recovery of nerve during rest was found to be very slight, and occurred during the first 2-3 hrs. Similar results were obtained by viscosity tests with 0.8% solns. in C_6H_6 at 25° in an Ostwald viscometer, with a pressure-gage connection. This test was based on the decrease in viscosity at increased pressures shown by colloid solns. which contain non-spherical dispersed particles. Calcns. were made by the formula of de Woele-Ostwald: $dl/dt = RP^n/\eta$ (P = pressure; η = viscosity at pressure P; t = time; l = distance) for structural colloids. The plotted results showed a flattening of the curves for samples taken from sheets that were milled longer, indicating a loss of nerve and a tendency to recover the original shape for samples taken from sheets after rest. Surface-tension detns. were made by a stalagmometer, but the results were unsatisfactory.

James Sorrel

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

BC

B-II-9

Ageing of rubber. II. Gold reaction of the products of the initial stages of oxidation of rubber. [illegible] and [illegible] BALANDIN (J. Gen. Chem. [illegible] cf. B., 1934, 72).—An [illegible] rubber reduces $AuCl_3$ to an [illegible] the formation of paler ultra-violet [illegible] for 30 min. The conductivity [illegible] effect (II). The [illegible] and aldehyde is postulated. R. T.

COMMON ELEMENTS

OPEN

MATERIALS INDEX

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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The action of surface-active substances and electrolytes on the crystallization of sulfur from rubber products. B. Dogadkin and Yu. Margolina. *J. Rubber Ind.* (U.S.S.R.) 11: 416-24(1934).—Large crystals of S in raw rubber mixts. often spoil vulcanized rubber goods, especially thin-walled goods, rubberized materials and rubber gums. Various polar compds. (surface-active substances) were tested for their effects in this connection. These substances form centers of crystn., thus hastening the first stage in the formation of a ppt., and they also slow down the growth of the crystals (the second stage of formation of ppt.), being themselves adsorbed on the surface of small crystals. Therefore in the presence of these substances the ppt. of S would consist of a large no. of evenly dispersed small crystals. A rubber-S (100:8) mixt. was dissolved at room temp. in benzene (mixt. of hydrocarbons) "Galosha" in the ratio 1:6. The polar compds. included tech. cod-liver oil, pine tar, stearic and oleic acids, Zn oleate, Ca oleate, etc. From 0.5 to 5.0% of each of these (based on the rubber) was added either to the rubber or to the benzene. The resulting cements were placed on glass and photomicrographs of the films were taken. As electrolytes, $CaCl_2$, NaCl, KBr, LiCl, $Pb(OAc)_2$ and $NaHCO_3$ were tested. These electrolytes form colloids with benzene, thus serving as countless centers for the crystn. of S. The av. sizes of crystals in μ were: in the mixt. without addn. agents 44.4; with 1% (on the rubber) of cod-liver oil 5.0; with 1.5% of Ca oleate 7.4; with traces of NaCl 8.2. The action of the agents depends on their concn. the best results with cod-liver oil were obtained at 1%, and with 3% the crystals of S were larger than those of the mixt. without the agents. The dispersing action of agents in cements diminishes with the aging: after 6 days of storing of prepd. gum with cod-liver oil (in soln.) it forms crystals of S larger than 44.4 μ. Therefore fresh cements should be used or a soln. of agents should be introduced into the mixt. just before using the cements. The high temp. (70°) kills the dispersion and large crystals of S are formed (larger than 44.4 μ). The use of machine oil and petrolatum (non-polar compds.) did not decrease the size of the S crystals.

A. Pestoff

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

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CR

Synthetic rubber. B. A. Dogadkin. - Russ. 42,601, April 30, 1935. A paste contg. alkali and alkaline earth metals as catalyst is spread on fabric, paper or other linings, which are then suspended in the reaction mixture.

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

.50

Electrodeposition of nonporous rubber films on iron. H. M. Sandomirskaya and B. A. Dogadkin. Russ. 43,733, July 31, 1935. Thiocyanates and thio salts are introduced into the rubber dispersion to eliminate the passivity of the iron and the formation of sol. Fe compds.

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

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Also in Colloid J. (USSR) 1, 447-64, 1935.

Water dispersion of rubber. Preparation of the dispersion and its general properties. B. Dogadkin. *J. Rubber Ind.* (U. S. S. R.) 12, 20-23(1935).—The dispersion was made by the method of plasticization. A mixt. of smoked sheet 37, reclaimed rubber 37, Rubbertax 6, rosin 10, ZnO 3, oleic acid 2 and wheat flour 5 was milled until very plastic (0.6 by Williams), and hydrophilic fillers, such as kaolin, were added to aid the dispersion, and to decrease the amt. of emulsifier. The mixt. was transferred to a Werner-Pfleiderer mixer, 2% aq. KOH (or NaOH + NH_4OH) was added gradually, with const. stirring at 40-60°. At first a hydrophobic dispersion was formed, then with the addn. of water the emulsifier (rosin and oleic acid) was sapond. and dissolved. As the water is increased, there is a sudden reversal of phases, and the rubber becomes the dispersed phase. Plasticity detns. during this process showed a max. plasticity at the moment of phase reversal. This max. depended upon the concn. of the NaOH and the proportion of water required decreased with increasing concn. of NaOH. With an increase in the plasticity of the rubber, the time required to disperse the mixt. to the reversal of phases became shorter, and the proportion of NaOH was less. The av. size of dispersed particles, with plasticity 0.470 (Williams) ($\Sigma dn/\Sigma n$) was 2.10 μ, and those with plasticity 0.740 was 1.37 μ. The greater the plasticity of the rubber, the greater is the stability of the dispersions. The stability was detd. by the method of "threshold of diln.," which means the min. concn. of dispersion when the system divides into layers after 3 days. A. Pystoff

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1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

Ca

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Synthetic latex and rubber. B. A. Dogadkin, K. B. Berezan and M. G. Lapuk. Russ. 40,254, March 31, 1936. Butadiene, its homologs or its analogs are polymerized as aq. emulsions in the presence of tautomeric substances such as diazoamino compds. and O-free azo dyes.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

DOGADKIN, B. A.

Reclaiming rubber. I. A. Tartakovskiy, F. F. Koshelev and B. A. Dogadkin. Russ. 46,356, March 31, 1936. Devulcanized or non-devulcanized natural or synthetic rubber is ground and dispersed in an aq. medium, any fabric present is removed by centrifuging and the rubber part of the dispersion is dried.

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

PROCESSES AND PROPERTIES INDEX

Ch

13

Emulsifying agent. B. A. Dogadkin and M. S. Lavrenenko. Russ. 47,706, July 31, 1938. The sediment sepd. in the purification of extd. cod-liver oil is treated with alkalies or enzymes to form an emulsifying agent.

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Ca

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Microporous ebonite or rubber. B. A. Dogadkin, V. P. Urban and D. M. Sandomirskii. Russ. 47,811, July 31, 1936. An aq. rubber mixt. placed in molds is covered with paper or fabric moistened with water or a soln. of a coagulating agent before treatment with a liquid coagulating agent. The gel is washed with water after coagulation, and vulcanized under conditions preventing the sepn. of moisture from the gel.

COMMON ELEMENTS

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

DOGADKIN, B. [A.]

The polymerization of butadiene in emulsions. I. Description of the process. V. Balandina, K. Berezan, A. Dobromyslova, B. Dogadkin and M. Lapuk. Bull. acad. sci. U. R. S. S., Classe sci. math. nat., Ser. chim. 1936, 397-407.- Polymerization of butadiene to synthetic latex takes place when tech. butadiene (65-85.7% butadiene and 14-24 % β-butylene) in an emulsion of water, NH_4OH and oleic acid (or other suitable salt of oleic or stearic acid) is heated in the presence of a polymerization catalyst (peroxides, diazoaminobenzene, etc.) in a rotating sealed glass tube at 40-70° for several days. The course of the polymerization was followed by noting the decrease in the total vol. of the system and the increase in viscosity, both phenomena being directly related to the degree of polymerization. The synthetic butadiene latex, which superficially resembled closely the natural product, was characterized by great stability because of the minute size and high degree of dispersion of the polymer particles. When stabilized by a mixt. of NH_4 oleate and albumin it was not completely coagulated by excess AcOH at pH 4. The viscosity of this butadiene latex was considerably lower than that of natural latex of the same concn. The plasticity of synthetic rubber obtained from it was increased by mech. treatment, a phenomenon which depends on its globular structure and the morphology of the latex globule. II. Effect of colloidal and chemical factors. K. Berezan, A. Dobromyslova and B. Dogadkin. Ibid. 409-22.- The effects of various factors on the polymerization of butadiene were studied. The effects of different types of stabilizers (emulsifiers and protective colloids), including fatty acids, fats and sulfonated oils, resin acids, proteins, carbohydrates, glucosides, alginic acid and aromatic sulfonic acids, depended on the nature of the stabilizer. Proteins (casein, albumin) retarded the polymerization process; the action of other emulsifiers which did not exert a specific influence on the mechanism of the polymerization was detd. primarily by their surface activity. Both the yield of polymer and the rate of polymerization were markedly increased by raising the pH of the medium. Polymerization, which was accelerated by dispersion of the butadiene in aq. emulsions, was catalyzed by H_2O_2, benzoyl

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peroxide, turpentine, oxidized natural rubber, hexachloroethane and diazoaminobenzene. The catalytic action of the peroxides is explained by liberation of O, which unites the primary linkages of the polymer, in an analogous way to the action of S in vulcanization. The activity of oxidized turpentine and rubber increased with their degrees of oxidation. The metallic salts of oleic acid varied in their effect on polymerization. In polymerization in emulsions with H_2O_2 as catalyst, Al, Mg and Ca oleates did not inhibit the process in concns. exceeding the threshold of coagulation; Pb, Ni, Zn, Cr and Fe salts, in concns. close to the threshold value inhibited the process; Mn and Cu salts stopped it completely. Phosphates of alkali metals accelerated polymerization; phenols and primary and secondary amines inhibited it; tertiary amines promoted the formation of soft polymers. III. Polymerization in the presence of diazoaminobenzene as catalyst. V. Balandina, K. Berezan, A. Dobromyslova, B. Dogadkin and M. Lapuk. Ibid. 423-33 (in German 432-5).- The rate of polymerization of butadiene in emulsions and the yield of polymer depended on the proportion of diazoaminobenzene (I) used as catalyst. Its optimum concn. was 1.5-2%, based on the butadiene; above this the yield and quality of the polymer were much poorer. Expts. in an autoclave at temps. of 40°, 50° and 60° showed that the polymerization of butadiene is a chain or autocatalytic reaction. The changes in the physico-chem. and mech. properties (plasticity, strength, soly. and degree of swelling) of the polymer with the progress of polymerization are briefly reviewed. Differences in the properties of solt and hard rubber are due to differences in mol. structure. John Livak

DOGADKIN, B. (continued from Page 1.)

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"APPROVED FOR RELEASE: 06/13/2000 CIA-RDP86-00513R000410720006-1

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

30

Dispersion of rubber in water. II. Dispersions obtained by the method of solvent replacement. Tz. Gel'fer and H. Dugadkin. *J. Rubber Ind.* (U. S. S. R.) 1936, 547-54; cf. C. A. 29, 7095[5]. —A mixt. of pale crepe 400, oleic acid 40 and aldol 4, was milled for 30 min. at 50-55°, and a 30% C_6H_6 soln. was prepd. in a Werner-Pfleiderer mixer, with addn. of 2.5% aq. NaOH and 0.5% aq. NH_4OH. At first the viscosity increased and then diminished. The solvent was distd. at 70-80°. The milk-like dispersion after the removal of the solvent contained 10-12% of solids. After centrifuging for 1 hr. 20 min. the concentrate contained 25% solids (the mother liquor 3.8% solids). The size of the dispersed particles was 0.9-11.4 μ, the av. $\Sigma dn/\Sigma n$ = 3.61, 4.75 and 4.18 μ. The properties of the dispersion depended on the plasticity of the pale crepe: the higher the plasticity, the more stable the dispersion, the smaller the av. size of the particles and the lower the viscosity. A 30-22% dispersion was prepd. and rubber films were made of 0.06 mm. thickness. The films were vulcanized by a 1% soln. of S_2Cl_2 in CS_2. Their tensile strength was 250 kg. per sq. cm. The stability of the dispersion was detd. by the method of "threshold of coagulation," i. e., the concn. of electrolyte to flocculate the dispersed phase. For a 20% dispersion, the "threshold of coagulation" was for NaCl, 0.2400 *M*; AcOH 0.0000-254 *M*; $BaCl_2$, 0.0000373 *M*; and $FeCl_3$, 0.000188 *M*.

A. Pestoff

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PROCESSES AND PROPERTIES INDEX

CA

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Structure of rubber. B. A. Dogadkin. *Uspekhi Khim* 6, 499–519(1936).—Cryst. rubber, rubber as a high mol. wt. polymer and as a sol-gel, and the structure of natural and synthetic rubbers are discussed. F. H. Rathmann

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

B-II-9

Polymerization of [illegible] butadiene. IV. [illegible] polymerides. [illegible] (Kolloid. Shurn., 1937, 3, [illegible]; cf. B. 1937, 1378).—The properties of artificial rubber obtained by polymerisation of butadiene in presence of [illegible] as catalyst have been examined. The soft polymerisate exhibits unlimited swelling in C_6H_6, suggesting that it consists chiefly of linear mols., whilst the tough form undergoes only limited swelling, suggesting that the mols. are linked firmly together. The max. swelling of the soft form increases with the degree of polymerisation. For C_6H_6 solutions of soft polymerisates the variations of η with concn. and rate of flow are similar to those for natural rubber, and the solvation calc. by Fikentscher and Mark's equation falls with increasing concn. At concns. up to 1% the relative η does not change with temp. at 10—60°, but for a 5% solution it falls linearly with rising temp. On keeping in light and air η gradually falls, apparently due to the depolymerising action of O_2, whilst in N_2 the reverse change occurs and soft polymerisates gradually toughen. R. C.

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1ST AND 2ND ORDER(S) | PROCESSES AND PROPERTIES INDEX | 3RD AND 4TH ORDER(S)

The peculiarities of vulcanization of synthetic rubber. B. A. Dogadkin. *Caoutchouc and Rubber* (U. S. S. R.) 1938, No. 8, 25.—A crit. discussion of Karmin's article (preceding abstr.). A. Pestoff

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

BC

B-II-9

Colloidal and chemical investigation of different brands of [illegible] latex; natural latex, Jatek, [illegible], [illegible], and Revaltex. B. A. [illegible] and B. M. Kovarskaya (Caoutchouc & Rubber, U.S.S.R., [illegible]; Rubber Chem. & Tech., [illegible]).—A comparison is made of these five brands as to η, relative stability towards electrolytes and at different temp., and compatibility with compounding ingredients. The η of latex begins to rise sharply at >40% concn., structural η then coming into play; addition of NH_3 or NaOH decreases the η, but an increase occurs initially with Revertex T. With various electrolytes the coagulating power increases with the valency of the cation. D. F. T.

COMMON ELEMENTS

COMMON VARIABLES INDEX

OPEN

MATERIALS INDEX

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

AUTHOR INDEX

1ST AND 2ND LETTER

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Vulcanization of sodium butadiene rubber and the action of fillers. B. A. Dogadkin and M. S. Fel'dshtein. *Caoutchouc and Rubber* (U. S. S. R.) 1939, No. 12, 13-18. —A tabular and graphical comparison is made of the "vulcanization" characteristics of Na butadiene rubber contg. various proportions of C black, chalk, kaolin and active silicic acid, before and after being heated within the temp. interval of 70-200°. Large percentages of fillers caused limited swelling of the unvulcanized rubber. This reaction was general and was not limited to active fillers. It is thought that the limited swelling is due primarily to the structure of the system. The rubber comprises the discontinuous disperse phase and the filler forms the continuous phase producing a singular net-like structure with the rubber sealed inside the cells. Heating of the mixt. reduced the proportions of fillers necessary to produce limited swelling and also caused limited swelling of the rubber itself, but in the latter case longer periods of heating were necessary. Heating at 120-140° produced the following changes which are characteristic of vulcanization: limited swelling, decreased soly. and greater toughness. The synthetic-rubber mixts. were vulcanized without S by heating at 100-200°. Under identical conditions smoked sheet mixts. could not be vulcanized. It is believed that the "vulcanization" proceeds as a result of the (1) interaction between the rubber and the oxygen adsorbed on the rubber and the fillers, and (2) thermal condensation of the rubber hydrocarbon. B. Z. Kamich

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3

Polymerization of butadiene in emulsions. VI. The properties of fractions and transformations of the soluble fraction of rubber. B. A. Dogadkin, D. M. Sandomirskii and P. Sharkevich. *Colloid J.* (U. S. S. R.) 6, 199-214 (1940); cf. C. A. 31, 8091[6]. Synthetic latex, prepd. by polymerization of butadiene in emulsion, was divided into 2 fractions: (1) sol. (30% of dry latex) and (2) insol. in C_6H_6 at room temp. The fractions had, resp., d_4^{20} 0.894, 0.896; n_D^{20} 1.518, 1.520; mol. refraction 18.30, 18.10; I no. 420, ; unsatn. 00.0, —. The sol. fraction was transformed into an insol. product by heating in O or N. this process in the presence of O was accompanied by absorption of O and sepn. of water. A toluene soln. of the sol. fraction formed a gel during heating in N in the presence of diaminobenzene. A decrease in viscosity was observed during heating in O in the presence of PhN_3, $NHPh$, $H_2NC_6H_4N_3Ph$, $PhNO_2$, $PhNH_2$, Ph_2NH, $MeNPh$ and $PhOH$. The absorption of O and sepn. of water were explained by condensation of 2 mols. of polymer through an O bridge (at the double-bonded C) and elimination of one H from each C, by combination with O. In N the process was probably the condensation of the mol., or of local chains of the mol., through formation of rings by breaking of double bonds. **VII. Dispersion of butadiene in emulsions.** D. M. Sandomirskii and B. A. Dogadkin. *Ibid.* 215-24. An insol. fraction of rubber, obtained as described above, was dissolved in toluene, xylene and other solvents at 80-100°, but not in C_6H_6. Soln. of this fraction in these solvents was promoted by salts of fat acids. The fraction was not sol. in the various solvents at 100-50° in N, but dissolved in the same solvents at the same temp. in O or air. Therefore, the solv. of this fraction depended on the influence of O. The fraction which dissolved in toluene at 100° (after removal of solvent and drying) had d_4^{20} 0.907, n_D^{20} 1.5106. A C_6H_6 insol. fraction probably had a spatial structure consisting of main-valency chains connected by local chem. bonds.

A. A. Podgorny

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PROCESSES AND PROPERTIES INDEX

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G

Structural changes in rubber caused by molecular oxygen. B. Dogadkin. *Trudy Konferentsii Vysokomolekul. yar. Soedineniyam, Akad. Nauk S.S.S.R., Otdel. Khim. Nauk i Otdel. Fiz.-Mat. Nauk* 1, 40-6(1943)(Pub. 1945). --Mild oxidation of linear rubber mols. with double bonds in the chain causes splitting and shortening of the chain, with decreased strength and viscosity in soln. and increased soly. In rubber whose chains are united by cross-bridges, these bridges are broken, but the polar bonds which are formed create new bridges by assocn., and larger polymers or networks result. These are harder and less sol. than the original rubber. Linear rubber mols. with double bonds in the side chains lose CO_2 and HCHO from the side chain but do not become shorter, and so grow harder, as a result of a change analogous to vulcanization. Many rubbers contain all 3 types of structures, and so show mixed effects when oxidized. H. M. Leicester

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1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

30

Change in the structure of rubber by the action of atmospheric oxygen. B. Dogadkin (Lomonosov Inst. of Fine Chem. Technol., Moscow). *J. Gen. Chem.* (U.S.S.R.) 15, 177-80(1945)(English summary); cf. C.A. 40, 187[1]. The nature of the changes induced by O in rubber depends on the conditions used. In linear polymers with double bonds (natural rubber) chain rupture occurs with corresponding phys. changes. Formation of ether type bonds between chains, which apparently occurs in oxidation at 145-50°, leads to loss of solv. and increase of phys. strength. Reaction of O with space polymers (e.g., used butadiene polymers and butadiene-styrene copolymers) leads to structure rupture and dispersion of the polymer, with an activation energy of 27,200 cal. per mol. A similar phenomenon occurs in milling rubbers of this type. Oxidation of polymers with double bonds in side chains (Na butadiene rubber) leads mainly by chain linkage into a space polymer structure, with loss of solv. and increase of phys. strength. G. M. K.

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PROCESSES AND PROPERTIES INDEX

30

Structural changes of rubbers brought about by molecular oxygen. B. Dogadkin (Lomonossov Inst. Fine Chem. Tech., Moscow). *Trans. Faraday Soc.* **42**, 709-19(1946); cf. C.A. **40**, 1685[8]. In the interaction of O_2 with linear polymers contg. double bonds, e.g., natural rubber, disintegration of the chains takes place in the initial stages. This results in increased soly., decreased strength, increased plasticity, and decreased viscosity of solns. of the rubber. The decrease in soly. and the increases in strength and elasticity commence: (1) at the stage of oxidation when local links of either type are formed between individual chains, or, (2) when the accumulation of polar groups contg. O_2 noticeably increases the intensity of intermol. attractive forces. A similar breakdown of spatial structures occurs in the milling of rubbers of this type, in which, in contrast to cases of mastication of linear polymers, the viscosity of solns. of spatial polymers does not change during the time of mastication. In the interaction of O_2 with linear polymers contg. double bonds in side chains, e.g., with Na butadiene rubber, the principal effect which takes place is the secondary process of combination of chains to spatial structures. This formation of spatial structures in the 2nd stage of oxidation is facilitated by the polyfunctionality of the products of the initial stage of oxidation of the original polymer. The structural changes described, proceeding by the action of O_2 constitute one of the causes of the appearance of the "vulcanization optimum." The chem. nature of the dissoln. of spatial polymers is confirmed by the magnitude of the activation energy of the process (27,000 cal. per mol.).

Victor R. Deitz

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1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

30

Kinetics and optimum phenomenon of vulcanization. B. Dogadkin, B. Karmin, and I. Golberg (Research Inst. Tire Industry, Moscow). *Compt. rend. acad. sci. U.R.S.S.* 53, 327-30(1946)(in English).—The change in properties of rubber through max. or min. values during vulcanization is due in part (1) to the interaction of rubber with the vulcanizing agent, and (2) to the interaction of rubber with mol. O. The tensile strength, which passes through a max., is equal to $(b_1 + a_1S)(b_2 - a_2O)$ where S is the proportion of S combined with the rubber, O is the proportion of combined O, and b_1, a_1, b_2, and a_2 are consts. This equation (in a modified form) compares favorably with the exptl. values in 5 examples, and lends support to the theory advanced.

W. N. Baker

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DOGADKIN, BORIS

DOGADKIN, BORIS ARISTARKHOVICH.

Khimiia i fizika kauchuka. Dopushcheno v kachestve uchebnika dlia khimicheskikh vtuzov. Moskva, Goskhimizdat, 1947. 421 p., illus., ports.

Bibliographical footnotes.

Title tr.: Chemistry and physics of rubber. Approved as a textbook for schools of advanced chemical studies.

TS1890.D6

SO: Aeronautical Sciences and Aviation in the Soviet Union, Library of Congress, 1955.

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USSR/Chemistry - Rubber Feb 1947
Chemistry - Colloids

PA 34T9

"The Structure and Properties of Filled Rubber Mixtures," B. A. Dogadkin, R. V. Uzina, Moscow Institute of Fine Chemical Technology imeni M. V. Lomonsov, 11 pp

"Kolloidnyy Zhurnal" Vol IX, No 2

Discusses mixtures of natural and synthetic latex with bentonite clays. In particular, it explains experiments which were conducted to determine the strengthening of caoutchouc in latex mixtures by means of colloidal hydrophilic fillers, a branch of rubber science which has been little studied so far. Discusses me-

LC 34T9

USSR/Chemistry - Rubber (Contd) Feb 1947

thodical observations, changes in tenacity and density the diffusion of water vapors through filled latex films, and evaluation of results of experiments conducted to determine the viscoeimetry and filtrability of latex mixtures.

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DOGADKIN, B. A.

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Dogadkin B.

68. **Vulcanisation of rubber. III. Kinetics of the change of tensile strength during vulcanisation of natural rubber.** B. A. Dogadkin, B. Karmin, and I. Gol'berg. *Kol. Zhur.*, 1947, 9, 255-60; Translation: *Rubb. Chem. Technol.*, 1954, 27, 615-21. It is shown that the tensile strength of vulcanised butadiene-styrene rubber is a linear function of the plasticity of the original material. Proceeding from the concept of the presence during vulcanisation of a number of opposing processes of structure formation and destruction, both of which influence the molecular weight of the rubber, a general equation is derived which expresses the kinetics of the change of tensile strength of a vulcanisate. Experimental material is offered which proves the applicability of the proposed equation to the representation of the kinetics of vulcanisation of natural rubber mixes with relatively small sulphur contents (up to 3%). 35725.

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Investigations in the field of vulcanization of rubber. IV. The optimum vulcanization of mixtures with high content of the structure-forming agent. B. Dogadkin and B. Karmin. *Kolloid Zhur.* 9, 348-54(1947); cf. *C.A.* 42, 2806*f*; 40, 1685*e*; 41, 3315*f*; *Kolloid Zhur.* 9, 255(1947).—The time curve of the tensile strength (E) of natural rubber, vulcanized with 2% S, and mercaptobenzothiazole (0.6%) or diphenylguanidine (0.75%), has a max. at exactly the moment when all the S has combined, and the time curve of the degree of swelling reaches a min. at exactly the same moment; beyond that point, E falls and the swelling increases again with time. This behavior is attributed to opposed effects of structure build-up by the S and structure disruption by atm. O_2. It contrasts with the kinetics of vulcanization in the presence of a high amt. (7%) of S and the same accelerators (0.3 or 0.378%, resp.) or without accelerator. In this case, the max. of the time curve of E is at a moment when about 3.5% S (with respect to the wt. of the rubber) has combined, and the curve of the degree of swelling has no min. but continues to decrease uniformly with time beyond the point of max. E; more S continues to combine along the branch of falling E. These curves, for high S contents, cannot be interpreted in terms of antagonistic structure formation and disruption. A max. E on the kinetic curve may, in this instance, be due to inhibited formation of the cryst. phase by the increasingly dense spatial network formed by vulcanization. In rubbers at various stages of vulcanization, with different S contents and different accelerators, E was a linear function of the amt. of cryst. phase formed by stretching 500%, as detd. by x rays, hence, increasing inhibition of crystal formation may result in a fall of E at stages where the binding of S is still far from completed. With the same rubber batch, smoked sheet 100, S 7, ZnO 5, diphenylguanidine 0.38, stearic acid 2 parts, the max. E occurred the earlier, and was the higher, the greater the rate of stretching (between 500 and 50 mm. per min). This effect is absent in batches with a low S content, and is explained by a slowing down of orientation, i.e. of crystn. of the rubber chains, with increasing rate of deformation, owing to relaxation; in other words, a higher rate of stretching acts in the same direction as an increased d. of the network. Of the 2 types of kinetic curves of vulcanization, due to different mechanisms, one characterized by a max. E coinciding with the completion of combination of S and with a min. of the degree of swelling, the other by an earlier max. of E and absence of a min. swelling, only the 2nd type is observed in Na butadiene rubber, even at the low S content of 2%, but, in contrast to the vulcanization of high-S natural rubber, the max. E occurs at a later stage than the completion of combination of S. N. Thon

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The kinetics and optimum state of vulcanization. I. Vulcanization of natural rubber. B. Dogadkin, B. Karmin, and I. Gol'berg. *J. Gen. Chem.* (U.S.S.R.) 17, 1070-9(1947)(in Russian); cf. *C.A.* 41, 3315f.—In vulcanization, 2 processes occur simultaneously: "constructive" combination of S and "destructive" combination of O, with opposing effects on the tensile strength σ; the sep. effects being formulated $\sigma S = b_1 + a_1S$ and $\sigma O = b_2 - a_2O$. It is postulated that the resulting σ is expressed by $\sigma = (b_1 + a_1S)(b_2 - a_2O)$. Introducing for the amt. of S combined at the moment τ, the kinetic expression of Lewis, *et al.* (*C.A.* 32, 4390[3]) $S = S_0(1 - e^{-h_1\tau})$ (where S_0 = initial amt. of S in the mixt.) and simplifying the kinetic equation of Freundlich (*Kautschuk* 9, 34(1933)) for the amt. of combined O to: $O = O_0(1 - e^{-h_2\tau})$, there is obtained, if $b_1b_2 = \sigma_0$, $a_1S_0/b_1 = a$ and a_2O_0/b_2, the total kinetic equation $\sigma = \sigma_0[1 + a(1 - e^{-h_1\tau})][1 - b(1 - e^{-h_2\tau})]$. With $X = 1 - e^{-h_1\tau}$, $Y = 1 - e^{-h_2\tau}$, $\sigma/\sigma_0 = (1 + aX)(1 - bY)$, and if σ_m is the max. σ at the optimum of vulcanization, σ_e the equil. σ at $\tau \approx \infty$ ($X \approx Y \approx 1$): $\sigma_m/\sigma_0 = (1 + aX_m)(1 - bY_m)$ and $\sigma_e/\sigma_0 = (1 + a)(1 - b)$; this leads to $a = [(\sigma_m/\sigma_0X_mY_m) - \sigma_e/\sigma_0]Y_m/(1 - Y_m) - 1$ and $b = 1 - \sigma_0/\sigma_e(1 + a)$, making it possible to det. a and b from the value and position of σ_m and σ_e on the exptl. curve of σ as a function of τ. The consts. h_1 and h_2 can be detd., on the one hand, from the exptl. rates of combination of S and of O, resp., on the other hand, from the above expressions for X and Y: if one considers the combination of S practically completed when only 0.2% of the initial S remains unreacted, $h_1 = 6/\tau_1$ where τ_1 = time of practical completion of the reaction with S; similarly, if combination of O is complete after the time τ_2 necessary for the attainment of the equil. σ_e, then h_2 = approx. $6/\tau_2$. The magnitude σ_0 is found by extrapolating σ to $\tau = 0$. The equations were tested on exptl. curves of σ against τ in vulcanization

at 143° of 5 batches (compns. in parts per wt.): I, II light crepe 100; III-V smoked sheet 100; I-V, ZnO 5; I, II, stearic acid 0.5, III-V, 2; I, II, S 2.5, III-V S 2.0; I, Zn dimethyldithiocarbamate 0.25; II, heptaldehyde-aniline 0.5; III, tetramethylthiuram disulfide 0.855; IV, mercaptobenzothiazole 0.60; V, diphenylguanidine 0.756; the batches I and II are those of Hauser (H. and Brown (*C.A.* 33, 898[9], 9719[1])). In the order I-V, the values obtained are: σ_m = 236, 280, 300, 240, 238 kg./sq. cm.; τ_m = 10, 20, 10, 40, 80 min.; σ_e = 150, 250, 190, 175, 115 kg./sq. cm.; τ_e = 90, 90, 150, 240, 600 min.; h_1 = 0.3, 0.14, 0.24, 0.1, 0.01; h_2 = 0.033, 0.07, 0.04, 0.025, 77.3; a = 284, 44.5, 52.3, 35.7, 77.3; b = 0.534, 0.450, 0.644, 0.523, 0.850; σ_0 = 10 (I-V). Curves drawn from these values coincide fairly well with the exptl. points; this appears to confirm the assumptions on which the kinetic equation has been derived. For vulcanization at 133° of batch IV, the theoretical kinetic curves of $\sigma O/\sigma_0$ and $\sigma S/\sigma_0$ are plotted separately, showing that in the sole presence of the constructive effect of S, and in the absence of the destructive effect of O, σ_m might reach 400 kg./sq. cm.; the theoretical kinetic curve of combination of S coincides perfectly with the exptl. datas. From the theoretical equation for const. a, b, and h_1, an increase in h_2 results in an initial increase of σ_m ending in a const. level, and in a rapid decrease of σ_m; an increase of h_2 for const. a, b, and h_1 results in a decrease in both σ_m and σ_e; with increasing a (b), σ_m increases (decreases) linearly; σ_e remains const.

N. Thon

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Structural changes in rubber by the action of molecular oxygen. II. Kinetics of the destructive solution of vulcanized rubber. B. Dogadkin and Z. Tarasova (M. V Lomonosov Inst. Fine Chem. Technol., Moscow). *J Gen. Chem.* (U.S.S.R.) 17, 1401-11(1947)(in Russian). cf. *C.A.* 35, 3123[9]; 40, 1085[5]; *Byull. Khim. Obshchestv im. D. I. Mendeleeva*, 1945.—Proof was sought and obtained of the indispensability of O for soln. of vulcanized rubber and, consequently, of the main-valence nature o vulcanization, as opposed to the intermol. forces theory advocated by Williams (*C.A.* 32, 8210[9]) on the basi of his peptization expts. A mixt. of smoked sheet 100 S 2, tetramethylthiuram disulfide 0.2, ZnO 1, and stearic acid 1, was vulcanized at 141° ± 0.5° (optimum in 20 min.) with the characteristics: $CHCl_3$ ext. 8%, Me_2CO ext. 3.8%, combined S 1.65%, tensile strength 100-200 kg./sq. cm., elongation 800%. Vulcanization was carried out on thin layers coated (in O-free C_6H_6 soln.) on the outer surface of a cylindrical glass ampul, in the absence of O (CO_2 atm.); the vulcanized product was then extd. with cold $CHCl_3$ in the dark and in a current of pure N for 16 hrs., and the ampul carrying the film was immersed in a thermostated closed vessel filled with xylene and equipped with a reflux condenser to prevent losses of solvent by the stream of gas bubbled through the vessel at a const. rate. Progress of the soln. was observed by microbalance weighings of ampul and film. With O rigorously excluded in current of N, only 2.8% of the wt. of the film was dissolved in 15 hrs. at 102.5°. That, contrary to Williams, peptization does not take place in the absence of O was demonstrated in expts. with 0.01 g. of vulcanizate, heated in sealed tubes at 141°, 72 hrs., in the presence of 10 cc. N-said. xylene, and 0.2 g. of Na oleate, 0.04 g. of piperidine, or 0.04 g. of the condensation product butyraldehyde with aniline; no evidence of peptization was observed either on heating or on 1 year's standing. In sharp contrast to this, the film did dissolve in xylene at 102.5° in a current of O; the relative rate of soln., i.e., the percentage r of rubber dissolved relative to the initial wt. of the film, is the slower the greater the initial thickness d_0 of the film, complete soln. being reached in from 100 to 250 min. with d_0 from 0.08 to 0.25 mm. For each given d_0, the curve of r against time is linear up to about r = 50%, then deflects and becomes increasingly steeper. Obviously, the const.-velocity portion corresponds to the stage of const. accessible surface area, while the acceleration indicates progressive disintegration and lifting from the glass wall. Correspondingly, while the r curves fan out from a common origin at 0, the plot of the abs. rate of soln. v (g. rubber dissolved) involves one common rectilinear portion for all d_0, the curves branching out only at the disintegration stage. Assuming the combination of O at the surface to be the rate-detg. step, at const. concn. of O, $v = ks$ (s = surface area) and $r = ksdb/sd_0b$ (where d = thickness of surface layer dissolved per unit time, b = d. of the vulcanizate), or $rd_0 = kd$ = const.; this is confirmed by the exptl. data, e.g., d_0 = 0.08, 0.130, 0.173, 0.252 mm., r = 51.6, 37, 32, 22% per min.; under O at 750 mm. Hg, at 102.5°, $d = 5.9 \times 10^{-3}$ cm./sec.; $v = 3.4 \times 10^{-4}$ g./sq. cm./sec. In terms of the partial pressure p of O, v (in the const.-rate range) increases linearly with p up to about p = 400 mm. Hg, whereafter the increase of v with further increasing p (up to 760) becomes gradually slower; p = 22.4, 187.0, 400.0, 555.0, 750.0, $10^3 v$ = 0.31, 1.05, 2.73, 3.20, 3.44. The dependence can be expressed by $v = k'\gamma p/(\gamma p + 1)$, assuming v to be proportional to the no. of points occupied by O, equal to $\gamma p/(\gamma p + 1)$ by a derivation analogous to

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PROCESSES AND PROPERTIES INDEX

Structural changes in rubber produced by molecular oxygen. III. Properties of the destructively dissolved vulcanizate of natural rubber. B. Dogadkin, Z. Tarasova, and A. Pazynskii (M. V. Lomonosov Inst. Fine Chem. Technol., Moscow). *J. Gen. Chem.* (U.S.S.R.) 17, 2222-8(1947)(in Russian); cf. *C.A.* 42, 2799e.

2809*y*. On standing, the light yellow, opalescent product of the destructively acid-dissolved vulcanizate ppts. ZnO; from the supernatant clear soln., Me_2CO seps. about 70% of the product in the form of a sticky mass which, after drying *in vacuo* at 20°, is sol. in the usual rubber solvents; its content of combined S is 1.98%, i.e., the same as in the original vulcanizate; the O content is 50 mg./g., of which 3.77 mg. is free carboxyl O; hence, for each carboxyl, there is a hydrocarbon residue of mol. wt. of about 8800. Owing to the high content of carboxyl groups and the low mol. wt., the product is sol. in binary solvents involving assocd. liquids (e.g., C_6H_6 + EtOH). Specific viscosity η_s at concns. c up to 6%, is a linear function of c; the const. $k = \eta_s/c$ (c = sp. vol.) depends on the depth of the destruction; for the product pptd. with Me_2CO, in soln. in CCl_4, k = 48 at 20°. This gives, according to the formula of Mehl, *et al.* (*C.A.* 34, 7307°), for the ratio of the axes of the ellipsoidal particles, b/a = 24, in contrast to 117-123 calcd. in the same way for the mol. fraction of natural rubber, and about 100 for plasticized butadiene styrene copolymer (from flow birefringence detns.); consequently, particles of the destructively dissolved vulcanizate are different from those of nonvulcanized rubber. Scattering of light is a linear function of c, in contrast to crude rubber. From photographic measurements of the diffusion coeff. D of solns. in CCl_4, the mol. wt. M was calcd. by the equation of Polson (*C.A.* 33, 8084°) $M = k/Df^2\eta$, where for the given solvent, k = 2.70×10^{-16} (at 20°), and the asymmetry factor f is taken = 2.15; with the exptl. $D = 8.84 \times 10^{-7}$ sq. cm./sec., M = 3000. On the other hand, from the max. ordinate of the diffusion curve, $D = 6.62 \times 10^{-7}$; the discrepancy indicates polydispersivity of the product. By the values of b/a and av. M it can be estd., as a first approximation, that the particles consist on the av. of 4-5 linked chains of 10-12 isopentene groups each if it is assumed that such particles are massive fragments of the spatial structure of the vulcanizate. Films obtained by dissolving the Me_2CO pptd. product in C_6H_6 and evapg. the solvent had tensile strength of 7.2-7.5 kg. per sq. cm. and elongation of 250%, in contrast to 100-200 and 800 for the original vulcanizate. This conflicts with the assertion of Williams (*C.A.* 32, 8210°) that the strength of vulcanized films is almost the same before and after peptization. N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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DOGADKIN, B.

PA 60T12

USSR/Chemistry - Rubber, Vulcanizing Jun 1947
Chemistry - Rubber, Reclaiming

"Destructive Dissolving of Vulcanized Rubber," B. Dogadkin, Z. Tarasova, A. Pasynskiy, Moscow Inst Fine Chem Tech, 4 pp

"Dok Akad Nauk SSSR, Nova Ser" Vol LVI, No 7

Asserts that vulcanization should be considered process in which main feature is formation of spatial structure from molecular chains, connected in operation of vulcanizing agent by forces of main valences. Describes process of destructive dissolving of rubber, undoubtedly of great importance in

60T12

USSR/Chemistry - Rubber, Vulcanizing Jun 1947
(Contd)

technical processes of refurbishing rubber by dissolving method. Illustrated with graphs.

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Studies on the vulcanization of rubber. VI. Variation of the modulus of two-dimensional extension caused by vulcanization of natural and butadiene-styrene rubbers. B. Dogadkin, G. Bartenev, and N. Novikova. *Kolloid. Zhur.* 10, 94-102(1948); cf. *C.A.* 43, 5622*d*.—Rubber membranes were extended by unilateral pressure. When the stress in the membrane increased, the ratio (area of extended membrane): (original area) increased first gradually, then very rapidly, and finally slowly again. The stress corresponding to the rapid rise is G (modulus of two-dimensional extension); S = percentage of S. With increase in combined S, G increased linearly to a max. (3.8 kg./sq. cm. at S = 1.8%), then dropped sharply for natural rubber (I); it increased linearly to a plateau (about 3.9 kg./sq. cm. at S = 1.4 to 2.4%), then increased more steeply again for Buna-S (II). S was varied by varying the time of vulcanization (10-160 min. at 142-144°) of the 2 mixts.: (1) smoked sheet 100, S 2, ZnO 5, stearic acid 2, mercaptobenzothiazole (III) 0.6, and (2) II 100, S 3, Zn stearate 2, III 1. Along the linear parts of the G - S curves, $dG/dS = 2kT\rho\gamma/3200$; where ρ is d. of the vulcanizate, γ is the fraction of S acting as bridges. γ = 0.19 for I, in agreement with chem. detn. For II, γ = 0.76, and is greater than detd. chemically; this shows that there are links contg. no S. At high S, the drop of G of I and its rise in II are due to oxidation. VII. **Effect of organic accelerators on the kinetics of vulcanization and properties of vulcanizates from natural rubber.** B. Dogadkin, B. Karmin, A. Dobromyslova, and L. Sapozhkova. *Ibid.* 208-80. When rubber is heated with less than 3% S for t min. in air, its tensile strength $\pi = \pi_0[1 + aS_0(1 - e^{-bt})][1 - bO_0(1 - e^{-bt})]$, where S_0 and O_0 are S and O, resp., finally taken up, k_1 and k_2 the consts. of these addns. on π. The a and b show the effect of these addns. on π. The final tensile strength π_0 is independent of k_1 and k_2. Accelerators like diphenylguanidine (I), mercaptobenzothiazole (II) or tetramethylthiuram disulfide (III), added in the amt. of 0.6-0.9 parts to smoked sheet rubber 100, S 2, ZnO 5, and stearic acid 2 parts, affect π_0, i.e., change also a and b in addn. to k_1 and k_2. The increase in π_0 and the reduction of swelling in CCl_4 increase in the order I < II < III. From vulcanization expts. at 123°, 133°, 143°, and 153°, the temp. coeff. of k_1 is calcd. It agrees with the const. calcd. from direct measurements of the combined S at different t, this shows that k_1 has the assumed meaning. Films of crude rubber + accelerator were exposed to O at 100-142°. II accelerates, and I and III strongly retard, oxidation. The temp. coeff. of oxidation in the presence of II, detd. directly, agrees with that of k_2. At a given degree of oxidation, rubber contg. II has a lower viscosity in soln. than without accelerator. The highest π reached during vulcanization increases with its temp. in the presence of III, decreases on temp. increase for II (because II accelerates oxidation), and is independent of temp. for I. Reaction of vulcanized rubber or Na butadiene polymer with MeI shows that the percentage of S present as monosulfide bonds is raised by I and II. J. J. Bikerman

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DOGADKIN, B.

"Research in the Field of the Vulcanization of Rubber: VII, Effect of Organic Accelerators on the Kinetics of Vulcanization and Properties of Vulcanized Rubber from Natural Rubber," Kolloid. Zhur., 10, No.4, 1948. Sci. Res. Inst. of Tire Ind.; Moscow Inst. of Fine Chem. Tech. M. V. Lomonosov,-1947-.
"Kinetics and Optimim Phenonmenon of Vulcanization," Dok. AN, 53, No. 4, 1946. Research Inst. of Tire Ind., Moscow. -1946-.

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