L [illegible]

ACC[illegible]

2

and the kinetics of catalyzed oxidation and hydroperoxide decomposition is considered on the basis of data in the literature. It is noted that the activation of chemiluminescence by additions of luminescing substances shifts the limits of applicability of chemiluminescence methods toward lower temperatures and reagent concentrations (i.e., low reaction rates and low intensities of luminescence). Chemiluminescence is therefore a convenient method of studying the kinetics of certain chemical reactions. Orig. art. has: 5 figures, 4 formulas and 2 tables.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Chemical physics institute, AN SSSR)

SUBMITTED: 19Jun64 ENCL: 00 SUB CODE: OC

NO REF SOV: 018 OTHER: 002

Card 2/2

L 40732-65 EWT(1)/EWT(m)/EPF(c)/EWP(j)/EWA(c) Pc-4/Pr-4/Pi-4 IJP(c)
RM
ACCESSION NR: AP5012398 UR/0020/64/157/006/1451/1454

AUTHOR: Safonov, G. P.; Shlyapintokh, V. Ya.; Entelis, S. G.

TITLE: Crystalloluminescence 21 and its use in studying kinetics of amino acylation

SOURCE: AN SSSR. Doklady, v. 157, no. 6, 1964, 1451-1454

TOPIC TAGS: crystal chemistry, luminescent crystal, luminescence, acylation, amine, chloride, chemical kinetics

Abstract: Reactions of condensation and polycondensation have been recently found to be accompanied by luminescence. In searching for new methods of studying the kinetics of these reactions, the authors investigated luminescence in its relationship with the mechanism and kinetics of the reactions of acid chlorides with amines. The reaction of aniline acylation by benzene chloride was selected as the model. The reaction was carried out in diethyl ether. Luminescence was measured with a photometric instrument fitted with the FEU-33 photo-multiplier (region of spectral sensitivity 350-610 millimicrons). The maximum sensitivity of the equipment is 20-40 photons per second at the photocathode surface. The results confirm the validity of the hypothesis that luminescence in this reaction arises in the crystallization of the poorly soluble product. Usually, the use of luminescent methods of studying kinetics is based

Card 1/2

L 40732-65
ACCESSION NR: AP5012398

on a proportional dependence between luminescence intensity. However, in reactions where accumulations of a precipitate attenuating luminescence intensity takes place, use of intensity measurements to determine kinetic parameters is not successful. The method described in this paper does not require luminescence intensity measurements, and changes in transmittance of the solution does not hamper its use. It was possible to photometrically measure the kinetics of the reaction which in itself was not accompanied by luminescence. Luminescence develops in the ancillary physical process of crystallization. Kinetic information is obtained by measuring the interval of time from the onset of the reaction to the moment of luminescence. Luminescence indicates that a certain concentration of the above products has been obtained in the system. Luminescence in the formation of molecular crystals has been found in this report, not only in the crystallization of benzanilide, but also in the formation of crystals of the p-iodamide of benzoic acid, eosin, uranine, and 9, 10-dibromomanthracene. Orig. art. has 1 figure, 5 formulas, 3 graphs, and 1 table.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences, SSSR)

SUBMITTED: 01Apr64 ENCL: 00 SUB CODE: SS, GC

NO REF SOV: 003 OTHER: 002 JPRS

Card 2/2

EMANUEL', Nikolay Markovich; DENISOV, Yevgeniy Timofeyevich; MAYZUS, Zinaida Kushelevna. Prinimali uchastie: ANTONOVSKIY, V.L.; BLYUMBERG, E.A.; VASIL'YEV, R.F.; GAGARINA, A.B.; GOL'DBERG, V.M.; ZAIKOV, G.Ye.; DORIKOV, Yu.D.; OBUKHOVA, L.K.; TSEPALOV, V.F.; SHLYAPINTOKH, V.Ya.; SKIBIDA, I.P., red.

[Oxidation chain reactions of hydrocarbons in the liquid phase] TSepnye reaktsii okisleniia uglevodorodov v zhidkoi faze. Moskva, Nauka, 1965. 374 p. (MIRA 18:8)

POSTNIKOV, L.M.; SHLYAPINTOKH, V.Ya.; SHUMILINA, M.N.

Chemiluminescence in slow chemical reactions. Part 4: Chemiluminescence used in studying the kinetics of gas phase oxidation. Kin. i kat. 6 no.2: 185-195 Mr-Ap '65. (MIRA 18:7)

1. Institut khimicheskoy fiziki AN SSSR.

L 01482-66 EWT(l)/EWT(m)/EPF(c)/EWG(m)/EWP(j)/T/EWA(c)/ETC(m) IJP(c)
DS/BJ/WW/JW/WE/RM

ACCESSION NR: AP5021782

UR/0074/65/034/008/1416/1447
535.37:531.1

58
51
B

44,55 44,55 44,55

AUTHOR: Papisova, V. I. Shlyapintokh. V. Ya.; Vasil'yev, R. F.

TITLE: Chemiluminescence and kinetics of chemical reactions 7,44,55

SOURCE: Uspekhi khimii, 21,44,55 v. 34, no. 8, 1965, 1416-1447

TOPIC TAGS: chemiluminescence, chemical kinetics

ABSTRACT: The review is devoted to the relationship between chemiluminescence and reaction kinetics, and is based on studies in which chemiluminescence was investigated in reactions whose mechanism was reliably determined, or in which the reactions were investigated both by means of luminescence and by methods of chemical kinetics. Particular attention is given to the potential of chemiluminescence as a method of quantitative study of reaction kinetics. The article is divided into the following sections: (1) chemiluminescence of flames; (2) reactions of nitrogen, oxygen, and hydrogen atoms; (3) infrared chemiluminescence in thermal reactions; (4) liquid-phase oxidation reactions associated with bright chemiluminescence; (5) systems with faint chemiluminescence. The first three sections deal with gas-phase

Card 1/2

L 01482-66

ACCESSION NR: AP5021782

7

reactions (hot and cold flames, reactions of atoms obtained in high concentration in electrical discharges). The fourth section discusses liquid-phase reactions such as oxidation of cyclohydrazides and acridine compounds. In the fifth section, the reactions considered do not differ fundamentally from the others, but include a great many that are of interest from the theoretical and practical points of view. Orig. art. has: 9 figures, 1 table, and 30 formulas.

ASSOCIATION: MGU im. M. V. Lomonosova i In-t khimicheskoy fiziki AN SSSR (Moscow State University and Institute of Chemical Physics, AN SSSR) 44,55

SUBMITTED: 00 44,55

ENCL: 00

SUB CODE: GC

NO REF SOV: 066

OTHER: 123

Card 2/2

L 17612-66 EWT(m)/EWP(j) RM
ACC NR: AP6002097 SOURCE CODE: UR/0062/65/000/011/1936/1941

AUTHORS: Postnikov, L. M.; Shlyapintokh, V. Ya.; Shumilina, M. N. 44 B

ORG: Institute of Chemical Physics, Academy of Sciences, SSSR (Institut khimicheskoy fiziki Akademii nauk SSSR)

TITLE: Estimation of lifetimes of excited molecules of formaldehyde, formed during the low-temperature gas-phase oxidation of acetaldehyde 7,44,55

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 11, 1965, 1936-1941

TOPIC TAGS: luminescence, quenching, luminescence spectrum, excited state, formaldehyde, oxidation

ABSTRACT: The effect of oxygen on the chemi-luminescence during the low-temperature gas-phase oxidation of propionic and acetic anhydrides, diethyl ether, and hexane by ditert. butylperoxide was studied to extend the work of L. M. Postnikov and V. Ya. Shlyapintokh (Dokl. AN SSSR 150, 340, 1963). The experimental results are presented in graphs and tables (see Fig. 1). The lifetimes of excited formaldehyde molecules, formed during these reactions, were determined by the method of Sterman and Volmer

Card 1/2 UDC: 541.127+541.51 2

L 17612-66

ACC NR. AP6002097

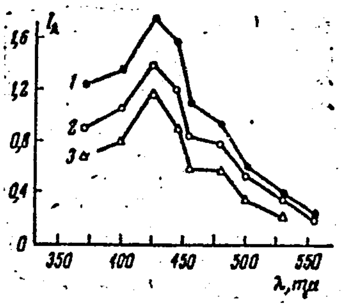

Fig. 1. Luminescence spectra of formaldehyde formed during the oxidation reaction of acetaldehyde. 1 and 2 - 182C; 3 - 121C.

$$\frac{I_1}{I} = \frac{k_1 + k_2}{k_1 + k_2 + k_3(O_2)_1} + \frac{k_3}{k_1 + k_2 + k_3(O_2)_1}(O_2),$$

where I and I_1 are the intensity of luminescence at oxygen concentrations (O_2) and $(O_2)_1$ respectively. It was found that the lower limit for the excitation lifetimes of excited formaldehyde molecules is $\tau > (0.7-1.3) \times 10^{-6}$ sec. Orig. art. has: 1 table, 5 graphs, and 5 equations.

SUB CODE: 07/ SUBM DATE: 29Jul63/ ORIG REF: 006/ OTH REF: 011

Card 2/2 vmb

ACC NR: AP6019666 (N) SOURCE CODE: UR/0368/66/004/006/0541/0545

AUTHOR: Ivanchev, S. S.; Guk, A. F.; Shlyapintokh, V. Ya.

41
B

ORG: none

TITLE: Use of chemiluminescence methods to study initiators of radical polymerization

SOURCE: Zhurnal prikladnoy spektroskopii, v. 4, no. 6, 1966, 541-545

TOPIC TAGS: polymerization initiator, polymerization kinetics, chemiluminescence, peroxide

ABSTRACT: To elicit the effect of the structure of organic peroxides on their initiating capacity in polymerization processes, the authors obtain the kinetic characteristics of the reaction of the decay of diacylic peroxide of paraffinic acids. To perform this work a homologous series of peroxides was synthesized from the peroxide of butyric acid to the peroxide of stearic acid. Chemiluminescence methods were used to obtain the kinetic characteristics of the initiators. The investigated peroxide compounds were used as initiators of the chemiluminescence reaction of the oxidation of ethylbenzene. The intensity of the luminescence was measured by a highly sensitive photometric device with a photomultiplier as the light receiver. The photocurrent was amplified by an electrometer amplifier and recorded by a self-balancing potentiometer. During the experiment oxygen was bubbled through the initiator

Card 1/2 UDC: 535.379

L 06523-67 EWT(l)/EWT(m)/EWP(j) IJP(c) WW/JW/RM

ACC NR: AP7000472 SOURCE CODE: UR/0074/66/035/004/0684/0698

SHLYAPINTOKH, V. Ya., Institute of Chemical Physics, Academy of Sciences USSR (Institut khimicheskoy fiziki AN SSSR)

39

B

"Free Radicals and Chemiluminescence"

Moscow, Uspekhi Khimii, Vol 35, No 4, 1966, pp 684-698

Abstract: After a brief synopsis of progress in the study of chemiluminescence, pertaining to the relative and absolute concentrations of atoms and free radicals in flames and combustion products, the rate constants of the reactions of these particles, the energy distribution of the products of elementary reactions, processes of energy exchange during collisions, and bond energies in certain molecules, the author of this survey goes on to discuss the possibilities of using chemiluminescence methods for the quantitative investigation of the mechanism and kinetics of radical and chain reactions occurring in the liquid phase. Such topics as the relationship between chemiluminescence and the mechanism of the oxidation of organic substances by molecular oxygen and the use of chemiluminescent methods to investigate the mechanism of the action of antioxidants are treated. The latter topic includes discussions of the mechanism of the termination of oxidation chains by stable nitrogen oxide radicals, the interaction of ethylbenzene hydroperoxide with thiophenol in the oxidation of ethylbenzene, the synergic effect

Card 1/2

SHLYAPINTOKH, P. Ya.

PC

PROCESSES AND PROPERTIES INDEX

B 2
2

Ignition of explosive gaseous mixtures in shock-waves. Ya. B. Zeldovich and P. Ya. Shlyapintokh (*C. R. Acad. Sci. U.R.S.S.*, 1949, **66**, 871—874).—Ignition of 22 : 78 CS_2-O_2 mixtures occurs when the velocity (*v*) of a flat-nosed bullet passing through the gas is 1330 m. per sec., but not when conical-nosed bullets are used, even at > 1750 m. per sec. This shows that ignition is related to the amplitude of the shock-wave, and not to heating of the projectile by skin friction. Critical *v*, temp., and compression effects in the shock-wave recorded for 2 : 1 : 7 H_2-O_2-A, 2 : 1 CO-O_2, and 22 : 78 CS_2-O_2 are: *v* 1320, 1590, and 1330 m. per sec., temp. 1420±70°, 1420±50°, and 1210±55° K., and ρ/ρ_0 4·2, 8·0, and 6·9, respectively (ρ_0 and ρ are the *d* of the mixtures at 20°/760 mm. and in the shock-wave, respectively).

R. Truscoe.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

SHLYAPNIKOV, A.A.

Practice in plotting a landform map of the Siberian portion of the Yenisey Valley. Sib. geog. sbor. no.2:28-39 '63. (MIRA 16:11)

[illegible]

Types of landforms in the Siberian portion of the Yenisey Valley. (MIRA 18:4)
[illegible] no. [illegible] 1965.

SHLYAPNIKOV, A-F.

LYUKSEMBURG, M.S., kandidat tekhnicheskikh nauk; SHLYAPNIKOV, A.F.

Best contours for hides. Leg.prom.15 no.8:42-43 Ag '55.
(Hides and skins) (MLRA 8:10)

DEMENT'YEV, V.I , kand. tekhn. nauk; OGRINCHUK, A.N., kand. tekhn. nauk; TEREKHOV, G.A., dots.; SHLYAPNIKOV, A.I., dots.; SHUVALOV, Yu.A., kand. tekhn. nauk; KAMENIR, Ya.A., kand. tekhn. nauk, retsenzent; PANTELEYEV, V.V., inzh., retsenzent; BAZHENOV, D.V., red. izd-va; UVAROVA, A.F., tekhn. red.

[Means for the automation of machining processes; manual] Sredstva avtomatizatsii mekhanicheskoi obrabotki; spravochnoe posobie. Moskva, Mashgiz, 1962. 520 p. (MIRA 15:3)
(Metalcutting) (Automation)

SHLYAPNIKOV, E. G. (Director); ALAKHVERDOV, I. A.; SAGITOV, A. V.; POCHKAYEV, I. A.; FOMICHEV, T. F.; KASK, E. A.; NIKOLSKIY, R. N.

"On zooveterinary servicing of consolidated kolkhoz."

SO: Vet. 28 (12) 1951, p. 17

Nakhoisk Zooveterinary District, SovetskiyRayon, Saratov Oblast'

SHAUROV, N.; SHLYAPNIKOV, N.

From IA.M. Gakkel's activities as a designer. Kryl.rod. 3 no.8:14
Ag '52. (Gakkel', IAkov Modestovich) (MIRA 8:8)

Shlyapnikov, N.

AID P - 1991

Subject : USSR/Aeronautics

Card 1/1 Pub. 135 - 15/20

Authors : Shaurov, N., and Shlyapnikov, N.

Title : I. I. Treteskiy's rocket engine project

Periodical : Vest. voz. flota, 5, 78-84, My 1955

Abstract : Biographical notes on Treteskiy, I. I., and the description of the rocket engine he invented in 1855.

Institution: None

Submitted : No date

BUDAGOV, Yu.A., DZHELEPOV, V.P., IVANOV, V.G.; LOMAKIN, Yu.F.;
FLYAGIN, V.B.; SHLYAPNIKOV, P.V.

Hydrogasdynamic calculation of the mechanism of pressure variation in a large bubble chamber. Prib. i tekh. eksp. 9 no.4:56-65 Jl-Ag '64. (MIRA 17:12)

1. Ob"yedinennyy institut yadernykh issledovaniy.

L 00069-66 EWT(m) DIAAP

ACCESSION NR: AP5021328 UR/0120/65/000/004/0042/0045
539.1.073.3

AUTHOR: Budagov, Yu. A.; Dzhelepov, V. P.; Lomakin, Yu. F.; Flyagin, V. B.; Shlyapnikov, P. V.

TITLE: Hydrodynamics of the resonant bubble chamber 19, 55

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1965, 42-45

TOPIC TAGS: proton accelerator, particle accelerator component, synchrotron, hydrodynamics, proton resonance

ABSTRACT: The authors proposed earlier that the speed of bubble chambers be increased by the excitation of periodic pressure oscillation within the working substance with frequencies equal to the resonant frequency of the liquid filling the chamber. In the present article, considering the bubble chamber as a special kind of volume resonator, the authors examine more closely the hydrodynamics of the processes of excitation within the liquid of undamped periodic pressure oscillations with the aim of increasing the speed of bubble chambers. The applicability of such chambers in proton synchrotron experiments is discussed. Expressions of practical interest are derived, and they connect the basic con-

Card 1/2

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ACCESSION NR: AP4018366 S/0120/64/000/001/0061/0068

AUTHOR: Bogomolov, A.V.; Budagov, Yu. A.; Vasilenko, A.T.; Dzhelepov, V.P.; D'yakov, N.I.; Ivanov, V.G.; Kladnitskiy, V.S.; Lepilov, V.I.; Lomakin, Yu. F.; Moskalev, V.I.; Flyagin, V.B.; Shetet, T.I.; Shlyapnikov, P.V.

TITLE: Meter-long bubble chamber in a magnetic field

SOURCE: Pribory* i tekhnika eksperimenta, no. 1, 1964, 61-68

TOPIC TAGS: bubble chamber, meter long bubble chamber, 10 Gev particle beam, bubble chamber in magnetic field, electromagnet bubble chamber

ABSTRACT: A bubble chamber with a sensitive volume of 1x0.5x0.38 m is described. The chamber is intended for studying the particle beams up to 10 Gev obtained from the OIYaI proton synchrotron. The chamber design was described earlier (Yu. A. Budagov, et al. International Conference on High-Energy Acceleration and Instrumentation, Berkeley, 1960); more details are supplied in the present article. Propane or some other liquid suitable for a particular experiment may serve as a working fluid. The chamber is placed in a 17-kilo-oersted magnetic field derived from a 2,200-kw electromagnet. The error in a

Card 1/2

BUDAGOV, Yu.A.; DZHELEPOV, V.P.; IVANOV, V.G.; LOMAKIN, Yu.F.;
FLYAGIN, V.B.; SHLYAPNIKOV, P.V.

Hydrodynamics of bubble chambers. Prib. i tekh. eksp.
9 no.2:46-50 Mr-Ap'64. (MIRA 17:5)

1. Ob"yedinennyy institut yadernykh issledovaniy.

BUDAGOV, Yu.A.; DZHELEPOV, V.P.; IVANOV, V.G.; LOMAKIN, Yu.F.; FLYAGIN,
V.B.; SHLYAPNIKOV, P.V.

Hydrodynamic study of the operating conditions of bubble
chambers. Prib. i tekh. eksp. 9 no.5:55-60 S-O '64.
(MIRA 17:12)

GOL'BEK, G.P.; MATVEYEV, V.V.; SHLYAPNIKOV, R.S.

[Physical method of determining the amounts of uranium, radium and thorium in radioactive ores] Fizicheskiy metod opredeleniia soderzhaniia urana, radiia i toriia v radioaktivnykh rudakh; doklady, predstavlennye SSSR na Mezhdunarodnuiu konferentsiiu po mirnomu ispol'zovaniiu atomnoi energii. Moskva, 1955. 18 p. (MLRA 9:7)
(Uranium) (Radium) (Thorium)

SHLYAPNIKOV, R.S.

CARD 1 / 2 PA - 1514

SUBJECT USSR / PHYSICS
AUTHOR MATVEEV, V.V., SOKOLOV, A.D., SLJAPNIKOV, R.S.
TITLE The Energy Distribution of Gamma Quanta Originating from a Punctiform Gamma Radiation Source in an Infinite Sandy Medium.
PERIODICAL Atomnaja Energija, 1, fasc. 4, 57-62 (1956)
Issued: 19.10.1956

The present article studies the energy spectra of γ-radiation at various distances from punctiform sources (Cr^{51}, Zn^{65}, Ra and MsTh). Description of tests: Tests were carried out in sandy soil (density 1,6 g/cm^3). The recording device for γ-radiation was located in a depth of 110 m. At various distances from it tubes filled with the gamma radiation source were fitted in a horizontal line with the recording device. A special scintillation gamma spectrometer was built for these tests. Gamma radiation was recorded by means of a radiating head consisting of a CsJ(Tl)-crystal, a photomultiplier "FEU-12" and an output cathode repeater. The impulses emitted from the cathode repeater were transmitted to a linear amplifier and from there to an analyzing counting system with 3 channels (channel of general counting, channel of differential counting, and channel of integral counting). Gamma radiation sources with different intensities were needed. Sources with Cr^{51} and Zn^{65} with a γ-intensity of from 0,1 to 10 millicurie were used. Furthermore, a set of Ra- and MsTh-sources with different intensities was employed.

Atomnaja Energija, 1, fasc. 4, 57-62 (1956) CARD 2 / 2 PA - 1514

Test results and their discussion: The energy distribution of the γ-quanta was carried out at distances of 5, 35, 45, 60 and 80 cm (corresponding to the values μR = 0,83; 7,49; 10 0; 11,7; 13,3) from the Cr^{51} source, and of 35, 70, 100 and 130 cm (corresponding to μR = 3,4; 6,8; 9,6 and 12,5) from the Zn^{65}-source. At $\mu R \geq 5$ the spectra of Cr^{51} and Zn^{65} are of the same character. At relatively short distances ($\mu R > 5$) primary radiation plays an important part, although secondary scattered radiation already amounts to a large part of the total radiation. The significance of some peaks is discussed. On the occasion of the passage of γ-rays through layers of sand the soft scattering of radiation with an energy of ~ 50 keV is accumulated (independent of the energy of the primary γ-quanta) in the energy distribution of the γ-radiation. For the purpose of clearing up the character of the gamma spectra in media with large Z similar measurements were undertaken with a radiation of 323 keV and 1114 keV in lead. Furthermore, the energy distribution of the γ-radiation of punctiform Ra- and MsTh-sources was studied. Also these spectra behave in a manner similar to that of the above discussed spectra.

INSTITUTION:

AUTHOR: **GOL'BEK, G.R., MATVEYEV, V.V.**, SHLYAPNIKOV, R.S. 89-9-9/32

TITLE: A Portable Radiometer Analyzer. (Polevoy radiometr-analizator)

PERIODICAL: Atomnaya Energiya, 1957, Vol 3, Nr 9, pp 247-250 (U.S.S.R.)

ABSTRACT: The electronic wiring circuit and the mechanical structure of a newly constructed portable (2,5 kg) radiometer analyzer is described, by means of which it is possible to describe the radium (Man)-thorium content (> 0,01%) of a rock.

Two measurements are possible:

1.) Recording of γ-radiation and determination of its intensity,
2.) Analysis of the spectral composition of γ-radiation, from which it is possible to draw conclusions as to the nature of the rock investigated.

By means of the device described it is possible to determine γ-intensities of from 3 to 15 000 mC/h and to carry out the spectral analysis of the γ-spectrum if γ-intensity is within the range of from 50 to 5000 mC/h. (With 1 Table, 2 Illustrations, and 2 Slavic References).

ASSOCIATION: Not given

PRESENTED BY:

SUBMITTED: 19.12.1956

AVAILABLE: Library of Congress

Card 1/1

SHLYAPNIKOV, R.S.

5

S/056/62/043/001/047/056
B102/B104

AUTHORS: Barkov, L. M., Mukhin, K. N., Ogurtsov, V. V., Romantseva, A. S., Svetlolobov, I. A., Chuyeva, S. A., Shlyapnikov, R. S., Likhachev, M. F., Stavinskiy, V. S., Strunov, L. N.

TITLE: The problem of the D^+-meson

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 1(7), 1962, 335-337

TEXT: The authors have searched for a D^+-meson production or a decay among 14,000 pairs of photographs. A propane bubble chamber with pulsed magnetic field was irradiated with a beam of positively charged particles (momentum ≈ 1.8 Bev/c) containing up to 9% K^+ mesons. The processes looked for were $K^+ + p \to D^+ + \Sigma^+$ and

$$D^+ \begin{array}{l} \nearrow K^0 + \pi^+ \\ \searrow K^+ + \pi^0 \end{array}$$

Card 1/2

5

S/056/62/043/001/047/056
B102/B104

The problem of the D^+-meson

The first branch of the decay reaction is the more possible. Neither a process $K^+ + p \rightarrow D^+ + \Sigma^+$ nor one of the type $K^+ + n \rightarrow D^+ + \Sigma^0$ could be found. It is inferred that the D^+ meson production cross section in K^+N reactions will be smaller than $1.2 \cdot 10^{-29} cm^2$.

ASSOCIATION: Institut atomnoy energii (Institute of Atomic Energy) (R. S. Shlyapnikov); Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute of Nuclear Research) (L. N. Strunov)

SUBMITTED: April 25, 1962

Card 2/2

6

BARKOV, L.M.; MUKHIN, K.N.; OGURTSOV, V.V.; ROMANTSEVA, A.S.; SVETLOLOBOV,
I.A.; CHUYEVA, S.A.; SHLYAPNIKOV, R.S.; LIKHACHEV, M.F.; STAVINSKIY,
V.S.; STRUNOV, L.N.

The problem of the D † -meson. Zhur. eksp. i teor. fiz. 43 no.1:335-337 Jl '62. (MIRA 15:9)

1. Ob"yedinennyy institut yadernykh issledovaniy (for Strunov).
(Mesons)

2.

L 58337-65 EWT(m) Pab DIAAP
ACCESSION NR: AT5010845 UR/3136/64/000/700/0001/0015

AUTHOR: Kruchinin, S. P.; Mukhin, K. N.; Rumyantseva, A. S.; Svetlolobov, I. A.; Sulkovskaya, [illegible]; Chu[illegible], S. A.; Shlyapnikov, R. S. 28 27 B4

TITLE: Elastic p-p scattering at 1.45 BeV

SOURCE: Moscow. Institut atomnoy energii. Doklady, no. 700, 1964. Uprugoye (p-p)-rasseyaniye pri 1,45 Bev, 1-15

TOPIC TAGS: elastic scattering, proton proton scattering, pion scattering, differential cross section

ABSTRACT: A propane bubble chamber was used to investigate the angular dependence of elastic scattering of protons by protons at an incident-proton momentum of 2.2 BeV/c, which is higher than the energies used in earlier investigations. The protons came from the 10 BeV accelerator of the Joint Institute of Nuclear Research. A total of 17,000 pairs of stereophotographs was scanned, ~ 900 cases of elastic π^+p and pp scattering cases were analyzed, and the reduction of these data made it possible to determine the differential cross section of elastic pp scattering at 1.45 BeV over the entire angle interval of 0--90° (c.m.s.). Calculations based on

Card 1/2

L 58337-65
ACCESSION NR: AT5010445

7

the optical model with a small region of phase shift gave best agreement with the experimental data with parameter values $R_1 = 0.45$ F, $R_2 = 0.95$ F, $a = 0.344$, and $\varphi = 1.77$ rad. (R--interaction radius, φ--phase shift, a--amplitude of transmitted wave for a unit amplitude of incident wave). In the energy region from 0.38 to 30.9 BeV, the differential cross section is proportional to $A \exp(-P_{c.m.s.}/P_0)$, with $A = 115$ mb/sr and $P_0 = 143$ MeV/c. "The authors thank I. I. Gurevich for valuable advice, A. P. Benediktov, V. I. Baranov, and A. V. Tel'nov for help in operating the equipment, and V. B. Palova, L. S. Baturina, and A. A. Kondrashina for participating in the measurements." Orig. art. has: 5 figures, 9 formulas, and 1 table.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: NP

NR REF SOV: 001 OTHER: 012

BR
Card 2/2

ACC NR: AP6021996 SOURCE CODE: UR/0120/66/000/003/0044/0050

AUTHOR: Baranov, V. I.; Shlyapnikov, R. S.

ORG: Institute of Atomic Energy, GKAE, Moscow (Institut atomnoy energii GKAE)

TITLE: Electronic equipment for a bubble chamber with a pulsed magnetic field

SOURCE: Pribory i tekhnika eksperimenta, no. 3, 1966, 44-50

TOPIC TAGS: bubble chamber, propane bubble chamber, pulsed magnetic field, beam accelerator

ABSTRACT: Electronic equipment for a propane bubble chamber with a pulsed magnetic field is described which consists of a chamber synchronization block, a block for sustaining the operation of the chamber, and a control block. The chamber was initiated when a starting pulse, produced by the accelerator, was fed to it. This pulse in turn triggered the particle ejection process. After the arrival of the starting pulse, the synchronization block sent in sequence pulses which controlled the operation of various sections of the chamber. During the operation of the chamber a series of its working parameters were maintained at the required level, including its operating temperature, its working pressure, and the number of particles passing through it. Experiments have shown that errors caused by delays in the starting pulse did not exceed 50 μsec. The authors are indepted to K. N. Mukhin for his discussion of the results and to A. P. Venediktov and A. B. Tel'nov for their help in the experimental

Card 1/2 UDC: 539.1.073.3

ACC NR: AP6021996

operation. Orig. art. has: 8 figures.

SUB CODE: 20/ SUBM DATE: 14May65/ ORIG REF: 005/ OTH REF: 003

Card 2/2

KATAL'NIKOV, S.G.; SHLYAPNIKOV, S.V.

Calculating the equilibrium constants of isotopic exchange between water and hydrogen sulfide. Zhur. fiz. khim. 36 no.4:853-855 Ap '62. (MIRA 15:6)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni D.I.Mendeleyeva.
(Hydrogen sulfide) (Chemical reactions)

SHLYAPNIKOV, S.V., KARPEYSKIY, M.Ya., LITVIN, Ye.F.

Use of gas-liquid chromatography for the separation of some amino acids. Biokhimiia 28 no.4:664-67 Jl-Ag '63. (MIRA 18:3)

1. Institut radiatsionnoy i fiziko-khimicheskoy biologii i Institut organicheskoy khimii AN SSSR, Moskva.

SHLYAPNIKOV, S.V.; KARPEYSKIY, M.Ya.

Comparative study of gas chromatographic separation of N-acyl amino acid esters. Biokhimiia 29 no.6:1076-1081 N-D '64. (MIRA 18:12)

1. Institut radiatsionnoy i fiziko-khimicheskoy biologii AN SSSR, Moskva. Submitted March 12, 1964.

SHLYAPNIKOV, S.V.; KARPEYSKIY, M.Ya.

Gas chromatographic separation of N-acetylamino acid esters in using polar stationary phases. Biokhimiia 30 no.2:226-234 Mr-Ap '65.

(MIRA 18:7)

1. Institut radiatsionnoy i fiziko-khimicheskoy biologii AN SSSR, Moskva.

SHLYAPNIKOV, S.V.; KARPEYSKIY, M. Ya.; YAKUSHINA, L.M.; OSTLENCHIK, V.S.

Use of gas-liquid chromatography method for quantitative analysis of some amino acids. Biokhimiia 30 no. 3:457-462 My-Je '65
(MIRA 19:1)

1. Institut radiatsionnoy i fiziko-khimicheskoy biologii AN SSSR, Moskva.

KARPEYSKIY, M.Ya.; SHLYAPNIKOV, S.V.; OSELEDCHIK, V.S.

Separation of hydroxyamino acids and determination of their configuration with the help of gas and liquid chromatography. Dokl. AN SSSR 165 no.5:1184-1187 D '65.

(MIRA 19:1)

1. Institut radiatsionnoy i fiziko-khimicheskoy biologii AN SSSR. Submitted January 19, 1965.

SHLYAPNIKOV, V. F.

KASATOCHKIN, V.I.; SHLYAPNIKOV, V.F.; NEPOMNYASHCHIY, L.B.

Submicroscopic structure of coal. Dokl.AN SSSR 96 no.3:547-548a My '54.
(MLRA 7:6)

1. Institut goryuchikh iskopayemykh Akademii nauk SSSR.
Predstavleno akademikom M.M.Dubininym.
(Coal)

SHLYAPNIKOV, Vladimir Izrailevich; KIRILLOV, Ivan Aleksandrovich;
OLINSKIY, M., red.; KOVALENKO, V., tekhn. red.

[On foot across the Crimea]Peshkom po Krymu. Simferopol',
Krymizdat, 1955. 196 p. (MIRA 15:12)
(Crimea--Guidebooks)

RUSAKOV, V.M. (Kuybyshev); SHLYAPNIKOV, V.N. (Moskva)

Symposium on pulmonary pathology. Arkh. pat. 24 no.11:93-95 '62. (MIRA 18:12)

SHLYAPNIKOV, V.N., aspirant

Histochemistry of pulmonary tissues in embryogenssis. Trudy
1-go MMI 22:287-298 '63 (MIRA 18:2)

SHLYAPNIKOV, V.N. (Moskva)

Localization of pneumonia in newborn infants. Arkh. pat. 25 no.4:19-23 '63 (MIRA 17:4)

1. Iz kafedry patologicheskoy anatomii (zav. - chlen-korrespondent AMN SSSR prof. A.I.Strukov) I.Moskovskogo ordena Lenina meditsinskogo instituta imeni I.M.Sechenova.

BAKHTIYAROV V.A., dotsent; SHLYAPNIKOV, V.N., kand.med.nauk

Work of the Kemerovo Province Society of Pathoanatomists in 1964. (MIRA 18:10)
Arkh. pat. 27 no.8:89-90 '65.

1. Predsedatel' Kemerovskogo oblastnogo obshchestva patologoanatomov (for Bakhtiyarov). 2. Sekretar' Kemerovskogo oblastnogo obshchestva patologoanatomov (for Shlyapnikov).

PHASE I BOOK EXPLOITATION SOV/5207

Vsesoyuznaya konferentsiya professorov i prepodavateley pedagogicheskikh institutov

Primeneniye ul'traakustiki k issledovaniyu veshchestva (Utilization of Ultrasonics for the Investigation of Matter) Moscow, Izd. MOPI, 1960. 267 p. 1,000 copies printed. (Series: Its Trudy, vyp. 11)

Ed. (Title page): V.F. Nozdrev, Professor and B.B. Kudryavtsev, Professor.

PURPOSE: This collection of articles is intended for physicists specializing in the physics of ultrasound.

COVERAGE: The collection of articles constitutes the transactions of the VII Conference on the Applications of Ultrasonics to the Study of Materials, which was held at the Moscow Oblast Pedagogical Institute imeni N.K. Krupskaya. Individual articles of the collection discuss various problems in the wave mechanics of ultrasound, the absorption and the propagation mechanics of ultrasonic waves in various media, the operating principle and design of generators and receivers of ultrasonic waves, the speed of sound and methods for its determination. Other articles deal with the applications of ultrasonics to investigations of the properties of materials. No personalities are mentioned. References accompany

Card 4/7

(17)

L 00832-67 EWT(m)/EWP(j) RM

ACC NR: AP6027773 (A) SOURCE CODE: UR/0190/66/008/008/1405/1410

AUTHOR: Shlyapnikova, I. A.; Miller, V. B.; Molvina, M. I.; Torsuyeva, Ye. S.; Shlyapnikov, Yu. A.

14
B

ORG: Institute of Chemical Physics, AN SSSR (Institut khimicheskoy fiziki AN SSSR)

TITLE: Monoamines as antioxidants and regularities and mechanisms of their effect

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 8, 1966, 1405-1410

TOPIC TAGS: monoamine, polypropylene, antioxidant

ABSTRACT: The oxidation of isotactic polypropylene in the presence of phenyl-α-naphtylamine and phenyl-β-naphtylamine occupying intermediate positions between strong and weak antioxidants was studied. The mechanism of the effect of antioxidiants was analyzed. Orig. art. has: 5 figures and 11 formulas. [Based on authors' abstract] [NT]

SUB CODE: 07/ SUBM DATE: 05Jul65/ ORIG REF: 007/

Card 1/1 hs UDC: 678.01:54

80613

5.3200

SOV/81-59-5-15247

Translation from: Referativnyy zhurnal, Khimiya, 1959, Nr 5, p 167 (USSR)

AUTHORS: Shushunov, V.A., Shlyapnikov, Yu.A.

TITLE: The Catalytic Decomposition of Organic Peroxide Compounds. I. The Kinetics of Acidic-Catalytic Decomposition of Cumene α-Hydroperoxide in Glacial Acetic Acid

PERIODICAL: Tr. po khimii i khim. tekhnol., 1958, Nr 1, pp 50 - 54

ABSTRACT: A study is made on the kinetics of cumene α-hydroperoxide (I) decomposition in a 99%-solution of CH_3COOH in the presence of H_2SO_4. The decomposition of I, under these conditions, takes place with the formation of 80 - 90% acetone (II) and 96 - 100% phenol. The reaction rate is proportional to the H_2SO_4 concentration in the first degree and in concentrations of I less than 0.02 M, it obeys an equation of the first order relative to the I concentration. In higher concentrations of I, it is noted that the self-acceleration of the reaction is the greater, the higher the concentration of I, which is explained by the effect of the formed II, the impurities of which speed up the reaction.

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20613

SOV/81-59-5-15247

The Catalytic Decomposition of Organic Peroxide Compounds. I. The Kinetics of Acidic-Catalytic Decomposition of Cumene -Hydroperoxide in Glacial Acetic Acid

Acetophenone is a weaker catalyst, benzophenone and phenol do not affect the reaction rate. The reaction rate increases considerably when $(CH_3CO)_2O$ is added to the solution. The initial reaction rate decreases when the water concentration increases to 5 mol.%, and changes little with a further increase in the water concentration. It is assumed that the additions introduced change the conditions of solvation of the molecules and ions, which take part in the reaction. The activation energy at a concentration of I of $7.2 \cdot 10^{-3}$ M in glacial CH_3COOH is 20.0 kcal/mol, in the presence of 0.1 M II is 16.1 kcal/mol.

I. Moiseyev

Card 2/2

MILLER, V.B.; NEYMAN, M.B.; SHLYAPNIKOV, Yu.A.

Thermal oxidative degradation of polypropylene. Part 2: Kinetics
of the initial stage of oxidation. Vysokom.soed. 1 no.11:
1703-1706 N '59. (MIRA 13:5)

1. Institut khimicheskoy fiziki AN SSSR.
(Propene)

5 (4)

AUTHORS: Shushunov, V. A., Shlyapnikov, Yu. A. SOV/20-128-2-33/59

TITLE: The Kinetics of the Acid Decomposition of Aralkyl Hydrogen Peroxides

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 2, pp 341-344 (USSR)

ABSTRACT: In the beginning the respective literature is briefly referred to (Refs 1-8). Statements testify that the hydrogen peroxides of cumene, diphenyl methane and tetralin as well as of other aralkyl hydrogen peroxide dissociate when heated with strong acids, forming the adequate phenols, ketons and aldehydes. The present paper investigates the reaction of the hydrogen peroxides of cumene, p-tert.-butyl cumene, 1,1-diphenyl ethane, cyclohexyl benzene, p-diisopropyl benzene, p-oxycumene, sec.butyl benzene and diphenyl methane with sulphuric acid. The reaction is of first order for the hydrogen peroxide as well as for the acid. The initial concentration of the hydrogen peroxide has no effect on the reaction constant. The decomposition products as well as the kind of solvent effect in different ways the reaction rate. The reaction is especially retarded by water addition (Table 1) and is greatly accelerated by addition of acetic anhydride (Fig 1). The accelerating effect

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The Kinetics of the Acid Decomposition of Aralkyl Hydrogen Peroxides SOV/20-128-2-33/59

of acetic anhydride is due to the fact that water resulting from the decomposition process is absorbed by acetic anhydride thus eliminating the retarding effect of the water. An ionic chain reaction in eight stages is constituted for the decomposition of cumene hydrogen peroxide. Table 2 shows the calculated reaction constants and the apparent activation energies of the investigated hydrogen peroxides. There are 1 figure, 2 tables, and 13 references, 2 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut khimii pri Gor'kovskom gosudarstvennom universitete im. N. I. Lobachevskogo (Scientific Research Institute of Chemistry at the Gor'kiy State University imeni N. I. Lobachevskiy)

PRESENTED: May 14, 1959, by V. N. Kondrat'yev, Academician

SUBMITTED: May 12, 1959

Card 2/2

S/195/60/001/003/005/013
B013/B058

AUTHOR: Shlyapnikov, Yu. A.

TITLE: Mechanism of the Decomposition of Hydrogen Peroxides by Means of Acids

PERIODICAL: Kinetika i kataliz, 1960, Vol. 1, No. 3, pp. 365 - 373

TEXT: With the aid of existing experimental material the author studied the rules of an acid decomposition of hydrogen peroxides and those of the isomerization of per-esters connected therewith. He showed that the schemes of acid decomposition previously proposed by Kharasch, Seubold, and Vaughan are inadequate. He proposes a reaction scheme of the acid decomposition of hydrogen peroxides, which he elaborated in collaboration with V. A. Shushunov (Ref. 19). This scheme explains qualitatively as well as quantitatively all experimentally determined rules:

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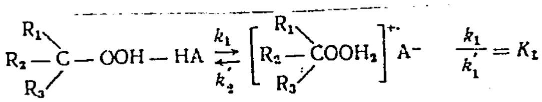

$$R_1R_2R_3C-OOH-HA \underset{k_2'}{\overset{k_1}{\rightleftarrows}} [R_1R_2R_3COOH_2]^{+}A^{-} \qquad \frac{k_1}{k_1'} = K_1$$

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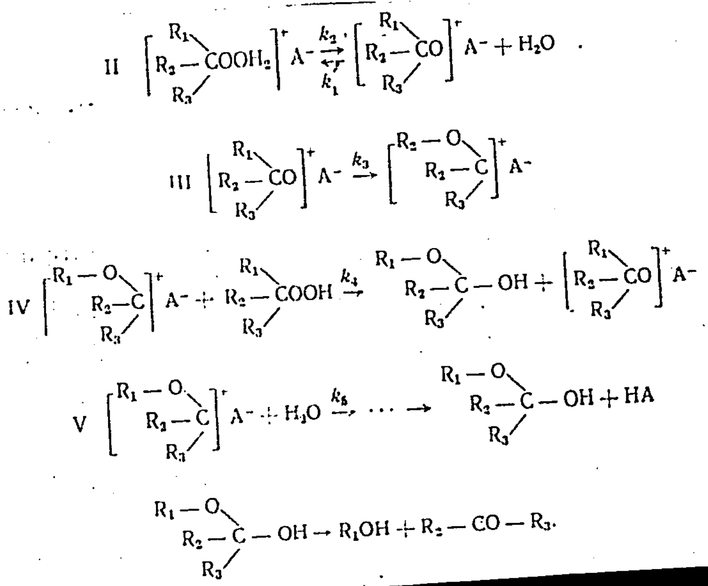

Mechanism of the Decomposition of Hydrogen Peroxides by Means of Acids

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B013/B058

This scheme differs from that proposed by Kharasch (Ref 1) by the fact that pairs of ions were assumed instead of free ions. Applying the method of quasisteady concentration, the calculation made on the basis of this scheme leads to equation (12):

$$-d[HP]/dt = K_1k_2[HP][HA]/(1 + \frac{k'_2}{k_3}[H_2O] + \frac{k_4[HP]}{k_4[HP] + k_5[H_2O]}.$$

$[HP]$ = concentration of the hydroperoxide, $[HA]$ = concentration of the acid. The third term of the denominator in (12) can be neglected at a sufficiently high water concentration ($k_5[H_2O] \gg k_4[HP]$). This results in equation (12a):

$-d[HP]/dt = K_1k_2[HP][HA]/(1 + k'_2/k_3[H_2O])$, which is identical with the experimentally determined equation (10), if $K_1k_2 = a$ and $k'_2/k_3 = b$:

(10) $-d[HP]/dt = a[HP][HA]/(1 + b[H_2O]) = k_k \cdot [HP][HA]$.

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Mechanism of the Decomposition of Hydrogen Peroxides by Means of Acids

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k_k - rate constant calculated for 1 mole acid; a and b = empiric constants. The author and Shushunov (Refs. 18 and 19) observed the same rules in the decomposition of various hydroperoxides. Data on the decomposition kinetics of various hydroperoxides under equal conditions are tabulated. The following was determined: the factors of the exponential function practically agree for all derivatives of the cumene hydroperoxide, including dihydroperoxide (considering that the calculation error in this case is great). The rate of decomposition of hydroperoxide is greatly increased through the introduction of tertiary butyl and specially hydroxy groups into the ring in para position. It is, however, greatly reduced through the introduction of the nitro group (Ref. 9). During the decomposition of p-nitro-phenyl-diphenyl methane hydroperoxide under the action of acids, the hydroxyl mainly passes over to the nonsubstituted phenyl (Ref. 22). The decomposition rate of cumene hydroperoxide under the action of chloric acid is higher than with sulfuric acid and increases more rapidly than would correspond to a first-order reaction. In ethyl alcohol this can be explained by

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Mechanism of the Decomposition of Hydrogen Peroxides by Means of Acids

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the catalytic effect of the $ClO_4'^-$ ion (Ref. 23). P. G. Sergeyev is mentioned. There are 2 figures, 1 table, and 23 references: 5 Soviet, 11 US, 2 British, 1 Czechoslovakian, and 4 German.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR)

SUBMITTED: January 28, 1960

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Card 5/7

S/190/60/002/009/015/019
B004/B060

AUTHORS: Shlyapnikov, Yu. A., Miller, V. B., Neyman, M. B., Torsuyeva, Ye. S., Gromov, B. A.

TITLE: Thermally Oxidative Destruction of Polypropylene. 15 III. Study of the Relative Efficacy of Some Antioxidants 15

PERIODICAL: Vysokomolekulyarnyye soyedineniya, 1960, Vol. 2, No. 9, pp. 1409-1412

TEXT: With the aim of preventing the oxidation of polypropylene films 18 the authors analyzed the stabilizing effect of the following substances: cyclohexyl benzene, thiourea, 2,4-dinitro-phenyl hydrazine, 2,5-di-t-butyl hydroquinone, diphenyl amine, benzidine, "Poligard", 2,4,6-tri-t-butyl phenol, monobenzyl ester of hydroquinone, 2,6-di-t-butyl-4-methyl phenol (Ionol), propyl gallate, phenyl-β-naphthyl amine (Neozon D), and diphenyl-p-phenylene diamine. The authors determined the induction period before the start of the polypropylene oxidation after adding these substances under the following conditions: 140°C, 300 torr P_{O_2}; concentration

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Thermally Oxidative Destruction of Polypropylene. S/190/60/002/009/015/019
III. Study of the Relative Efficacy of Some B004/B060
Antioxidants

of the stabilizer 0.01 mole/kg (0.003 mole/kg in some cases). Fig. 1 shows the experimental apparatus which permitted the simultaneous analysis of seven samples. The polypropylene film was prepared by rubbing down pulverized polypropylene with the stabilizer, addition of solvent causing the stabilizer, but not the polypropylene, to dissolve, drying and pressing in inert gas at 120 - 130°C and 120 kg/cm^2 pressure. Fig. 2 shows the kinetic curves of oxidation a) of films with the same surface and different weight, b) of films having the same weight but differing in thickness. It follows that oxidation takes place within the film and not only on the surface. Fig. 3 shows the stabilizing effect of 0.003 mole/kg of benzidine, diphenyl amine, and Neozon D. Table 1 gives the induction periods for the examined stabilizers on addition of 0.01 mole/kg, Table 2 the same for several stabilizers on addition of 0.003 mole/kg. Diphenyl-p-phenylene diamine proved to be the best stabilizer, followed by Neozon D, propyl gallate, and Ionol. These results contradict the statement made by S. Ye. Bresler et al. (Ref. 6) that such substances should be applied to polymer stabilization as poorly stabilize at room temperature. Also

Card 2/3

SHLYAPNIKOV, Yu. A. Cand Chem Sci -- "Kinetics and ~~the~~ mechanism of acidic decomposition of hydrogen peroxides." Mos, 1961 (Acad Sci USSR. Inst of Petrochemical Synthesis). (KL, 4-61, 188)

GROMOV, B.A.; MILLER, V.B.; SHLYAPNIKOV, Yu.A.

Compression molding of films from polypropylene. Plast.massy no.10: 66 '61. (MIRA 15:1)

(Films (Chemistry)) (Propene)

29517
S/062/61/000/011/004/012
B119/B138

15.8061

AUTHORS: Shlyapnikov, Yu. A., Miller, V. B., and Torsuyeva, Ye. S.

TITLE: Principles of action of inhibitors in oxidation of polypropylene

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 11, 1961, 1966-1970

TEXT: Linear, isotactic propylene was oxidized at temperatures above its melting point (up to 200°C with an oxygen pressure of up to 300 mm Hg) in the presence of inhibitors. The following compounds were used as inhibitors: 2,6-di (1,1-dimethylhexyl)-4-methyl phenol (1), 2,2'-methylene-bis-(4-methyl-6-tert-butyl phenol)-a (2), NN'-di-phenyl-p-phenylene diamine (3), N-phenyl-N'-cyclohexyl-p-phenylene diamine (4), and NN'-dicyclohexyl-p-phenylene diamine (5). Investigation was made into the dependence of the length of the induction period on the concentration of the inhibiting substance and on temperature, respectively, and the variation in the quantity of inhibitor during the induction period.

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Principles of action of inhibitors ...

In the latter study, the unconsumed residues of the inhibitors were quantitatively distilled off from the reaction mixture and spectrophotometrically determined. The authors found that the consumption of inhibitor (1) was too high at 200°C and the length of the induction period was only weakly affected (with concentrations increasing up to 0.2 mole/kg there was a linear rise in induction period from 3 to 60 min at 200°C and from 3 to 170 min at 180°C). Concentrations of (2) up to 0.05 mole/kg show a steep rise in the induction period, from 5 to 300 min. Further increase in the concentration of (2), causes only a slight increase in induction period. The simultaneous presence of (1) and (2) shortens the induction period. The inhibiting action of both (1) and (2) is considerably reduced with rising oxygen pressure. Consumption of (2) during the induction period proceeds according to a first order reaction (effective velocity constant: $1.9 \cdot 10^{-4}$ sec^{-1}). The consumption of (1) also depends on its concentration. (3) In concentrations of 0.01 mole/kg to 0.015 mole/kg will prolong the induction period from a few minutes to 5 hr, whereas higher concentrations have only a slight additional effect. (4) has a

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Principles of action of inhibitors ...

critical concentration minimum. Of all substances investigated, (4) has the strongest oxidation-inhibiting effect. Consumption of (4) and (5) also corresponds to a first order reaction (velocity constant $9 \cdot 10^{-5}\,\text{sec}^{-1}$ for (4) and $1 \cdot 10^{-3}\,\text{sec}^{-1}$ for (5)). Consumption of (2), (4), and (5) mainly proceeds by direct oxidation, while a smaller part of these substances is converted by side reactions, such as formation of free radicals and cooperation in branching of propylene chains (especially in (1) and (3)). The dependence of induction period on initial concentration of the inhibitor can be written approximately as follows: $\tau = \tau_{cr} + \frac{1}{k_i} \ln \frac{[I]}{[I]_{cr}}$, $[I]_{cr}$ = critical concentration of inhibitor, $[I]$ = initial concentration of inhibitor, τ_{cr} = induction period of polymer without inhibitor, τ = induction period. [Abstracter's note: Meaning of k_i could not be determined]. Oxidation of the inhibitor initiates the destruction of the polymer. The present paper was read at the general meeting of the

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Principles of action of inhibitors ...

Otdeleniye khimicheskikh nauk Akademii nauk SSSR (Department of Chemical Sciences of the Academy of Sciences USSR). There are 5 figures, 1 table, and 12 references: 8 Soviet and 4 non-Soviet. The four references to English-language publications read as follows: E. L. Waters, C. J. Busso, Industr. and Engng. Chem. 41, 907 (1949), R. H. Rosenwald, J. R. Hoaston, Industr. and Engng. Chem. 41, 914 (1949). R. H. Rosenwald, J. R. Hoaston, J. A. Chenicek, Industr. and Engng. Chem. 42, 162 (1950). G. W. Kennerly, W. L. Patterson, Industr. and Engng. Chem. 48, 1919 (1956).

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ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics of the Academy of Sciences USSR)

SUBMITTED: July 27, 1961

Card 4/4

26298
S/190/61/003/008/011/019
B110/B218

15-8200 2209

AUTHORS: Gromov, B. A., Miller, V. B., Neyman, M. B., Shlyapnikov, Yu. A.

TITLE: Study of the mobility of ionol in polypropylene and polyformaldehyde

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 8, 1961, 1231-1233

TEXT: It was the aim of the present work to determine the diffusion coefficient D of the antioxidant ionol (2,6-di-tert-butyl-4-methylphenol) in solid isotactic polypropylene (PP) and polyformaldehyde (PF). Ionol tagged with C_{14} was examined. In this, the authors followed the method by A. A. Zhukhovitskiy et al. (Primeneniye radioaktivnykh izotopov v metallurgii (Application of radioisotopes in metallurgy), Metallurgizdat, Sb. 34, 1955, p. 102). Tagged ionol (app. 1.2 mg for PP, and app. 0.5 mg for PF) was applied to the polymer plate (1-2 mm thick). The plates were heated to experimental temperature (60-110°C for PP, 80-110°C for PF).

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S/190/61/003/008/011/019
Study of the mobility of ionol in ... B110/B218

and the activity was measured, which decreased due to diffusion of ionol into the plates. According to Zhuknovitskiy, the curve $I/I_0 = f(t^{-1/2})$ has an asymptote which passes through the origin of coordinates. Between D and the tangent of the asymptote, the relation $D = \left(I_{\infty}^2 d^2\right)/\left(I_0^2 \cdot \pi \cdot m^2\right)$ holds, where d = thickness of the sample, m = tangent of the slope, and I_{∞} = activity after an infinite time of diffusion. With D being sufficiently large, the β rays of C_{14} cannot practically penetrate the plate so that one may write down for I_{∞}: $I_{\infty} \cong I_0/\mu d$. Here, μ is the absorption coefficient of β-radiation (as is the case with most organic substances it is 0.28 cm^2/mg). To exclude losses of ionol, the authors also chose an experimental arrangement in which the ionol was applied between two polymer plates. In this case, they measured the sum $I_1 + I_2$ of the activity of both plates, and found: (1) for PP, $D = 5 \cdot 10^6 \cdot \exp(-23000/RT)$; (2) for PF, $D = 2.5 \cdot 10^1 \exp(-16300/RT)$. Due to the high diffusion rate of ionol

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S/190/61/003/008/011/019
B110/B218

Study of the mobility of ionol in ...

in PP, even an incomplete mixing of the antioxidant with the polymer is sufficient. There are 2 figures and 3 Soviet references.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AS USSR)

SUBMITTED: November 30, 1960

Card 3/3

39850
S/190/62/004/008/011/016
B101/B138

5,3400

AUTHORS: Shlyapnikov, Yu. A., Miller, V. B., Neyman, M. B., Torsuyeva, Ye. S.

TITLE: Correlations in the effects of inhibitors in oxidation reactions. I. Alkyl phenols

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 8, 1962, 1226-1234

TEXT: The authors studied the effect of 2,6-di-tert.-octyl-4-methyl phenol (I) and 2,2'-p-methylene-bis-(4-methyl-6-tert.-butyl phenol) (II) on the induction period of the oxidation of isotactic polypropylene. The inhibitor consumption was measured for the induction period at 170 - 200°C in the presence of I, and at 190 - 210°C in the presence of II, according to Vysokomolek. soyed., 2, 1409, 1960. The amount unconsumed was determined by weighing the inhibitor sublimed from the reaction mixture at 200°C. Results: (1) The induction period increases with inhibitor concentration but without linear relation. With I, the

X

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induction period τ depends on pressure: at 170°C and 0.01 moles I/kg polypropylene, τ was 56 and 32 min at 300 and 600 mm Hg, respectively. (2) The absorption spectra of the oxidation products show that their composition remains unchanged during τ, while their amount is proportional to the decreasing inhibitor concentration. The change in concentration of II during oxidation follows a first-order rule. (3) During τ the decrease in the molecular weight of polypropylene is accelerated as the inhibitor concentration rises. At every polymer chain rupture approximately 5 mols. inhibitor are consumed. (4) τ is considerably shortened by adding I to polypropylene already containing II. (5) The low intensity of the epr signals of I and II suggests that only a small portion of inhibitor is present in the form of free radicals. Conclusions: A large amount of inhibitor is consumed by direct oxidation and chain termination initiated by it, but only a small portion by those not initiated by it. The different behaviors of I and II are due to their different effects on initiation and branching during hydroperoxide decomposition. Rapid and direct oxidation by molecular oxygen is assumed for II. There are 4 figures and 1 table. The most important English-language references are: E. L. Waters, C. J. Busso, Industr. and Engng. Chem., 41, 907, 1949;

S/190/62/004/008/011/016
Correlation in the effects of ... B101/B138

R. H. Rosenwald, J. R. Hoatson, Industr. and Engng. Chem., 41, 914, 1949; R. H. Rosenwald, J. R. Hoatson, J. A. Chenicek, ibid., 42, 162, 1950.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics of the AS USSR)

SUBMITTED: May 18, 1961

X

Card 3/3

SHLYAPNIKOV, Yu.A.; MILLER, V.B.; NEYMAN, M.B.; TORSUYEVA, Ye.S.

Regularities of the effect of inhibitors in oxidation reactions. Part 2: Mixtures of alkyl phenols with didecyl sulfide. Vysokom. soed. 5 no.10:1507-1512 0 '63.
(MIRA 17:1)

1. Institut khimicheskoy fiziki AN SSSR.

L 13700-63 EWP(j)/EPF(c)/EWT(m)/BDS Pc-4/Pr-4 RM/WW B1

ACCESSION NR: AP3003521 S/0020/63/151/001/0148/0150

AUTHORS: Shlyapnikov, Yu. A.; Miller, V. B.; Neyman, M. B.; Torsuyeva, Ye. S.

TITLE: Participation of inhibitor in degenerate branching of a chain 65

SOURCE: AN SSSR. Doklady, v. 151, no. 1, 1963, 148-150 64

TOPIC TAGS: inhibitor, oxygen pressure, oxidizing reaction, chain branching

ABSTRACT: The author investigated the influence of the inhibitor "monophenol" on the quantity of critical concentration of another inhibitor "biphenol". It is shown that the factor of self-accelerating oxidizing reaction of high-molecular carbohydrate depends on the oxygen pressure and on the concentration of the "monophenol" inhibitor. The growth of the self-accelerating oxidizing reaction factor in the presence of the inhibitor "monophenol" is explained by the participation of the inhibitor in the act of degenerate branching of chains. The paper was presented by Academician N. N. Semenov on 11 March 1963. Orig. art. has: 11 formulas and 2 figures.

ASSOCIATION: Inst. of Chemical Physics, Academy of Sciences

Card 1/1

L 19610-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM/MLK

ACCESSION NR: AT4049860 S/0000/64/000/000/0218/0221

AUTHOR: Kapachauskene, Ya. P., Shlyapnikov, Yu. A.

B+1

TITLE: Oxidation of high-pressure polyethylene

SOURCE: Khimicheskiye svoystva i modifikatsiya polimerov (Chemical properties and the modification of polymers); sbornik statey. Moscow, Izd-vo Nauka, 1964, 218-221

TOPIC TAGS: high-pressure polyethylene, polyethylene oxidation, ionol, ionol conversion product, polyethylene oxidation energy

ABSTRACT: The oxidation of high-pressure polyethylene was studied in the absence of admixtures and in the presence of the non-toxic antioxidant ionol at 130-200C. In the pure state, polyethylene oxidizes in accordance with the autocatalytic law, with an induction period. The induction period was taken as the time during which the pressure in the reaction system ($V \cong 10$ ml) dropped, in comparison with the original, by 2.5 mm Hg. The induction period τ as a function of the pressure can be expressed by $\tau = a + bP$. The effective energies of activation, determined from the temperature function of a and b in the range 160-200C, for low (E_a) and high (E_b) oxygen pressures were: $E_a = 16$ kcal/mole and $E_b = 20.5$ kcal/mole; below 150-160C, these values rose noticeably and were

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equal to approximately 23 and 28 kcal/mole. The primary products of oxidation are apparently chiefly hydroperoxides which later decompose with the formation of volatile products, the composition of which was not determined. The induction period below 180-190C was markedly prolonged in the presence of ionol; in this case, the solubility as well as the characteristic viscosity of the polyethylene remained practically unchanged to the end of the induction period. The induction period increased non-linearly with the ionol concentration; the dependence of the induction period at a given antioxidant concentration of the temperature did not follow the Arrhenius law. Above 190C, the ionol had practically no effect on oxidation. Changes in the ionol concentration during the induction period were studied at 158, 166, and 171C. After a rapid drop in concentration in the initial period, the antioxidant was consumed more gradually, in accordance with the first order law; at the end of the induction period, the relative speed again increased. The effective constant of the speed of consumption of ionol at 166C is equal to 8.6×10^{-3} $\sec^{-1}$; moreover, 74% of the antioxidant is consumed in chemical processes and 24% is evaporated. The energy of activation of the chemical component of the speed constant is equal to 21.1 ± 1 kcal/mole and for evaporation, 26 ± kcal/mole. The conversion products of the ionol were found to retard

L 19610-65

ACCESSION NR: AT4049860 2

the oxidation more effectively than the original ionol. Orig. art. has: 4 figures and 1 formula.

ASSOCIATION: Institut khimii i khimicheskoy tekhnologii AN Litovskoy SSR (Institute of Chemistry and Chemical Technology of the Academy of Sciences, Lithuanian SSR) Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 18Jan63 ENCL: 00 SUB CODE: OC, MT

NO REF SOV: 004 OTHER: 006

Card 3/3

L 19636-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 ASD(p)-3/RAEM(i) RM

ACCESSION NR: AP5000744 S/0191/64/000/012/0003/0005

AUTHOR: Kapachauskene, Ya. Pa. , Shlyapnikov, Yu. A. B

TITLE: The oxidation of high-pressure polyethylene stabilized with alkylphenols and carbon black

SOURCE: Plasticheskiye massy*, no. 12, 1964, 3-5

TOPIC TAGS: polyethylene, high pressure polyethylene, polyethylene oxidation, polyethylene stability, antioxidant, alkylphenol, carbon black

ABSTRACT: The oxidation of high-pressure polyethylene was studied at 200C and 300 mm Hg oxygen pressure in the presence of purified antioxidants, i.e., 2, 2'-methylene-bis-(4-methyl-6-tert.-butylphenol) (I), 2, 2'-thio-bis-(4-methyl-6-tert.-butylphenol) (II), and in the presence or absence of thiodilauryl propionate, 1-3 wt% channel black, or 3 wt% silica gel with 7 m^2/g specific surface area). Carbon black was shown to decrease the induction period in the presence of antioxidant, although this effect was less pronounced with the more effective additive II, and decreased at 190-220C. The consumption of 0.04 mole/kg I or 0.015 mole/kg II was shown to be proportional to antioxidant concentration both in the absence or presence of carbon black and to proceed by a first order reaction.

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L 19636-65

ACCESSION NR: AP5000744

The decrease in induction time in the presence of carbon black is shown to be related to its catalytic effect, whereas carbon black does not have any direct effect on the concentration of antioxidant. Thus, absorption of antioxidant on carbon black is negligible during the induction period. Addition of powdered silica gel extended the induction period, and thiodilauryl propionate reduced the concentration of the studied antioxidants. The decrease in induction time following addition of carbon black was also observed in the presence of both antioxidant and thiodilauryl propionate. Both I and II were shown to be more effective than ionol. Orig. art. has: 1 table and 7 figures.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: MT

NO REF SOV: 005 OTHER: 005

Card 2/2

L 34141-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 GS/RM
ACCESSION NR: AT4049847 S/0000/64/000/000/0106/0109

25
27
B

AUTHOR: Shlyapnikov, Yu. A.; Miller, V. B.; Neyman, M. B.; Torsuyeva, Ye. S.

TITLE: The kinetics of the effect of inhibitors in oxidation reactions. III. Inhibitor 2,2'-thio-bis-(4-methyl-6 tert.-butylphenol)

SOURCE: Khimicheskiye svoystva i modifikatsiya polimerov (Chemical properties and the modification of polymers); sbornik statey. Moscow, Izd-vo Nauka, 1964, 106-109

TOPIC TAGS: polypropylene, isotactic polymer, oxidation inhibitor, alkylphenol, thiobiphenol, polymer oxidation, biphenol

ABSTRACT: The oxidation of linear isotactic polypropylene was investigated at about 200C in the presence of the inhibitor 2,2'-thio-bis-(4-methyl-6-tert.-butylphenol), m.p. 83-34C, abbreviated as thiobiphenol. The dependence of the induction period on the thiobiphenol concentration was studied at 190, 200 and 210C, and an oxygen pressure of 300 mm Hg. At a concentration of 0.005-0.020 mole/kg, an approximately linear relationship was found between the induction period and the thiobiphenol concentration. Thiobiphenol consumption in the induction

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L 34141-65
ACCESSION NR: AT4049847

period was investigated only at 200C at initial inhibitor concentrations of 0.015 and 0.030 mole/kg. The rate constants of thiobiphenol consumption calculated from the slope of the plotted curves are 1.38 x 10^{-4} sec^{-1} for the initial 0.015 mole/kg and 1.07 x 10^{-4} sec^{-1} for the 0.030 mole/kg concentration, i.e. the deviation of the inhibitor consumption from the first-order law is insignificant. The relationship between the critical concentration of thiobiphenol at the end of the induction period and its initial concentration calculated by the given equation shows that the constant "k" depends linearly on the initial thiobiphenol concentration. The plotted critical concentration of thiobiphenol decreases approximately 30-fold when the initial concentration is increased from 0.005 to 0.030 mole/kg, while that for biphenol decreases by less than 50%. A thiobiphenol solution in heptane has a maximum absorption in ultraviolet light at 292-300 mμ, while the analogous biphenol solution absorbs at 28 - 285 mμ. The consumption of each inhibitor in the mixture is first order in nature, but the rate constants differ considerably from the rate constant of each of the inhibitors when used alone: for thiobiphenol in a mixture, k = 1.07 x 10^{4} sec^{-1} instead of 1.38 x 10^{-4} sec^{-1} for the same initial concentration, and for biphenol in a mixture, k = 3 x 10^{-4} sec^{-1} instead of 2 x 10^{-4} sec^{-1} in the absence of thiobiphenol. The

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L 34141-65
ACCESSION NR: AT4049847

2

equation describing the consumption of one inhibitor in the oxidizing mixture containing two inhibitors of the same type is given. In a mixture of these two inhibitors, 2,2'-thio-bis-(4-methyl-6-tert.-butylphenol) is consumed more slowly, and 2,2'-methylene - bis-(4-methyl-6-tert.-butylphenol) more rapidly than each of them are consumed separately at the same initial concentration. "The authors express their gratitude to F. Yu. Rachinskiy for supplying the 2,2'-thio-bis-(4-methyl-6-tert.-butylphenol)." Orig. art. has: 4 figures and 5 formulas.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Chemical physics institute, AN SSSR)

SUBMITTED: 07Jul62 ENCL: 00 SUB CODE: OC, GC

NO REF SOV: 005 OTHER: 000

Card 3/3

L 35077-65 EPF(c)/EWP(j)/EWT(m) Pc-4/Pr-4 RM

S/0081/64/000/024/S023/S024

ACCESSION NR: AR5006364

24

B+1

SOURCE: Ref. zh. Khimiya, Abs. 24S132

AUTHOR: Kapachauskene, Ya. P.; Shlyapnikov, Yu. A.

TITLE: Oxidation of high pressure polyethylene

CITED SOURCE: Sb. Vysokomolekul. soyedineniya. Khim. svoystva i modifik. polimerov. M., Nauka, 1964, 218-221

TOPIC TAGS: Oxidation, high pressure polyethylene, ionol, antioxidant

TRANSLATION: The oxidation of high pressure polyethylene was studied at 130-200° and at varying O_2 pressures. The curves for the induction period τ are linearized by the transformation of coordinates $\tau P = a + bP$, where the activation energies of the change, a and b are equal to 16 and 20.5 kcal/mol respectively at 160-200°, but at < 150° are increased to 23 and 28 kcal/mol. Ionol effectively inhibits oxidation at < 180-190°. In the middle of the induction period the ionol is spent according to the 1st order law since a considerable portion (26%) is volatilized from the oxidized sample. The actual constant of the consumption rate of ionol at 166° is $8.6 \cdot 10^{-3}$ sec^{-1}. The activation energy for the chemical component of the

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L 35077-65

ACCESSION NR: AR5006364

0

rate constant is equal to 21.1 ± 1 kcal/mol and for evaporation, 26 ± 2 kcal/mol. The ionol conversion products are more effective antioxidants than ionol itself. Authors' abstract

SUB CODE: OC

ENCL: 00

Card 2/2

ACCESSION NR: AP4030363 S/0190/64/006/003/0470/0472

AUTHORS: Gromov, B. A.; Miller, V. B.; Shlyapnikov, Yu. A.

TITLE: Correlations in the performance of inhibitors in oxidation reactions. 5. Kinetics of α-naphthol consumption in the induction period

SOURCE: Vy#sokomolekulyarny#ye soyedineniya, v. 6, no. 3, 1964, 470-472

TOPIC TAGS: polypropylene, oxidation of polypropylene, oxidation inhibitor, alpha-naphthol, 2,2-methylene-bis-(4-methyl-6-tert.butylphenol), didecilsulfide, temperature effect, oxygen effect, oxidation induction period, activation energy

ABSTRACT: The consumption rate of α-naphthol in the induction period of polypropylene oxidation at various temperatures and oxygen pressures was studied. The technique is described in an earlier publication by the authors and M. B. Neyman (Sb. Khimicheskiye svoystva i modifikatsiya polymerov. Izd. "Nauka," 1964). It was found that by using 0.2 mole of alpha-naphthol per 1 kg of isotactic polypropylene, at a constant oxygen pressure of 300 mm mercury, the induction period of polypropylene oxidation decreased from 510 to 240 minutes with an increase in temperature from 180 to 200C. It was also revealed that at a constant

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ACCESSION NR: AP4030363

temperature of 200C the duration of the induction period dropped from 450 to 150 minutes when the oxygen pressure was raised from 150 to 650 mm Hg. Calculations showed that in the middle part of alpha-naphthol consumption the rate constant exhibited a linear relation to the oxygen pressure, and that the temperature dependence of the induction period was 16.8 kcal/mole. The addition of 0.01 mole of the oxidation inhibitor 2,2-methylene-bis-(4-methyl-6-tert.butylphenol) per 1 kg of polypropylene with an equal amount of alpha-naphthol (at 200C and an oxygen pressure of 300 mm Hg), shortened the induction period to 225 minutes, as against 285 minutes needed for alpha-naphthol alone. On the other hand, the simultaneous incorporation of 0.1 mole/kg of alpha-naphthol and 0.08 mole/ kg of the inhibitor didecilsulfide extended the induction period to 510 minutes, as compared with 160-170 minutes for alpha-naphthol alone. The authors theorize that the oxidation inhibiting performance of alpha-naphthol was caused by the pressure of its transformation products. Orig. art. has: 5 figures.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics AN SSSR)

SUBMITTED: 11Mar63
DATE ACQ: 07May64
ENCL: 00

SUB CODE: OC
NO REF SOV: 002
OTHER: 000

Card 2/2

[illegible], [illegible] Yu.A.

Oxidation of high pressure polyethylene stabilized with alkylphenols and carbon black. Plast. massy no.12:3-5 '64. (MIRA 18:3)

L 29992-65 EWT(m)/EPF(c)/EWP(j) Pc-4/Pr-4 RM 27

ACCESSION NR: AP4047220 S/0190/64/006/010/1895/1900 26

AUTHOR: Gromov, B.A.; Miller, V.B.; Neyman, M.B.; Torsuyeva, Ye. S.; B
Shlyapnikov, Yu. A.

TITLE: Mechanism of action of weak antioxidants 4 during the oxidation of polypropylene 1

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 6, no. 10, 1964, 1895-1900

TOPIC TAGS: polypropylene, polypropylene oxidation, antioxidant, monophenol, isotactic polypropylene, antioxidant consumption

ABSTRACT: In order to confirm the hypothesis that all monphenols are weak antioxidants, the author investigated the oxidation of isotactic polypropylene in the presence of 2,4,6-tri-tert.-butylphenol, 2,6-ditert.-butyl-4-phenylphenol and 4,4'-methylene-bis-(2,6-di-tert.-butylphenol). Samples of polypropylene were oxidized in sealed ampoules as described in earlier papers. In addition to determining the consumption of the monophenol, the authors measured the water content in the gas phase of the ampoule, and in some cases the characteristic viscosity (in tetralin at 130C). The results showed that the monophenol was consumed according to a zero order law, at a rate proportional to the oxygen pressure; the rate was decreased by the presence of didecylsulfide. In the presence of antioxidant, the molecular weight of the polymer decreased sharply, and oxidation was

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L 29992-65
ACCESSION NR: AP4047220

found to proceed in a non-stationary way at all antioxidant concentrations. Mathematical analysis of these results indicated that the reason for the low degree of effectiveness of the monophenols as antioxidants is that they stimulate branching of the kinetic oxidation chain. Orig. art. has: 1 table, 6 figures and 11 equations.

ASSOCIATION: Institut khimicheskoy fiziki AN SSSR (Institute of Chemical Physics, AN SSSR)

SUBMITTED: 26Dec63 ENCL: 00 SUB CODE: OC, GC

NO REF SOV: 005 OTHER: 000

Card 2/2

L 1126-66 EWT(m)/EPF(c)/EWP(j) RM

ACCESSION NR: AP5022936 UR/0062/65/000/008/1481/1483
541.6+542.943

AUTHOR: Yasina, L. L.; 44,55 Miller, V. B.; 44,55 Shlyapnikov, Yu. A.; 44,55 Skripko, L. A. 44,55

TITLE: Mechanism for the inhibition of the polypropylene 15 oxidation 7 process by 36
tetramethoxydiphenylnitroxide 32

SOURCE: AN SSSR. Izvestiya. Seriya khimicheskaya, no. 8, 1965, 1481-1483 13

TOPIC TAGS: polypropylene plastic, 44,55 oxidation, inhibitor

ABSTRACT: The mechanism of inhibition of polypropylene oxidation by 2,2',4,4'-tetramethoxydiphenylnitroxide, $(CH_3O)_2C_6H_3\text{-NO-}C_6H_3(OCH_3)_2$, was studied at 200°C and 300 mm Hg of oxygen pressure. The object of the study was to define the active oxidation inhibiting species. The polypropylene used had a characteristic viscosity $\eta = 3.8$ and a molecular weight equal to 150,000. The dependence of the induction period of polypropylene oxidation upon inhibitor concentration is shown in fig. 1 of the Enclosure. The UV absorption spectra are shown in fig. 2 of the Enclosure. The changes in induction period and UV absorption spectra indicate that

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L 1126-66

ACCESSION NR: AP5022936 15 4

2,2',4,4'-tetramethoxydiphenylamine is the actual oxidation inhibitor for propylene stabilized with 2,2',4,4'-tetramethoxydiphenylnitroxide. One molecule of amine is formed from two molecules of nitroxide. Formation of amine is completed within 1-2 minutes from the beginning of the oxidation process and it is reflected in a rapid decline of the polypropylene molecular weight. Orig. art. has: 3 figures.

ASSOCIATION: Institut khimicheskiy fiziki Akademii nauk SSSR (Institute of Chemical Physics, Academy of Sciences, SSSR) 44,55

SUBMITTED: 23Nov64 ENCL: 02 SUB CODE: GC, OC

NO REF SOV: 005 OTHER: 003

Card 2/4

L 1126-66

ACCESSION NR: AP5022936

ENCLOSURE: 01

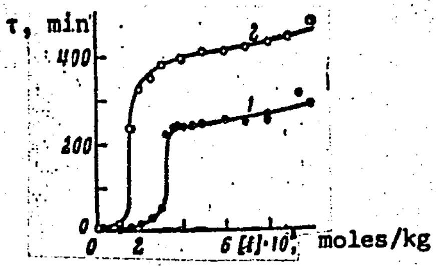

Fig. 1. 1--2,2',4,4'-tetramethoxydiphenylnitroxide; 2--2,2',4,4'-tetramethoxydiphenylamine.

Card 3/4

L 1126-66

ACCESSION NR: AP5022936

ENCLOSURE: 02

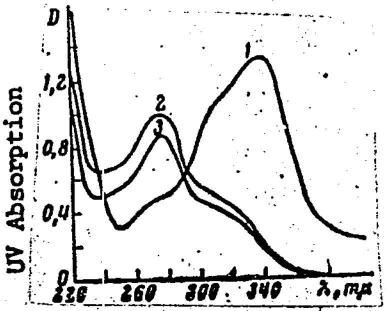

Fig. 2. 1--2,2'4,4'-tetramethoxydiphenylnitroxide; 2--product distilled out of polypropylene stabilized with tetramethoxydiphenylnitroxide after 15 min oxidation; 3--2,2',4,4'-tetramethoxydiphenylamine.

Card 4/4

L 11608-66 EWT(m)/EWP(j)/T WW/RM

ACC NR: AP6001864 SOURCE CODE: UR/0190/65/007/012/2094/2095

44,55 44,55

AUTHORS: Yushkevichyute, S. S.; Shlyapnikov, Yu. A.

43B

44,55

ORG: Institute for Chemistry and Chemical Technology, AN Lithuanian SSR (Institut khimii i khimicheskoy tekhnologii AN Litovskoy SSR); Institute for Chemical Physics, AN SSSR (Institut khimicheskoy fiziki AN SSSR) 44,55

TITLE: Diffusion of 2,6-di-tert-butyl-4-methylphenol in high pressure polyethylene 7, 44

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 7, no. 12, 1965, 2094-2095

TOPIC TAGS: polymer, polyethylene, ~~diffusion~~, physical diffusion, liquid diffusion

ABSTRACT: The diffusion coefficient for the antioxidant 15 2,6-di-tert-butyl-4-methylphenol (ionol) 7 in high pressure polyethylene in the temperature interval of 65--95C was determined by the technique developed by A. A. Zhukhovitskiy and V. A. Geodikyan (Dokl. AN SSSR, 102, 301, 1955). The ionol was tagged by C^{14} in the tert butyl group, and the diffusion coefficient D was calculated by means of the equation

$$D = \frac{I_\infty^2 \cdot d^2}{I_0^2 \pi \cdot m^2} = \frac{1}{\pi \cdot \mu^2 \cdot m^2};$$

where I_0 and I_∞ are the initial activity and at infinite time (i.e., uniform distribution), d - the thickness of specimen, μ = the absorption coefficient C^{14} for β activity, and m is the slope of the line of I/I_0 vs $t^{\frac{1}{2}}$ shown in Fig. 1. It was

Card 1/2 UDC: 532.72+678.742

L 11608-66

ACC NR: AP6001864

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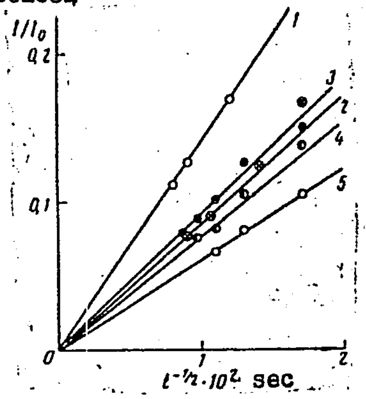

Fig. 1. Change in specimen activity as a function of diffusion of ionol in polyethylene (in coordinates I/I_0 vs $t^{\frac{1}{2}}$) at different temperatures: 1 -.65C; 2 - 75C; 3 - 80C; 4 - 85C; 5 - 95C.

found that D = 6.8 (exp - 13100/RT), that the diffusion of ionol increases with degree of elongation of the specimen, and that annealing of specimens causes a further increase in the diffusion of ionol. Orig. art. has: 1 table, 1 graph, and 1 equation.

SUB CODE: 07,11/ SUBM DATE: 14Jan64/ ORIG REF: 002/ OTH REF: 002

Card 2/2

L 10525-66 EWT(m)/EWP(j) RM

ACC NR: AP5027173 SOURCE CODE: UR/0076/65/039/010/2418/2424

AUTHOR: Shlyapnikov, Yu. A.; Miller, V. B. 44,55 44,55 51 B

ORG: Institute of Chemical Physics, Academy of Sciences SSSR (Institut khimicheskoy fiziki, Akademiya nauk SSSR) 44,55

TITLE: Mechanism of action of antioxidants 7,44,55

SOURCE: Zhurnal fizicheskoy khimii, v. 39, no. 10, 1965, 2418-2424

TOPIC TAGS: antioxidant additive, oxidation inhibition, oxidation kinetics, hydrocarbon

ABSTRACT: A scheme of inhibited oxidation of hydrocarbons 7 is proposed which takes into account the participation of the antioxidant in the chain initiation and propagation:

$$IH + O_2 \xrightarrow{k_0} I^{\cdot} + HO_2^{\cdot} \xrightarrow{RH} \alpha R^{\cdot} + \text{inactive products},$$

$$R^{\cdot} + O_2 \xrightarrow{k_1} RO_2^{\cdot},$$

$$RO_2^{\cdot} + RH \xrightarrow{k_2} ROOH + R^{\cdot},$$

$$RO_2^{\cdot} + IH \xrightarrow{k_3} ROOH + I^{\cdot},$$

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2

L 10525-66

ACC NR: AP5027173

$$\mathrm{ROOH} + \mathrm{RH} \xrightarrow[R_4]{O_2} \delta\, \mathrm{RO}_2 + \text{inactive products}$$

$$\mathrm{ROOH} + \mathrm{R}_2\mathrm{S} \xrightarrow{k_5} \text{inactive products}$$

where IH is the antioxidant and δ the number of kinetic chains formed in the breakdown of one hydroperoxide molecule (i.e., the probability of degenerate chain branching). The following equations result from this scheme:

$$\frac{d([\mathrm{R}^{\cdot}] + [\mathrm{RO}_2^{\cdot}])}{dt} = \alpha k_0 [\mathrm{IH}][\mathrm{O}_2] - k_3 [\mathrm{RO}_2^{\cdot}][\mathrm{IH}] + \delta k_4 [\mathrm{ROOH}][\mathrm{RH}],$$

$$\frac{d[\mathrm{ROOH}]}{dt} = k_2 [\mathrm{RO}_2^{\cdot}][\mathrm{RH}] + k_3 [\mathrm{RO}_2^{\cdot}][\mathrm{IH}] - k_4 [\mathrm{ROOH}][\mathrm{RH}] - k_5 [\mathrm{ROOH}][\mathrm{R}_2\mathrm{S}].$$

Some special cases of solution of this system of equations are considered, and certain aspects of the mechanism of inhibited oxidation are analyzed. It is shown that the concept of participation of the antioxidant in the act of degenerate branching is the missing link which makes it possible to advance a consistent mechanism of inhibited oxidation that adequately accounts for various experimental facts. Orig. art. has: 25 formulas.

SUB CODE: 07 / SUBM DATE: 15Jul64/ ORIG REF: 008 / OTH REF: 002

Card 2/2

L 04458-67 EWT(m)/EWP(j)/T IJP(c) WW/RM

ACC NR: AP6030233 SOURCE CODE: UR/0030/66/000/008/0064/0068

AUTHOR: Neyman, M. B. (Doctor of chemical sciences); Shlyapnikov, Yu. A. (Candidate of chemical sciences)

ORG: none

53
52
B

TITLE: Studies in polymer oxidation inhibition

SOURCE: AN SSSR. Vestnik, no. 8, 1966, 64-68

TOPIC TAGS: antioxidant additive, oxidation inhibition, heat resistant plastic, reaction mechanism

ABSTRACT: Research on the mechanism of action of polymer antioxidants carried out over a period of six years at the Institute of Chemical Physics, Academy of Sciences USSR has been reviewed. Early experiments showed that the effectiveness of an antioxidant depends not only on the constant of the rate of reaction of the inhibitor with peroxide radicals, but also on its structure, particularly on the number and mutual arrangement of the reactive functional groups. This was revealed, inter alia, in a comparative study of the antioxidant effectiveness of monohydroxy and dihydroxy hindered phenol-type antioxidants. On the basis of this research, a new theory of antioxidant action was formulated, which not only explains presently known facts but predicts new phenomena. For example, this theory explained the synergistic effect of two antioxidants, and correctly predicted the existence of a critical

Card 1/2 UDC: 541.6

L 04458-67

ACC NR: AP6030233

concentration of synergistic mixtures below which the synergistic effect vanishes. The synergistic effect of two antioxidants was attributed to one of them being a chain-reaction inhibitor and the other, a hydroperoxide-reducing agent (e.g., a thio ether). It is claimed that the theory permits a new approach to the selection of polymer antioxidants which, unlike the purely empirical approach used heretofore, takes into account theoretical data. The new approach has already yielded dividends in the preparation of a polypropylene which withstands a temperature of 120C for 4000 hr. Orig. art. has: 3 figures. [ATD PRESS: 5066-F]

SUB CODE: 07 / SUBM DATE: none

Card 2/2

L 33427-66 EWT(m)/EWP(j) JW/RM

ACC NR: AP6012724 (A) SOURCE CODE: UR/0190/66/008/004/0769/0770

AUTHOR: Shlyapnikova, I. A.; Miller, V. B.; Neyman, M. B.; Shlyapnikov, Yu. A. 48 B

ORG: None

TITLE: Upper critical concentration of an antioxidant 15

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 8, no. 4, 1966, 769-770

TOPIC TAGS: antioxidant additive, ~~polypropylene,~~ solution concentration, oxidation, ~~antioxidant, critical concentration~~

ABSTRACT: The upper critical concentration of an antioxidant has been investigated. It was shown that antioxidant additives increase the probability that the degenerated chain branching under certain conditions, does possesslower and upper critical concentrations. The upper critical concentration during polypropylene oxidation is shown in the presence of antioxidant-phenyl-β-naphtylamine. Orig. art. has: 1 figure and 3 formulas. [NT]

SUB CODE: 11/ SUBM DATE: 15Oct65/ ORIG REF: 003/

Card 1/1 UDC: 678.01:54