[illegible] -33-1-36/49

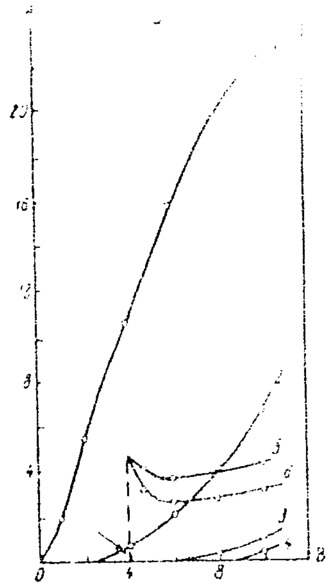

Fig. 5. Oxidation of I in the presence of p-phenylenediamine: 2 = 0.001; 3 = 0.005; 4 = 0.05; 5 = 0.25; 6 = 0.5; 7 = 5.0; 8 = 10.0.

Card 7/12

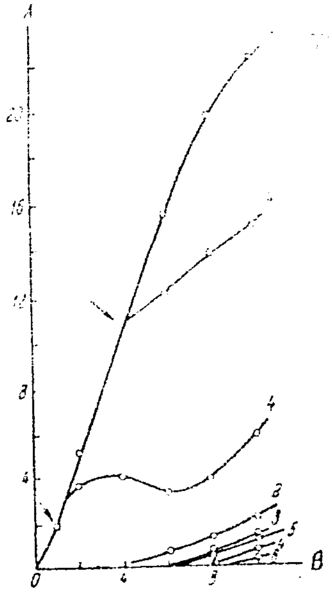

Fig. 6. Oxidation of I in the presence of p- and o-aminophenols: 2 = 0.001, 3 = 0.005, and = 0.025 for p-aminophenol; 5 = 0.005 and 6 = 0.025 for o-aminophenol.

Card 8/12

[illegible]

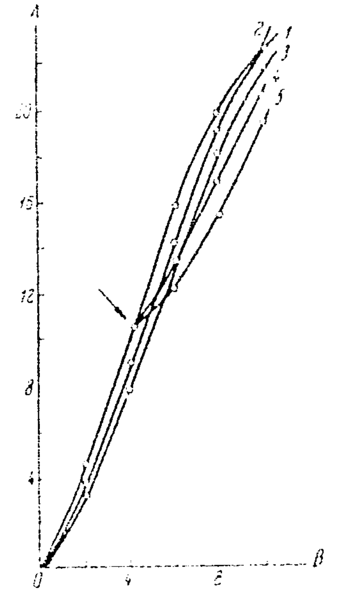

Fig. [illegible]. Oxidation of I in the presence of dimethyl ether of hydroquinone: 2 = 0.1; 3 = 0.5; 4 = 1.0; 5 = [illegible]

Card 9/12

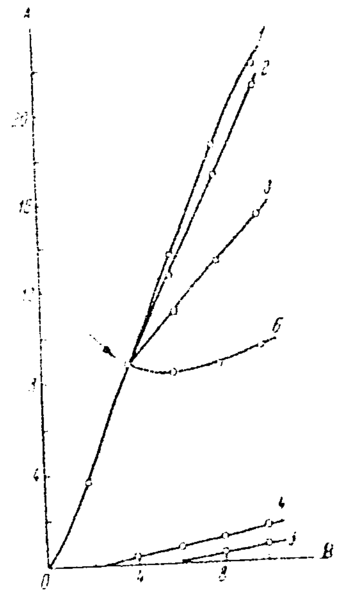

Fig. 6. Oxidation of I in the presence of diphenylamine: 2 = 0.001; 3 = 0.01; 4 = 0.05; 5 = 0.1; 6 = 1.0

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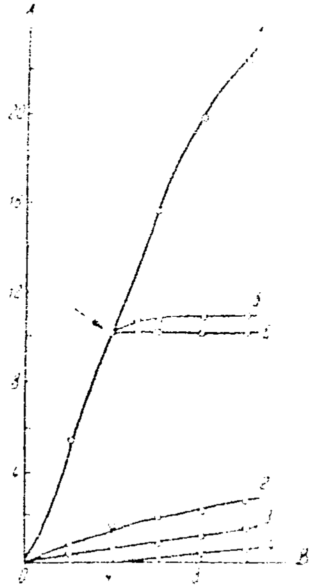

Fig. 9. Oxidation of I in the presence of dimethylaniline: 2 = 0.1; 3 = 0.2; 4 = 0.4; 5 = 1.0; 6 = 5.0.

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SOV/80-33-1-30/49

There are 9 figures; 1 table; and 23 references, 12 Soviet, 3 German, 6 U.S., 2 U.K. The 5 most recent U.S. and U.K. references are: R. H. Rosenwald, Ind. Eng. Ch., 42, 162 (1950); G. S. Hammond, J. Am. Chem. Soc., 77, 3238 (1955); C. E. Boozer, et al., J. Am. Chem. Soc., 77, 3233 (1955); C. J. Pedersen Ind. Eng. Ch., 48, 1881 (1956); L. F. Fieser, A. E. Oxford, J. Am. Chem. Soc., 64, 2060 (1942).

SUBMITTED: May 25, 1959

Card 12/12

88724

S/190/61/003/001/003/020
B119/B216

15.8500

AUTHORS: Rafikov, S. R., Sorokina, R. A.

TITLE: Chemical changes in polymers. IV. Thermooxidative changes of polyamides

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 1, 1961, 21-29

TEXT: The authors point out the extremely small number of publications on the influence of oxygen on polyamides. The present work was undertaken with a view to elucidating the polymer changes produced by the action of oxygen at elevated temperatures. The following substances were used for the experiments: Anid (polyhexamethylene adipamide), granulated and in fibrous form; Caprone (polycaproamide) in the form of granulate, fibers and films (type ПК-4 (PK-4)); granulated and fibrous Enant (polyenanthamide) and Anid Г-669 (G-669), a copolymer made from caprolactam and the hexamethylene-diamine salts of adipic acid (salt АГ (AG)) and acelaic acid. Two series of experiments were performed: 1. The above-mentioned polyamides (fibers and films) were placed in a weak air

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88724

S/190/61/003/001/003/020
B119/B216

Chemical changes in polymers...

stream and maintained at elevated temperatures below the melting point of the polymer for 8 hr. 2. Dried air or nitrogen, respectively, was blown through the polymer melt at various temperatures. The first test series showed that the changes of the physicochemical polymer properties increase with increased testing temperature: the specific viscosity of the solutions drops, the Huggins constant increases. These changes are insignificant at temperatures below 140°C. At temperatures above 200°C, infusible, insoluble, but swellable products are formed (branched, or rather three-dimensionally cross-linked molecules with reduced mechanical properties). At yet higher temperatures, the substances decompose (splitting off of volatile compounds, blackening of the polyamide which loses its ability to swell in cresol, increase of oxygen content and decrease of carbon- and hydrogen content of the substance). The chemical structure (in contrast to the degree of molecular orientation) of the polyamide has practically no influence on the type and extent of change during thermooxidation in the solid state. The second test series showed that passing N_2 through the polyamide melt causes no change in the initial product, even at temperatures above 260°C. When air is passed

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B119/B216

Chemical changes in polymers...

through the melt, black, insoluble and infusible products which have an increased oxygen content and are nonswellable in cresol are formed locally at the points where polyamide comes into contact with O_2. The authors assume the following reactions: primary addition of O_2 in the form of peroxide at corresponding points of the polyamide chain, which initiates a radical chain reaction. High temperature, however, lead to decomposition of the initial substance, of type and extent depending on its chemical structure (heterolysis, substitution). Hexamethylene-diamine containing polyamides split off pyrrol, among other substances. Mention is made of a work the first-mentioned author carried out in collaboration with B. A. Arbuzov. There are 1 figure, 2 tables, and 15 references: 9 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds of the AS USSR)

SUBMITTED: May 19, 1960

Card 3/3

88728

S/190/61/003/001/008/C20
B119/B216

15 8107

AUTHORS: Rafikov, S. R., Syuy Tszi-pin

TITLE: Chemical transformations of polymers. V. Photochemical transformations of polycaproamide in vacuo under the influence of ultraviolet light

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 1, 1961, 56-65

TEXT: The authors draw attention to the known fact that polyamide fibers and films rapidly lose their valuable properties under the combined influence of air, moisture and light. The present work was undertaken for the purpose of studying the effect of UV light under conditions excluding all other possibly active factors. 0.06 to 0.08 mm thick unidirectionally oriented Caprone films (type ПK-4 (PK-4)) of molecular weight approximately 13 000 were irradiated under vacuum (10^{-5} - 10^{6} mm Hg) in a quartz-molybdenum vessel by means of a mercury-quartz lamp (type ПPK-2 (PRK-2)). The films were wrapped immediately round the cylindrical lamp which was placed in the center of the irradiation vessel. Irradiation

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Chemical transformations of polymers...

time: 2 - 140 hr; temperature: 30±2°C. After irradiation, the films were examined by the following methods: Gas-chromatographic analysis of the volatile decomposition products in the XT-2M (KhT-2M) chromatograph over MCM (MSM) silica gel; viscosity measurement of the Caprone in cresol solution, and from this, calculation of the molecular weight; end-group determination by conductometric titration with HCl and KOH, respectively; determination of solubility and ability to swell in cresol; by taking thermomechanical and strain curves (Polyani instrument); and, in some cases, by recording the UV-, IR and epr (electron paramagnetic resonance) spectra. These investigations showed that UV irradiation of Caprone films leads both to synthetic and destructive processes in the molecule. Irradiation with light of the near ultraviolet promotes particularly the latter processes. Decomposition occurs by homolytic photolysis of amide bonds with subsequent cleavage of CO and secondary transformations of the radicals produced. During this process, C-C bonds of the initial molecule are frequently ruptured with formation of lower hydrocarbons (C_2 - C_4). The occurrence of synthetic and cross-linking reactions (similarly as in cross-linking of polyethylene under the influence of radiative irradiation)

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Chemical transformations of polymers...

is mainly due to the cleavage of H atoms and recombination of the macroradicals. In the absence of oxygen, UV irradiation, even in high doses, reduces the mechanical strength of Caprone by less than 30%. The material does not turn brittle. The author thanks V. V. Voyevodskiy and I. V. Obreimov for their cooperation in the spectroscopic studies (the former placed a magnetic radiospectrometer type ЭПР-2 (epr-2) developed at the laboratory of the IKhF AN SSSR (Institute of Chemical Physics AS USSR) at the authors' disposal. This apparatus enables epr spectra to be taken during sample irradiation with a UV high-pressure burner of the type СВДШ-250 (SVDSh-250). An electromagnetic stabilizer of the type СНЭ -220-0.5 (SNE-220-0.5) was used in the studies. There are 7 figures, 4 tables, and 21 references: 9 Soviet-bloc and 11 non-Soviet-bloc.

X

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds, AS USSR)

SUBMITTED: May 30, 1960

Card 3/3

22562
S/190/61/003/005/005/014
B101/B218

15 8107 2209

AUTHORS: Rafikov, S. R., Zhubanov, B. A., Khasanova, R. N., Gumargaliyeva, K. Z., Sagintayeva, K. D.

TITLE: Studies in the field of polymer synthesis. I. Synthesis of polyamides on the basis of xylylene diamines

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 5, 1961, 699-705

TEXT: Proceeding from the fact that heat-resistant polyamides suitable for fiber and glass production are formed by symmetric, aliphatic-aromatic diamines, a study has been made of the reactions of m-xylylene diamine (A) and n-xylylene diamine (B) with adipic acid (1), azelaic acid (2), sebacic acid (3), o-phthalic acid (4), isophthalic acid (5), and terephthalic acid (6). The synthesis of esters of A with 1, 2, 4, and 5, and of B with 1 and 3 was performed by mixing diamine solutions and acid in 95% alcohol. B was synthesized with 2, 4, and 5 at the boiling temperature of the alcoholic solution. The resulting ester was filtered off. The precipitate was formed not before 24 hr. Since terephthalic acid is hardly soluble in organic solvents, synthesis A + 6 was effected by addition of the acid to the

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B101/B218

Studies in ...

aqueous diamine solution and by subsequent boiling. Alcohol + benzene (1 : 1) were used as solvent for the synthesis of A + 3 because the ester did not precipitate from 95% alcohol. Table 1 contains the yields and melting points of the esters synthesized. Polymerization occurred either in the melt or in a cresol solution. The ester B + 6 could not be polymerized this way on account of its insolubility in cresol and its high melting point. In this case, the polyamide was obtained from an equimolar mixture of dimethyl terephthalate and p-xylylene diamide. Tables 2 and 3 list data and properties of the polymers. Polycondensation of xylylene diamines with o-phthalic acid failed. 50% of a substance melting at 237-237.5°C was isolated. It was identified as diphthalyl xylylene diamine. The authors assume a rupture of the reaction chain by formation of a cyclic imide, owing to the neighboring position of the carboxyl groups. The intrinsic viscosity of polyamides indicates that their molecular weight varies between 10,000 and 20,000. The authors thank D. V. Sokol'skiy and B. V. Suvorov for the diamine put at their disposal. B. A. Poray-Koshits is mentioned. There are 2 figures, 3 tables, and 13 references: 6 Soviet-bloc and 7 non-Soviet-bloc. The 3 most important references to English-language publications read as follows: O. B. Edgar, E. Ellery, J. Chem. Soc., 1952, 2633;

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S/190/61/003/005/005/014
B101/B218

Studies in ...

C. B. Edgar, R. Hill, J. Polymer Sci., 8, 1, 1952; E. F. Carlston, F. G. Lum, Industr. and Engng. Chem. 49, 1239, 1957.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences, AS Kazakhskaya SSR)

SUBMITTED: July 19, 1960

(I) Диамин	(II) Кислота	(III) Выход соли, %	(IV) Т. пл. соли, °C
(A) м-Ксилилендиамин	(1) Адипиновая	93,0	186—187
(a) То же	(2) Азелаиновая	86,3	156—158
» »	Себациновая (3)	—	64—67
» »	о-Фталевая (4)	95,0	205—206
» »	(5) Изофталевая	76,3	219—220
» »	(6) Терефталевая	40,0	270
(Б) п-Ксилилендиамин	(1) Адипиновая	92,3	232—233
(a) То же	(2) Азелаиновая	93,0	200
» »	Себациновая (3)	95,0	228
» »	о-Фталевая (4)	95,0	205—206
» »	(5) Изофталевая	98,0	262—264
» »	(6) Терефталевая	87,0	340

Card 3/7

KAGARLITSKIY, A.D.; SUVOROV, B.V.; RAFIKOV, S.R.

Oxidation of organic compounds. Report No.25: Oxidative ammonolysis of some monoalkylbenzenes. Trudy Inst.khim.nauk AN Kazakh.SSR 7:57-67 '61. (MIRA 15:8)
(Benzene) (Ammonolysis)

15 8620
11.2217

2209

25266

S/190/61/003/007/010/021
B101/B220

AUTHORS: Rafikov, S. R., Gladyshev, G. P.

TITLE: Studies in the field of the synthesis of polymers. II. Photo-oxidative activation of methyl methacrylate by ultraviolet light

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 7, 1961, 1034-1040

TEXT: The photopolymerization by means of UV light is made difficult by the fact that the exposure lasts long and special quartz vessels are needed. The aim of the present study was to utilize the post effect of methyl methacrylate (MMA) initiated by UV light and to effect the polymerization of MMA separated from its initiating. MMA distilled at 100-120 mm Hg was irradiated in a quartz cell by means of a ПРК-2 (PRK-2) mercury lamp (capacity 375 w). The irradiation intensity was found to be $2.4 \cdot 10^{16}$ quantums/ml.sec by using uranyl oxalate. The amount of oxygen consumed for the formation of peroxides was determined volumetrically. Furthermore, the amount of peroxides formed was determined

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iodometrically. These operations were performed in pure argon. Results: 1) The consumption of O_2 does not differ from that measured on thermal oxidation of MMA, the oxidation rate with UV irradiation is, however, higher by at least one order of magnitude. The absorption of O_2 is not dependent on its partial pressure. 2) The curves of the oxygen absorption become steeper with increasing temperature. The apparent activation energy was calculated to be 10 kcal/mole. If MMA is irradiated immediately after distillation, i.e., if it does not contain any traces of peroxides, the formation of peroxides occurs more slowly under the effect of irradiation. 3) The quantity of peroxides formed is directly proportional to the dose of irradiation. 4) The titanium reagent gave negative reactions with H_2O_2, oxyalkyl hydrogen peroxides, and acyl peroxides. After irradiation, the MMA was liberated from oxygen in a dilatometer by repeated freezing and evacuation to $2-3\cdot10^{-2}$ mm Hg, the dilatometer filled with Hg, and the polymerization effected in the thermostat. Reproducible data were only obtained if the polymerization was effected immediately after irradiation, the MMA thus having no contact with air. The kinetics of the polymerization as function of the

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temperature are shown in Fig. 5. The shape of the curves is similar to that obtained on normal polymerization by peroxides. The "gel effect" under UV irradiation appeared, however, only with higher degrees of conversion. This is explained by additional breaking of the chains, which has been proved, moreover, by the fact that the rate of polymerization decreases under very high doses of irradiation (Fig. 6), although the concentration of the peroxides increases. The macroradicals react with inhibiting compounds. The infrared spectra taken in the laboratoriya molekulyarnoy spektroskopii Instituta khimicheskikh nauk AN KazSSR (Laboratory of Molecular Spectroscopy of the Institute of Chemical Sciences, AS Kazakhskaya SSR) proved the existence of secondary decomposition products of the peroxides: carbonyl, carboxyl, and hydroxyl groups. Such compounds are characteristic also for the thermal decomposition of peroxides. The total activation energy was found to be 11.2 kcal/mole. It is lower than on polymerization of MMA in the presence of benzoyl peroxide (19.6 kcal/mole) or other initiators. From $E = 0.5E_{init} + (E_{iner} - 0.5E_{break})$, where E means the total activation energy, E_{init} the activation energy of the initiation, E_{incr} the activation energy of

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Studies in the field of the ... 25266 S/190/61/003/007/010/021
B101/B220

the increase of the chains (6.3 kcal/mole). E_{break} the activation energy of the breaking of the chains (2.8 kcal/mole). E_{init} was found to be 12.6 kcal/mole, thus less than the activation energy during thermal oxidation of MMA in the presence of peroxides (22±1 kcal/mole). For degrees of conversion of 5-15% a break of the kinetic curves was observed, which is due to the acceleration of the polymerization at the interface monomer-mercury. The results show that the UV irradiation of MMA can be used for the subsequent polymerization at low temperatures. N.A. Bakh is mentioned. There are 5 figures and 8 references: 7 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental-organic Compounds, AS USSR), Institut khimii AN KazSSR (Institute of Chemistry, AS Kazakhskaya SSR)

SUBMITTED: September 27, 1960

Card 4/5

RAFIKOV, S.R

26277 S/190/61/003/007/021/021
B101/B230

15 8050

AUTHORS: Tsetlin, B. L., Medved', T. Ya., Chikishev, Yu. G., Polikarpov, Yu. M., Rafikov, S. R., Kabachnik, M. I.

TITLE: Radiation polymerization of tertiary monovinylphosphine oxides

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 7, 1961, 1117 - 1118

1117 1118

TEXT: This letter to the editor reports the synthesis of polymers on the basis of tertiary monovinylphosphine oxides (Ref. 1: M. I. Kabachnik, T. Ya. Medved', Yu. M. Polikarpov, Dokl. AN SSSR 135, 849, 1960; M. I. Kabachnik, Chang Jung-yü, Ye. N. Tsvetkov, Dokl. AN SSSR 135, 603, 1960) to be of great importance due to the high thermal and chemical stability of phosphine oxides. Experiments to polymerize such monomers by applying initiators of the radical polymerization (benzoyl peroxide, azoisobutyric acid dinitrile) failed to produce satisfactory results. Oxides of the tertiary diallyl- and dimethallyl phosphines were, in the presence of

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X

Radiation polymerization of . . . [illegible] [illegible]

this type of initiators, either not polymerized at all or their polymerization proceeded at an extremely low rate with very poor yield (Ref [illegible]). The authors conducted experiments to initiate polymerization of diethylvinylphosphine oxide (I) and diphenylvinylphosphine oxide (II) by radiation. As source of radiation an X-ray irradiation apparatus was used. Samples were exposed to irradiation in molten state in vacuum. In irradiation of (I) the dose rate was $4.5 \cdot 10^{16}$ ev/ml sec at an irradiation time of 30 hr at 70°C. As a product, a solid polymer was obtained having a molecular weight of ~13.000 (the monomer was distilled off under vacuum). Degree of conversion amounted to ~80 %, radiation yield G of the polymerization was 80 molecules of the monomer per 100 ev. The polymer is well soluble in water, ethanol, and benzene. In irradiation of (II), the dose rate was $4 \cdot 10^{15}$ ev/ml sec for a time of 50 hr at 130°C. A polymer was obtained having a molecular weight of ~30.000; degree of conversion ~60 %, radiation yield ~350 molecules per 100 ev. The polymer is soluble in ethanol and benzene when heated, and may be precipitated from alcohol by adding a small quantity of water. Vitrification temperature of the

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25177 S/190/61/003/007/021/021
B101/B230

Radiation polymerization of....

reprecipitated polymer (II) is about 160°C (determined by thermomechanical method, Ref. 3: B. L. Tsetlin, V. I. Gavrilov, N. A. Velikovskaya, V. V. Kochkin, Zavodsk. lab., 22, 352, 1956). It has been proved hereby that the radiation polymerization is an efficient method to obtain polymers on the basis of oxides of monovinylphosphines. Mechanism of the process is being studied at present. [Abstracter's note: Complete translation.] There are 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to English-language publication reads as follows: Ref. 2: K. D. Berlin, G. B. Butler, J. Org. Chem., 25, 2006, 1960; K. D. Berlin, G. B. Butler, J. Amer. Chem. Soc., 82, 2712, 1960

SUBMITTED: February 23, 1961

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Card 3/3

GLADYSHEV, G.P.; RAFIKOV, S.R.

Synthesis of polymers. Part 3: Photooxidative activation of methyl methacrylate in the visible region of the spectrum. Vysokom.soed. 3 no.8:1187-1190 Ag '61. (MIRA 14:9)

1. Institut khimicheskikh nauk AN KazSSR i Institut elementoorganicheskikh soyedineniy AN SSSR.
(Methacrylic acid) (Radiation)

20324

S/020/61/137/001/016/021
B101/B204

5.3830 2209 1234, 1153

AUTHORS: Gladyshev, G. P. and Rafikov, S. R.

TITLE: Initiation of polymerization by means of electric charges formed on the interface

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 1, 1961, 113-115

TEXT: After giving a survey of published data concerning interface polymerization, the authors presume that here the potential drop of the interface might play an important part, which causes an orientation of the molecules. Proceeding from the Arrhenius equation for the reaction rate V: $V = A_1 \exp(-E_1/RT)$ (1), the following is written down for the reaction on the interface: $V = A_2 \exp(-E_2/RT)$ (2), where $A_2 > A_1$; $E_2 = E_1 - E_\varphi$; $E_\varphi = n23060(\varphi - Td\varphi/dT)$. The potential drop thus may increase the factor A, and decrease the activation energy. This assumption was checked by initiation of various polymerization processes on the interface at normal temperature and absence of the usual initiators and

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Initiation of polymerization... S/020/61/137/001/016/021
B101/B204

catalysts, and the results were compared with control tests (polymerization in a homogeneous system with benzoyl peroxide). The following experiments are described: A 1 - 2 cm thick layer of acrylonitrile (AN) on glycerin, containing 1 - 2% water, after 10 to 12 hr, gave noticeable flakes of polymer at 20-22°C, whose molecular weight was found viscosimetrically to be equal to 100,000 - 200,000. The air oxygen inhibiting the radical polymerization of AN produced no effect upon this process. On the interface AN - H_2O, a noticeable polymerization rate was observed only in CO_2 atmosphere. Methylmethacrylate (MMA) formed a polymer film on the interface with water or mercury after 30-40 hr. On the interface MMA - paraffin or MMA - glycerin, polymerization occurred after 4-5 hr. This reaction is accelerated in a CO_2 atmosphere. As the admixture of some substances increases the potential drop on the interface, the effect of 0.01% CH_3COOH, $CH_2ClCOOH$, and HCl was tested. In the system AN - glycerin (with 1% H_2O), this addition at 20°C led to a polymerization of from 25-30% after 15-20 hr. In AN - H_2O (1:1) the additional acid in nitrogen

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Initiation of polymerization...

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atmosphere after 100 hr gave 1.5% polymer with a molecular weight of 6,000,000. In the system AN - glycerin - acid, the polymerization rate was accelerated by water. Experiments, to electrify MMA by shaking (400-600 vibrations per minute), in the absence of all initiators led to an increase of viscosity and the forming of 5 - 10% polymer after 3 hr. The authors thus find their assumption concerning the effect of the potential drop on the interface to be confirmed. They assume that in this way also other non-saturated compounds may be polymerized. Although the data hitherto available permit no conclusion to be drawn as to the mechanism of the reaction, a radical mechanism is assumed to exist because of the reaction being inhibited by inhibitors. Mention is made of A. D. Abkin, V. A. Kargin, V. A. Kabanov, N. A. Plate, S. S. Medvedev, and N. N. Semenov. There are 14 references: 13 Soviet-bloc and 6 non-Soviet-bloc.

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk KazSSR (Institute of Chemical Sciences of the Academy of Sciences Kazakhskaya SSR)

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PRESENTED: October 15, 1960, by N. N. Semenov, Academician

Card 3/4

20324

Initiation of polymerization...

S/020/61/137/001/016/021
B101/B204

SUBMITTED: October 15, 1960

Card 4/4

MANUKOVSKAYA, L. G.; SOLOMIN, A. V.; SUVOROV, B. V.; RAFIKOV, S. R.

Continuous method of production of terephthalic acid by the
liquid phase oxidation of m-xylene. Neftekhimia 2 no.4:531-535
Jl-Ag '62. (MIRA 15:10)

1. Kazakhskiy gosudarstvennyy sel'skokhozyaystvennyy institut
i Institut khimicheskikh nauk AN KazSSR, Alma-Ata.

(Terephthalic acid) (Xylene)

34994
S/190/62/004/003/014/023
B110/B144

15.8080

AUTHORS: Rafikov, S. R., Zhubanov, B. A., Gumargaliyeva, K. Z., Pavlitenko, L. V.

TITLE: Studies in the field of polymer synthesis IV. Synthesis of mixed polyamides on the basis of xylylene diamines, hexamethylene diamines and adipic acid

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 3, 1962, 41[illegible]-41[illegible]

TEXT: The authors studied mixed polyamides which arise when a mixture of p- and m-xylylene diamines (I) and/or hexamethylene diamines (II) is made to react with adipic acid (III). The thermal resistivity of mixed polyamides is assumed to be increased by the introduction of aromatic rings into the aliphatic polyamide chain of II and III of corresponding structure. The lawfulness in the change of the properties of mixed p- and m-I polyamides should therefore be studied. They were obtained by polycondensation of corresponding diamine salts mixed with III. The molar ratios of diamines were: 95:5, 80:20, 65:35, 50:50, 35:65, 20:80, and 5:95. The melting points of salts obtained from aqueous-alcoholic

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Studies in the field of...

S/190/62/004/003/014/023
B110/B144

solutions were p-I + III = 233°C, m-I + III = 187°C, II + III = 195°C. Polycondensation was conducted in an N_2 stream at a temperature below 270°C but higher than the melting point. The thermomechanical curves were found with an apparatus by B. L. Tsetlin et al (Zavodsk. labor., 22, 352, 1956), the melting points were determined according to P. J. Flory, and the intrinsic viscosities in cresol or highly concentrated H_2SO_4 were also determined. All mixed I and III polyamides are hard, stable, hornlike, and insoluble in the usual solvents. Their melts yield semitransparent fibers which can be cold drawn by 300-400 %. Melting points and flow temperatures of m-I + III, p-I + III, and p-I + II + III polyamides increase continuously with the amount of I residue. This suggests isomorphous substitution of I residues in the crystalline region. The distinct minimum of the softening point - composition curve for m-I + III : p-I + III = 40 : 60 and II + III : p-I + III ≈ 30 : 70 is probably due to a larger amount of amorphous polymer and copolymer. Different dependences on the composition of mixed m-I, II, and III polyamides are probably due to: (1) great difference in the linear dimensions of diamines and (2) disturbance of axial symmetry of the macromolecule by

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Studies in the field of...

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the m-I nucleus. The intrinsic viscosity (0.5-1.3 dl/g) determined in cresol and concentrated H_2SO_4 showed normal concentration dependence. A polyamide (molecular weight 11,800) which arose from m-I, II, and III, (diamine ratio 1:1) dissolved in ethylene chlorohydrin, another one which arose from p-I, m-I, and III (diamine ratio 1:4) dissolved in a mixture of 60 % ethylene chlorohydrine and 40 % $CH_2ClCOCH$. There are 4 figures, 1 table, and 7 references: 4 Soviet and 3 non-Soviet. The most important reference to the English-language publication reads as follows: R. D. Evans, H. R. Mighton, P. J. Flory, J. Amer. Chem. Soc., 72, 2018, 1950.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences AS Kazakhskaya SSR)

SUBMITTED: March 2, 1961

Card 3/3

S/081/62/000/005/098/112
B166/B101

AUTHORS: Gutsalyuk, V. G., Samsonova, N. S. Rafikov, S. R.

TITLE: Effect of certain factors on the physicomechanical properties of polyvinyl chloride plastics

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 5, 1962, 607, abstract 5P30 (Izv. AN KazSSR. Ser. khim., no. 2(18), 1960, 100-107)

TEXT: In order to improve the corrosion-resisting plastics coatings of underground pipelines a study has been made of the effect of the main external factors (contact with petroleum and petroleum products, contact with mineralized water, the effect of ultraviolet irradiation) on the physicochemical properties of polyvinyl chloride plastics (PVC plastics). It is shown that prolonged contact (up to 20 months) between PVC plastics and petroleum and gasoline increases the tensile strength of the plastic but lowers its elasticity as a result of elution of the plasticizers; analogous changes occur under the effect of ultraviolet light and heat, in addition to which, for PVC plastics based on dibutyl phthalate the percent elongation decreases more sharply, which is due to its high

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S/081/62/000/005/098/112
B166/B101

Effect of certain factors on the ...

volatility; the partial elution of plasticizers which occurs when PVC plastics come in contact with ground water does not lead to deterioration in the insulating properties of the plastics. [Abstracter's note: Complete translation.]

Card 2/2

S/190/62/004/006/011/026
B110/B138

AUTHORS: Rafikov, S. R., Hsü Chi-p'ing

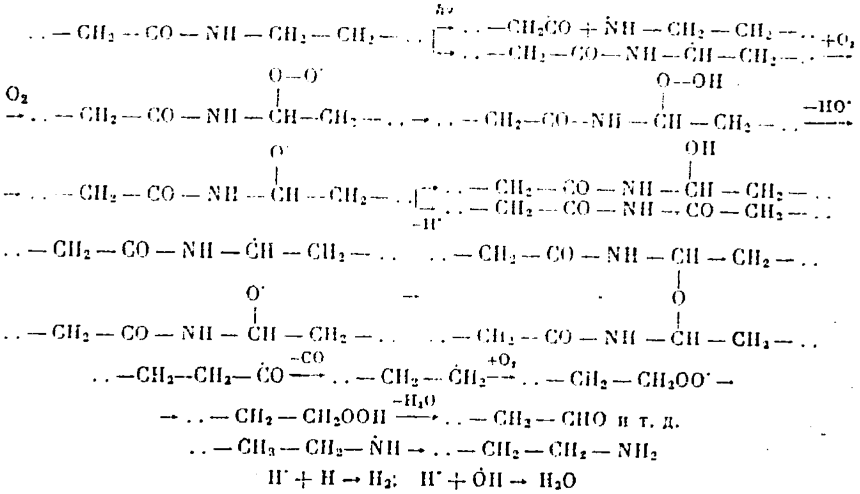
TITLE: Chemical transformations of polymers. VI. Effect of ultraviolet radiation on polyamides in the presence of oxygen and water vapors

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 6, 1962, 851-859

TEXT: Light aging of polyamides was investigated under approximately atmospheric conditions (O_2; H_2O vapor). The effect of ultraviolet radiation was tested on a transparent film (30 - 40μ) of Г-669 (G-669) polyamide, which was polycondensed from caprolactam, and the salts АГ (AG) and АзГ (AzG) at a ratio of 2:1:1. The ПРК-2 (PRK-2) quartz lamp was used with and without pyrex glass filter (O_2 and H_2O vapor atmosphere). C_2 of half the O_2 partial pressure in air was used for collecting the gaseous products of the photo-oxidation. After irradiation at 30 and 70°C, the decomposition products were chromatographically analyzed with the ХТ-2М (KhT-2M) apparatus. After 100 hr irradiation, $[\eta]$ increased from 0.384

Card 1/5

to 0.405. Since the CO separation was more intensive at 70°C than the H_2 separation, temperature increase causes rupture of the polyamide chain. After 50 hr irradiation at 70°C, photo-oxidation causes [η] to decrease from ~0.391 to 0.270. The molecular weight rose from 13,000 to 21,300, since more symmetrically branched molecules were formed owing to the simultaneous processes of destruction and structure formation. This is indicated by the abrupt fall in percentage, elongation and total inability to crystallize during extension. C-separation during photo-oxidation is ten times higher than photolysis, which indicates the appearance of carbonyl-containing compounds in the molecule. The COOH content remains constant during photo-oxidation for 100 hr at 30°C, at 70°C it increases by 20% owing to partial oxidation of the carbonyl groups formed. The NH_2 content rises rapidly after 20 hr at 30°C and then drops continuously, since the NH_2 groups are bonded with CHO ones. Photo-oxidation is probably:



$$\ldots-\mathrm{CH_2-CO-NH-CH_2-CH_2}-\ldots \xrightarrow{h\nu} \begin{cases} \ldots-\mathrm{CH_2\dot{C}O} + \mathrm{\dot{N}H-CH_2-CH_2}-\ldots \\ \ldots-\mathrm{CH_2-CO-NH-\dot{C}H-CH_2}-\ldots \xrightarrow{+O_2} \end{cases}$$

$$\xrightarrow{O_2} \ldots-\mathrm{CH_2-CO-NH}-\overset{\displaystyle O-O^{\cdot}}{\overset{|}{\mathrm{CH}}}-\mathrm{CH_2}-\ldots \rightarrow \ldots-\mathrm{CH_2-CO-NH}-\overset{\displaystyle O-OH}{\overset{|}{\mathrm{CH}}}-\mathrm{CH_2}-\ldots \xrightarrow{-HO^{\cdot}}$$

$$\rightarrow \ldots-\mathrm{CH_2-CO-NH}-\overset{\displaystyle O^{\cdot}}{\overset{|}{\mathrm{CH}}}-\mathrm{CH_2}-\ldots \begin{cases} \rightarrow \ldots-\mathrm{CH_2-CO-NH}-\overset{\displaystyle OH}{\overset{|}{\mathrm{CH}}}-\mathrm{CH_2}-\ldots \\ \xrightarrow[-H^{\cdot}]{} \ldots-\mathrm{CH_2-CO-NH-CO-CH_2}-\ldots \end{cases}$$

$$\ldots-\mathrm{CH_2-CO-NH-\dot{C}H-CH_2}-\ldots \qquad \ldots-\mathrm{CH_2-CO-NH}-\underset{\displaystyle \overset{|}{O}}{\underset{|}{\mathrm{CH}}}-\mathrm{CH_2}-\ldots$$

$$\overset{\displaystyle O^{\cdot}}{} \qquad \rightarrow$$

$$\ldots-\mathrm{CH_2-CO-NH}-\overset{\displaystyle O^{\cdot}}{\overset{|}{\mathrm{CH}}}-\mathrm{CH_2}-\ldots \qquad \ldots-\mathrm{CH_2-CO-NH}-\overset{|}{\mathrm{CH}}-\mathrm{CH_2}-\ldots$$

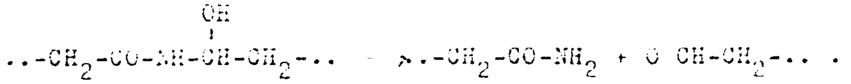
$$\ldots-\mathrm{CH_2-CH_2-\dot{C}O} \xrightarrow{-CO} \ldots-\mathrm{CH_2-\dot{C}H_2} \xrightarrow{+O_2} \ldots-\mathrm{CH_2-CH_2OO^{\cdot}} \rightarrow$$

$$\rightarrow \ldots-\mathrm{CH_2-CH_2OOH} \xrightarrow{-H_2O} \ldots-\mathrm{CH_2-CHO} \text{ и т. д.}$$

$$\ldots-\mathrm{CH_3-CH_2-\dot{N}H} \rightarrow \ldots-\mathrm{CH_2-CH_2-NH_2}$$

$$\mathrm{H^{\cdot} + H \rightarrow H_2;} \quad \mathrm{H^{\cdot} + \dot{O}H \rightarrow H_2O}$$

The CHO group can also develop according to:



$$\cdots\text{-CH}_2\text{-CO-NH-}\overset{\overset{\text{OH}}{|}}{\text{CH}}\text{-CH}_2\text{-}\cdots \rightarrow \cdots\text{-CH}_2\text{-CO-NH}_2 + \text{O CH-CH}_2\text{-}\cdots$$

With full spectrum irradiation at 30°C, photolytic processes are also important. Viscosity first decreases slightly and then increases rapidly. After 2 hr an insoluble gel is formed and after 5 hr cross linking is more intensive than during photolysis in vacuum. The rate of structure formation rises as radicals are accumulated by the chain. Accordingly, the molecular weight decreases from 13,000 to 12,100 after 30 min irradiation. As with photolysis, the ultraviolet spectra showed an absorption band at 2870 Å, corresponding to heterocyclic pyrrole compounds and the films turn yellowish-brown. During irradiation in the presence of O_2 and H_2O vapor, only one third CO is separated and a less insoluble gel is formed. The mechanical properties were not as good as with vacuum irradiation, but better than with irradiation with O_2. The inhibiting effect of H_2O vapor may be due to the reaction of H_2O with the radicals ...CH_2-NH... and ...CH_2-CO... developing by hydrolysis of the amide bonds. To test this

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irradiation was carried out in H_2O vapor (32 mm Hg, 30°C; 234 mm Hg, 70°C), without O_2 absence. The same gaseous products were obtained here as during photolysis, but in smaller quantities. In the presence of H_2O the macroradicals $...CH_2CONH\dot{C}HCH_2...$ change into methylol derivatives $...CH_2CONHCH(OH)CH_2...$, which decompose into amide and aldehyde. These react with amino groups and distort their analysis. There are 3 figures and 3 tables.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR
(Institute of Elemental-organic Compounds AS USSR)

SUBMITTED: April 26, 1961

Card 5/5

S/850/62/008/000/003/004
B119/B101

AUTHORS: Suvorov, B. V., Rafikov, S.R., Kagarlitskiy, A. D.,
Sabirova, A. A.~~, Svetasheva, V. A.~~

TITLE: Oxidation of organic compounds. Communication XXXIII.
Oxidizing ammonolysis of p- and m-xylene mixtures

SOURCE: Akademiya nauk Kazakhskoy SSR. Institut khimicheskikh
nauk. Trudy. v. 8. Alma-Ata, 1962. Kataliticheskiy
sintez monomerov. 109-114

TEXT: The synthesis of terepththalic dinitrile (I) and isophthalic dinitrile (II) was investigated by reaction of mixtures of p- and m-xylene of various molar ratios in amounts of 40-70 g with 120-175 g of NH_3, 350-500 g of H_2O, and 2400-4800 liters of air per hour and per liter of catalyst, with contact times of 0.2 - 0.5 sec, at 350-410°C. Molten lead vanadate served as catalyst. The contents of I and II in the reaction product were determined by polarography. Results: The yields of I and II were only slightly affected by a change in the contact time and in the rate of adding the reaction mixture. When the reaction

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S/650/62/008/000/003/004
B119/B101

Oxidation of organic compounds...

temperature is raised the yield of I + II reaches a maximum between 360 and 390°C, while the yield of gaseous substances increases steadily. The formation of I and II depends essentially on the molar ratio of the xylene isomers used: under otherwise equal reaction conditions, the yields of I were ~39, ~3, and ~52%, whilst those of II were ~35, ~3, and over 80% respectively, at the ratios m-xylene : p-xylene = 4:1, 1:1, and 1:9 (referring to the theoretical maximum yield). There are 5 figures.

✓

Card 2/2

S/190/62/004/009/008/014
B101/B144

AUTHORS: Gladyshev, G. P., Rafikov, S. R.

TITLE: Investigation into polymer synthesis. VII. Photooxidative activation of the polyacrylate ester oligomer by the visible spectral region

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 9, 1962, 1351-1353

TEXT: The oligomer of МДФ-2 (MDF-2) poly-(diethylene glycol)phthalate-dimethacrylate with the structure

$H_2C=C(CH_3)-COOCH_2CH_2OCH_2CH_2O[OC-C_6H_4-COOCH_2CH_2OCH_2CH_2O-]_2 \cdot OC=C(CH_3)-CH_2$;

n_D^{20} 1.5118 was irradiated with 4358 Å light in the presence of 0.084% by volume of diacetyl. Polymerization was then conducted in a dilatometer. Results: (1) Photopolymerization of MDF-2 activated in an inert atmosphere is very rapid. The apparent activation energy is 11.4 kcal. (2) When air is bubbled through the oligomer during irradiation peroxide compounds accumulate which initiate the polymerization after O_2 has been removed.

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Investigation into polymer synthesis... S/190/62/004/009/008/014
B101/B144

(3) At 20°C the kinetics of the polymerization of MDF-2 activated by irradiation is similar to that of the oligomer activated by benzoyl peroxide. (4) The polymerization rate increases rapidly with the temperature at a peroxide concentration of $18.8 \cdot 10^{-2}$ g-equ/l. At this concentration the polymerization degree was approximately 30% after 250 min at 20°C, 65% at 30°C and 90% after ~80 min at 60°C. (5) Qualitative experiments showed that other acrylate polyesters also are activated by irradiation in the presence of diacetyl. The polymerization of these substances may also be initiated by 1 - 5% methyl methacrylate activated by photooxidation. Conclusion: the photooxidative activation with visible light is suited for the polymerization of polyacrylate esters at low temperatures. There are 3 figures.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences AS KazSSR)

SUBMITTED: May 24, 1961

Card 2/2

S/190/62/004/009/007/014
B101/B144

AUTHORS: Rafikov, S. R., Gladyshev, G. P.

TITLE: Study of polymer synthesis. VI. Polymerization of methyl methacrylate activated by photooxidation in the presence of sensitizers

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 9, 1962, 1345-1350

TEXT: The activation of methyl methacrylate (MMA) in the presence of diacetyl (I) or benzyl (II) by exposure to the light of the 4358 Å Hg line was studied, and also the polymerization of activated MMA in an Hg dilatometer. Results: (1) MMA becomes activated by irradiation in the presence of I or II in an argon atmosphere. In the presence of 0.18% of I, the molecular weight was 76,500 and the degree of polymerization 22.6% after a 4-hr irradiation at 20°C. In the presence of II, the values obtained under the same conditions were 331,000 and 1.54%, respectively. (2) Bulk polymerization of MMA is possible with I. After irradiation for 18 - 20 hrs, the degree of polymerization was 75 - 80%. The activation energy was 11.5 kcal. (3) When oxygen is bubbled through MMA in the

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presence of I or II, peroxide compounds are formed and the polymerization is accelerated. A polymerization of almost 100% was reached after 85 hrs at 40°C with a peroxide concentration of $5.1 \cdot 10^{-2}$ g-equ/l. The molecular weight of the polymer was 364,000 at $5.1 \cdot 10^{-2}$ g-equ/l and 1,000,000 at $1.3 \cdot 10^{-2}$ g-equ/l. Between 20 and 40°C it was independent of the temperature. (4) The linear function $v_0 = f(\sqrt{c})$, where v_0 is the initial polymerization rate, and c is the concentration of peroxide compounds, confirms the radical nature of the reaction. (5) The concentration of free radicals determined by diphenyl picryl hydrazyl was 10^{16} radicals per gram after 30 min in an argon atmosphere, and 10^{15} radicals per gram after 500 - 1000 min. (6) As the "gel effect" is diminished as compared with that during polymerization in the presence of benzoyl peroxide, large bulk polymer products can be got. There are 6 figures.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences AS KazSSR)

SUBMITTED: May 24, 1961

40729

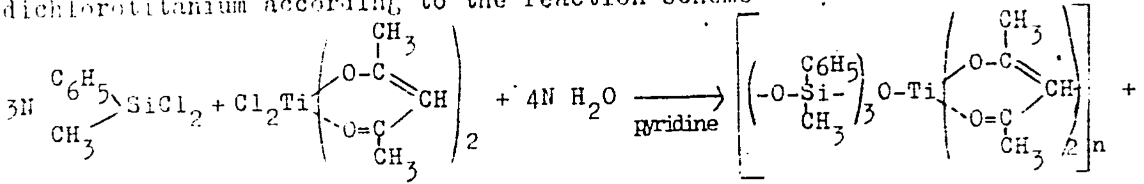
S/062/62/000/009/005/009
B119/B186

AUTHORS: Rafikov, S. R., Andrianov, K. A., Pavlova, S. A., Tverdokhlebova, I. I., and Pichkhadze, Sh. V.

TITLE: Study of polyorganotitanosiloxanes in solutions

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 9, 1962, 1581 - 1584.

TEXT: Poly-bis-(acetyl acetonate)titanophenyl methyl siloxane was produced by cohydrolyzing methyl phenyl dichlorosilane with bis-(acetyl acetonate) dichlorotitanium according to the reaction scheme



8N HCl. The reaction product was obtained by fractional precipitation from a 20 % solution in benzene n-heptane (1:1). The individual fractions

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B119/B186

Study of polyorganotitanosiloxanes in ...

were analysed into their elements; their molecular weight and viscosity were determined (solvent: dimethyl formamide, benzene, chlorobenzene, methyl ethyl ketone). Results: With minimum deviations, all the fractions show a relative homogeneity, and differ only in molecular weight. Maximum molecular weight found: 11,200; degree of polymerization n of this fraction = 17; characteristic viscosity (depending on the solvent used and the rate of flow through the capillary tube of the viscosimeter): 0.01 - 0.04. There are 6 figures and 1 table.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR)

SUBMITTED: February 17, 1962

Card 2/2

44420
S/190/62/004/010/004/010
B144/B186

AUTHORS: Hsü Chi-p'ing, Rafikov, S. R.

TITLE: Chemical conversion of polymers. Rate of gas evolution and quantum yield in the photolysis of polycaproamide

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 10, 1962, 1474-1478

TEXT: The rate of gas evolution was studied from 0.04 mm ГК-4 (PK-4) films exposed in vacuo to light of 2537 Å from 6 БУВ-15 (BUV-15) lamps symmetrically arranged at a distance of 50 mm round the sample tube; total wattage: 90 w. After irradiation the gas volume was measured and the gas was chromatographically analyzed. Then the sample was again exposed and the energy absorption determined actinometrically with uranyl oxalate. The test was repeated with a one-layer film wrapped around the tube. The energy absorption was found from the difference between the $H_2C_2O_4$ contents in the actinometer. Whereas H evolution is constant, CO evolution drops sharply at the beginning and becomes almost constant after 20 hrs of irradiation. This phenomenon has been

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Chemical conversion of polymers. Rate ... S/190/62/004/010/004/010
B144/B186

previously explained by the authors (Vysokomolek. soyed. 3, 56, 1961; ibid. 4, 351, 1962). The absence of branching is deduced from the linear course of the H_2 and CO evolution curves. The quantum yield equals $9.4 \cdot 10^{-4}$ during the initial period, and $6.1 \cdot 10^{-4}$ at a constant evolution rate. This is in good agreement with the authors' data on the exposure of polycaproamide to the total spectrum of ПРК-2 (PRK-2) lamps (making allowance for the difference between the spectra of the 2 types of lamp) and with data on polyethylene terephthalate by K. I. Osborn (J. Polymer Sci., 38, 357, 1959) and on polymethyl methacrylate by M. I. Frolova, A. V. Ryabov (Vysokomolek. soyed., 1, 1953, 1959). The quantum yield obtained by photolysis of polycaproamide is by two orders of magnitude lower than that obtained by hard radiation. There are 1 figure and 2 tables.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds AS USSR)

SUBMITTED: May 26, 1961

Card 2/2

S/190/62/004/011/003/014
B119/B186

AUTHORS: Rafikov, S. R., Chelnokova, G. N., Sorokina, R. A.

TITLE: Chemical reactions of polymers. VIII. Degradation of polyhexamethylene adipamide at high temperatures

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 11, 1962, 1639 - 1646

TEXT: Polyhexamethylene adipamide of molecular weight 23,500 was subjected to heat treatments at 350°C (in N_2 current) and at 380 and 400°C (in an autoclave and N_2 atmosphere) for several hours each, and the resulting decomposition products were investigated. At 350°C, a steric (three-dimensional) crosslinking of the polymer occurs with cleavage of NH_3 and CO_2. At 380°C and over, a primary hydrolytic cleavage of the amide bonds sets in, followed by a separation of CO_2, cyclopentanone, amines, and NH_3. The presence of CO and low hydrocarbons in the decomposition product points to an additional homolytic cleavage of the -CO-NH- bonds. The

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Chemical reactions of polymers... S/190/62/004/011/003/014
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hydrolysis of the polymer is initiated by the presence of minimum amounts of moisture in the dried initial product. It is maintained by the formation of H_2O in the self-condensation of cyclopentanone and its condensation with amines and NH_3. The end product of this condensation is an insoluble and nonfusible polymeric substance. There are 3 figures and 3 tables. The most important English-language references are: B. G. Achhammer, J. Appl. Chem., 1, 301, 1951; J. Research NBS, 46, 389, 1951; S. Straus, L. A. Wall. J. Research NBS, 60, 39, 1958; 63A, 269, 1959; B. Kamerbeek, G. H. Kroes, W. Grolle, Thermal degradation of some polyamides. Report delivered at the Conference on Heat-resisting Polymers, September 1960, London.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds AS USSR)

SUBMITTED: June 9, 1961

Card 2/2

S/844/62/000/000/084/129
D423/D307

AUTHORS: Tsetlin, B. L., Rafikov, S. R., Plotnikova, L. I. and Glazunov, P. Ya.

TITLE: Radiation grafting of polymeric chains to the surface of mineral particles

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 497-500

TEXT: The work was carried out with a view to forming and grafting polymer chains to the surface of mineral powders for use in e.g. fillers. The experiments were carried out with ZnO, MgO and BeO powders exposed to the vapor of methylmethacrylate at a temperature of 100°C, in thin-walled glass ampoules whilst the entire apparatus was rotated by an electric motor. The radiation source was a 700 kv electron accelerator. There was no evidence for the formation of grafted polymers in the control, nonirradiated experiment, but with a radiation intensity of 1.2×10^{18} ev/cm^3.sec and an exposure time

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Radiation grafting of ...

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D423/D307

of 75 mins, 51.3% by weight on MgO of total polymer was formed, with 20.7% as grafted polymer. Results for BeO with 6×10^{18} ev/cm^3 sec and only 5 min irradiation time yielded 24% of the grafted polymer. The relationship between total quantity of polymer formed and intensity of radiation was shown to correspond to a bimolecular mechanism for rupture of kinetic chains due to recombination of the growing macroradicals, and confirmed the radical mechanism of the polymerization process. Experiments carried out with ZnO did not lead to positive results. This is explained as being due to the property of electron semiconduction, so that the ion-radical of O^- formed is an acceptor of free electrons and its concentration is quite small in ZnO. There are 3 figures and 1 table.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AS SSSR; Institut fizicheskoy khimii AN SSSR (Institute of Elemental Organic Compounds, AS USSR; Institute of Physical Chemistry, AS USSR)

Card 2/2

RAFIKOV, S.R.; SEMBAYEV, D.Kh.; SUVOROV, B.V.

Oxidation of organic compounds. Part 28: Oxidative ammonolysis of acrolein. Zhur.ob.khim. 32 no.3:839-841 Mr '62.
(MIRA 15:3)

1. Institut khimicheskikh nauk AN Kazakhskoy SSR.
(Acrolein) (Acrylonitrile)

PROKOF'YEVA, M.V.; RAFIKOV, S.R.; SUVOROV, B.V.

Interaction of aromatic acid nitriles with alcohols in the presence of hydrogen chloride. Zhur.ob.khim. 32 no.4:1318-1323 Ap '62.
(MIRA 15:4)

1. Institut khimicheskikh nauk AN Kazakhskoy SSR.
(Nitriles) (Alcohols)

3

RAFIKOV, S.R.

38110
S/020/62/144/002/023/028
B101/B110

15.5540

AUTHORS: Vlasov, A. V., Glazunov, P. Ya., Mikhaylov, N. V., Rafikov, S. R., Tokareva, L. G., Tsetlin, B. L., and Shablygin, M. V.

TITLE: Formation of oriented structures in radiation-induced polymerization of vinyl monomers on fibers

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 382 - 383

TEXT: An attempt was made to obtain oriented polymers by polymerizing the monomer from the gas phase on oriented macromolecules of fibers acting as "matrices". The experiments were made with a two-chamber apparatus as used for graft polymerization of vinyl monomers on mineral particles (cf. B. L. Tsetlin et al., Tr. 2-go Vsesoyuzn. soveshch. po radiatsionnoy khimii, Izd. AN SSSR, 1962). One chamber contained caprone cord fiber heated to 80°C, and the other contained completely anhydrous acrylonitrile (40°C). Irradiation was made with X-rays (dose rate, $3\cdot10^{15}$ ev/cm^3·sec) for 3 - 6 hrs at 10^{-4} - 10^{-5} mm Hg. The weight of the fiber increased by 15 - 33 %. The perpendicular dichroism in the -C≡N stretching vibrations (2235 cm^{-1}),

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3

Formation of oriented structures in ... S/020/62/144/002/023/028
B101/B110

detected by spectroscopy, proved the orientation of the polymer. Experiments with acrylonitrile and non-oriented fiber as well as with liquid acrylonitrile and oriented fiber showed no dichroism. The liquid monomer molecules are assumed to prevent orientation. Further experiments with polymers, man-made and natural fibers used as "matrices" are under way. There is 1 figure.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR). Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

PRESENTED: January 19, 1962, by V. A. Kargin, Academician

SUBMITTED: January 12, 1962

Card 2/2

RAFIKOV, S.R.; ANDRIANOV, K.A.; PAVLOVA, S.A.; TVERDOKHLEBOVA, I.I.

Polyorganotitanosiloxanes in solutions. Izv. AN SSSR.Otd.khim.nauk no.9:1581-1584 S '62. (MIRA 15:10)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.
(Titanium organic compounds) (Siloxanes)

L 17146-65 EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4 WW/RM
ACCESSION NR: AR4049275 S/0081/64/000/015/S021/S021

SOURCE: Ref. zh. Khimiya, Abs. 15S119

B

AUTHOR: Zhubanov, B.A., Rafikov, S.R., Gumargaliyeva, K.Z., Pavlitenko, L.V.

TITLE: Research in the field of polymer synthesis. Article 10. Mixed polyamides 15 based on m-xylylene diamine, isophthalic and terephthalic acid

CITED SOURCE: Izv. AN KazSSR. Ser. khim., vy*p. 2(22), 1962, 88-91

TOPIC TAGS: polymer synthesis, polyamide synthesis, mixed polyamide, xylylene diamine, isophthalic acid, terephthalic acid, polyamide solubility, polyamide mechanical property

TRANSLATION: The authors investigated the properties of mixed polyamides based on m-xylylene diamine (I) and a mixture of isophthalic (II) and terephthalic (III) acids, which made it possible to obtain more heat-resistant and transparent polymeric glasses 14 than are possible with homopolymers of I and II. The mixed polyamides were synthesized by heating a mixture of salts of I with II or III for 5-6 hours in an argon flow, then for 30-60 minutes at low vacuum to complete the reaction. The mixed polyamides were characterized in terms of melting temperatures and thermomechanical curves. When the

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L 17146-65
ACCESSION NR: AR4049275

0

concentration of III in a mixture with II is increased to an equimolecular ratio, the mixed polyamides formed were transparent and slightly tinted solid substances. A further increase in the content of III in the reactive mixture resulted in the formation of an opaque and horny polymer. Most mixed polyamides are insoluble in organic solvents or in concentrated sulfuric acid. Analysis of the thermomechanical curves indicates that the mixed polyamides obtained have an amorphous structure. See abstract 15S111 for Article 9. B. Englin

ASSOCIATION: none

SUB CODE: OC, MT ENCL: 00

Card 2/2

TSYAN' ZHEN'-YUAN' [Ch'ien Jên-yüan], prof.; RAFIKOV, S.R., prof.,
red.; DUBROVSKAYA, N.A., red.; LAVROVA, I.N., red.;
KHOMYAKOV, A.D., tekhn.red.

[Determination of the molecular weights of polymers] Opredelenie molekuliarnykh vesov polimerov. Pod red. S.R.Rafikova. Moskva, Izd-vo inostr.lit-ry, 1962. 234 p. Translated from the Chinese. (MIRA 15:5)

(Polymers) (Molecular weights)

KORSHAK, Vasiliy Vladimirovich; FRUNZE, Tat'yana Mikhaylovna; RAFIKOV,
S.R., doktor khim. nauk, otv. red.; ZHULIN, V.M., red.; LOSKUTOVA,
I.P., red.; TIKHOMIROVA, S.G., tekhn. red.

[Synthetic heterochain polyamides] Sinteticheskie geterotsepnye poliamidy. Moskva, Izd-vo Akad. nauk SSSR, 1962. 523 p.
(MIRA 15:7)

(Polyamides) (Macromolecular compounds)

ARKHIPOVA, I.A.; RAFIKOV, S.R.; SUVOROV, B.V.

Production of nicotinic and isonicotinic acids and their amides by the hydrolysis of nitriles. Zhur.prikl.khim. 35 no.2:389-393 F '62. (MIRA 15:2)

1. Institut khimicheskikh nauk AN KazSSR.
(Nicotinic acid) (Isonicotinic acid) (Nitriles)

IZEL'SON, Ya.Z.; RAFIKOV, S.R.; SUVOROV, B.V.

Oxidation of organic compounds. Report No.34: Dissociation of vanadium pentoxide. Izv.AN Kazakh. SSR. Ser.tekh.i khim.nauk no.1:11-15 '64. (MIRA 17:3)

EPEL'BAUM, Kh.I.; GUTSALYUK, V.G., RAFIKOV, S.R.

Effect of cracked stocks of the thermal cracking process on the rheological properties of paraffin oils at lower temperatures. Izv.AN Kazakh. SSR. Ser.tekh.i khim.nauk no.1:28-35 '63.

(MIRA 17:3)

GUTSALYUK, V.G.; EPEL'BAUM, Kh.I.; RAFIKOV, S.R.

Depression properties of tarry residues from petroleum refining. Izv. AN Kazakh. SSR. Ser. tekh. i khim. nauk no.2:26-33 '63. (MIRA 17:2)

RAFIKOV, S.R.

S/062/63/000/003/005/018
B101/B186

AUTHORS: Tverdokhlebova, I. I., Pavlova, S. A., and Rafikov, S. R.

TITLE: Dependence of the properties of solutions on polymer structures. Communication 4. Solutions of polyphenylaluminosiloxane

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 3, 1963, 488 - 493

TEXT: Polyphenyl-alumino-siloxane was synthesized by reaction of phenyl-sodium-oxy-dihydroxy-silane with aluminum sulfate. The substance showed an intramolecular cyclic-network structure, softening point 160°C. By fractionated precipitation with petroleum ether from benzene solution fractions of the polymer were precipitated which had the same composition; intrinsic viscosity was determined in chlorobenzene and in benzene, and the exponent a in the function $[\eta] = k \cdot M^a$ was calculated. At 20°C a was 0.17 in chlorobenzene, 0.345 in benzene. This slight dependence of the intrinsic viscosity on the molecular weight confirms the dense network structure of the polymer. There are 8 figures and 5 tables.

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S/062/63/000/003/005/018
B101/B186

Dependence of the properties of ...

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR)

SUBMITTED: May 22, 1962

Card 2/2

L 10625-63 EPR/EPF(c)/EWP(j)/EWT(m)/BDS--ASD--Ps-4/Pr-4/Pc-4--RM/WW
ACCESSION NR: AP3000696
S/0190/63/005/005/0700/0702

71
69

AUTHOR: Glady*shev, G. P.; Rafikov, S. R.

TITLE: Investigations in the field of polymer synthesis. VIII. Methyl methacrylate polymerization in the presence of 2,3-butanedione under the influence of visible light

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 5, no. 5, 1963, 700-702

TOPIC TAGS: photopolymerization, initiator, kinetics, methyl methacrylate

ABSTRACT: The photopolymerization kinetics of methyl methacrylate (MM) in the presence of 1,3-butanedione as initiator has been studied. Light of $\lambda = 436$ mμ and intensity 0.13×10^{17} quantum/min cm^2 from a mercury arc lamp was used. The reaction was conducted at 30, 0, and -50C in the presence of 0.03 to 0.01% of the dione in the absence of oxygen to a degree of conversion of 2 to 3%. The reaction rate (v) was determined dilatometrically. The mean free radical lifetime (τ) was determined by the rotating sector method to be 2.5 sec. From τ, v, and the MM concentration the k_p/k_t ratio, where k_p and k_t are rate constants of propagation and termination, respectively, was calculated to be 14×10^{-6} at 30C, 6.5×10^{-6} at 0C, and 1.3×10^{-6} at -50C. The value of E_p-E_t, where E_p and E_t are the

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ACCESSION NR: AP3000696

2

appropriate activation energies, was calculated to be 4.3 kcal/mol in the 0 to 30C range. Determination of the intrinsic viscosity of the polymer in benzene indicated that, in agreement with Semenov's (N. N. Semenov, Khimiya i tekhnologiya polimerov, No. 7-8, 196, 1960) collective interaction concept, the mol. wt. of the polymer prepared at -50C exceeds that of the polymer synthesized at 0 or 30C. Orig. art. has: 3 formulas and 2 figures.

ASSOCIATION: Institut khimicheskikh nauk AN Kaz SSR (Institute of Chemical Sciences, AN Kaz SSR); Institut elementoorganicheskikh soyedeneniy AN SSSR (Institute of Organoelemental Compounds, AN SSSR)

SUBMITTED: 28Oct61 DATE ACQ: 17Jun63 ENCL: 00

SUB CODE: CH NO REF SOV: 005 OTHER: 001

ch/
Card 2/2

L 10513-63 EPF(c)/EWP(j)/EWT(m)/BDS--ASD--Pc-4/Pr-4--RM/WW
ACCESSION NR: AP3000697 S/0190/63/005/005/0703/0705

67
64

AUTHOR: Rafikov, S. R.; Sechkovskaya, V. A.; Glady*shev, G. P.

TITLE: Investigation in the field of polymer synthesis. IX. Polymerization of acrylonitrile under the influence of the visible region of the spectrum in the presence of chlorine

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 5, no. 5, 1963, 703-705

TOPIC TAGS: photopolymerization, acrylonitrile, polyacrylonitrile, chlorine, initiator, wet spinning

ABSTRACT: Photopolymerization of acrylonitrile (AN) in the presence of chlorine as the initiator has been studied. The polymerization was carried out in a dimethylformamide (DMF) solution irradiated with the visible region of the spectrum from a mercury arc lamp. The intensity of the 436-m μ line was 0.4×10^{17} quantum/min x cm^2. Prior to the addition of chlorine, argon was blown through the mixture. The reaction was also carried out in a $ZnCl_2$ or $CaCl_2$ aqueous solution. It was found that the polyacrylonitrile (PAN) yield increased linearly with AN concentration in DMF. The effect of irradiation time

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[Cl_2], and reaction temperature on PAN yield was studied in 10% AN solutions in DMF. It was found that with a proper selection of [Cl_2] and irradiation time considerable yields could be obtained. Thus, with 2.2 mol % Cl_2 on AN and ~ 7-hr irradiation, the yield was ~ 33% at 20C. The optimum conditions with regard to yield were 50C and 3 mol % Cl_2. PAN with the highest mol. wt. was also obtained at 50C. Solution polymerization can yield polymer solutions suitable for wet spinning. Orig. art. has: 1 figure and 4 formulas.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences, AN KazakhSSR); Institut elementoorganicheskikh soyedeneniy AN SSSR; (Institute of Organoelemental Compounds, AN SSSR)

SUBMITTED: 28Oct61 DATE ACQ: 17Jun63 ENCL: 00

SUB CODE: CH NO REF SOV: 002 OTHER: 001

ls/
Card 2/2

VLASOV, A.V.; MIKHAYLOV, N.V.; TOKAREVA, L.G.; RAFIKOV, S.R.;
TSETLIN, B.L.; GLAZUNOV, P.Ya.

Radiation-induced graft polymerization from the gas phase.
Khim.volok no. 6:24-28 '63. (MIRA 17:1)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (for Vlasov, Mikhaylov, Tokareva). 2. Institut elementoorganicheskikh soyedineniy AN SSSR (for Rafikov, TSetlin). 3. Institut fizicheskoy khimii AN SSSR (for Glazunov).

L 12720-63 EPF(c)/EWP(j)/EWT(m)/BDS Pr-4/Pc-4 RM/WW
ACCESSION NR: AP3002296 S/0062/63/000/006/1118/1120 66 65

AUTHOR: Buchachenko, A. L.; Sdobnov, Ye. I.; Rafikov, S. R.; Neyman, M. B.

TITLE: Reactivity of diethyl phosphite in radical reactions with tritertiary butyl phenoxyl

SOURCE: AN SSSR. Izv. Otdeleniye khimicheskikh nauk, no. 6, 1963, 1118-1120

TOPIC TAGS: diethyl phosphite, tritertiary butyl phenoxyl, dimerization, kinetic method, degree of solvation

ABSTRACT: The reaction of tertiary butyl phenoxyl with diethyl phosphite proceeds with abstraction of the phosphine hydrogen from monomeric tautomer containing pentavalent phosphorous. The rate constant in benzene at 20 degrees was found to be k sub 1 = 1.2 x 10 sup -25 cc/sec and the equilibrium constant for the dimerization of diethyl phosphite, K = 7.5 x 10 sup -21 cm sup -3. The procedure developed provides a general kinetic method for determining degree of solvation of the reaction center. Orig. art. has: 3 figures.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics); Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR

Card 1/2

ZHUBANOV, B.A.; RAFIKOV, S.R.; MOSHKEVICH, S.A.

Synthesis of polymers. Part 11: Mixed polyamides based on m-xylylenediamine, adipic, aminoenanthic, and aminoundecanoic acids. Vysokom. soed. 5 no.9:1325-1328 S '63. (MIRA 17:1)

1. Institut khimicheskikh nauk AN KazSSR.

KORSHAK, V.V.; BEKASOVA, N.I.; CHIKISHEV, Yu.G.; ZAMYATINA, V.A.;
TSETLIN, B.L.; RAFIKOV, S.R.

Radiation synthesis of borazole-based polymers. Vysokom.
soed. 5 no.10:1447-1450 O '63. (MIRA 17:1)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

S/048/63/027/001/037/043
B125/B102

AUTHORS: Yatsenko, E. A., Gutsalyuk, V. G., and Rafikov, S. R.

TITLE: Investigation of the tarry substances in mineral oils from their infrared absorption spectra

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 27, no. 1, 1963, 107 - 110

TEXT: The relationship between the tarry substances in different types of crude oil from the Ural deposition Munayly and Karaton and their infrared absorption spectra is described. Such spectra were taken of 5% solutions of these mineral oils in CCl_4, on plates 30 μ thick, using an ИКС-14 (IKS-14) spectroscope. Strong absorption bands exist at 2861, 2926, 2956 cm^{-1} in the region of the stretching vibrations of the C-H bonds in the spectra of the tarry fractions. The fractions precipitated from solutions in carbon tetrachloride show more intense absorption bands than those precipitated from alcohol-benzene solutions. The aliphatic chains of the tar fractions precipitated with acetone have the highest degree of ramification, the tars of

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S/048/63/027/001/037/043
B125/B102

Investigation of the tarry ...

the alcohol-benzene fraction the lowest. The narrow band at 1050 cm^{-1} is probably due to the components with saturated cycles. Other bands indicate the existence of arylalkyl ketone, diaryl ether, and substituted mono and polycyclic aromatic structures. The most important structural elements of the tar molecules are probably bi- and polycondensed aromatic groups. Various tar fractions differ by the amount and the structure of their aromatic structures. There are 3 figures and 1 table.

Card 2/2

S/079/63/033/002/007/009
D204/D307

AUTHORS: Arkhipova, I.A., Rafikov, S.R. and Suvorov, B.V.

TITLE: Hydrolysis of terephthalodinitrile with aqueous ammonia under pressure

PERIODICAL: Zhurnal obshchey khimii, v. 33, no. 2, 1963, 637 - 641

TEXT: The above reaction was studied to determine the possibility of selectively preparing the desired intermediate products. Terephthalodinitrile (TDN), prepared by the oxidative ammonolysis of p-xylene of Pb vanadate, was reacted with aqueous ammonia (taken in various TDN: ammonia:water molar ratios, n) at 200-300°C, in a stainless steel autoclave under pressures from 5 to 40atm., over 3 hours. For n = 1:14:210, the yields of the diammonium salt of terephthalic acid (I) increased from ~ 30 % at 200°C to ~ 100 % at 300°C, whilst the yields of $NH_4COOC_6H_4CONH_2$ (II) fell from ~ 50 % at 200°C to ~ 10 % at 250°C. At 200°C, with $TDN:H_2O = 1:210$, increasing the molar ratio of $NH_3:TDN$ to $\tilde{>}8$ favored the formation of I and II, whilst 30-40 % of

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S/079/63/033/002/007/009
Hydrolysis of terephthalodinitrile ... D204/D307

each of $NH_2COC_6H_4CN$ and $NH_2COC_6H_4CONH_2$ was formed at NH_3:TDN = 1-2. A small amount of ammonium p-cyanobenzoate was also formed with low concentrations of NH_3. At 250°C, increased concentrations of water promoted the rate of reaction and favored the formation of the final products of hydrolysis. During the formation of - $CONH_2$ from - CN, the ammonia behaved only as a catalyst; in the conversion of - $CONH_2$ to $COONH_4$ however, considerably higher concentrations of NH_3 were required. There are 3 figures.

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk Kazakhskoy SSR (Institute of Chemical Sciences of the Academy of Sciences of the Kazakh SSR)

SUBMITTED: March 14, 1962

Card 2/2

BUCHACHENKO, A.L.; SDOBNOV, Ye.I.; RAFIKOV, S.R.; NEYMAN, M.B.

Reactivity of diethyl phosphite in radical reactions with tritert-butylphenoxyl. Izv. AN SSSR. Otd.khim.nauk no.6:1118-1120 Je '63. (MIRA 16:7)

1. Institut khimicheskoy fiziki AN SSSR i Institut elementoorganicheskikh soyedineniy AN SSSR.
(Phosphorous acid) (Radicals (Chemistry))

SUVOROV, B.V.; RAFIKOV, S.R.; ZHUBANOV, B.A.; KOSTROMIN, A.S.; KUDINOVA, V.S.;
KAGARLITSKIY, A.D.; KHMURA, M.I.

Catalytic synthesis of the dinitrile of terephthalic acid.
Zhur. prikl. khim. 36 no.8:1837-1847 Ag '63. (MIRA 16:11)

KAGARLITSKIY, A.D.; SUVOROV, B.V.; RAFIKOV, S.R.; KOSTROMIN, A.S.

Catalytic synthesis of benzonitrile by means of the oxidative ammonolysis of aromatic compounds. Zhur. prikl. khim. 36 no.8:1848-1852 Ag '63. (MIRA 16:11)

ACCESSION NR AM4016117 BOOK EXPLOITATION S/

Rafikov, Sagid Raufovich; Pavlova, Sil'viya Aleksandrovna; Tverdokhlebova Iraida Ivanovna

Methods of determining molecular weights and the polydispersion of high molecular weight compounds (Metody* opredeleniya molekulyarny*kh vesov i polidispersnosti vy*sokomolekulyarny*kh soyedineniy), Moscow, Izd-vo AN SSSR, 1963, 334 p. illus., biblio. Errata slip inserted. 5,000 copies printed. Sponsoring Agency: Akademiya nauk SSSR. Institut elementoorganicheskikh soyedineniy.

TOPIC TAGS: high molecular compound, molecular weight, diffusion, light diffusion, sedimentation, osmometry, ebullioscopy, crioscopy, end group, viscosimetry

TABLE OF CONTENTS [abridged]:

RAFIKOV, S.R.; CHELNOKOVA, G.N.; RODE, V.V.; ZHURAVLEVA, I.V.; SOROKINA, R.A.

Chemical transformations of polymers. Part 15: Specific features of the thermal degradation of polyenanthamide. Vysokom. soed. 6 no.4:652-654 Ap '64. (MIRA 17:6)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

S/0190/64/006/004/0710/0715

ACCESSION NR: AP4032571

AUTHORS: Chelnokova, G. N.; Rafikov, S. R.

TITLE: Chemical transformations of polymers. 16. High temperature destruction of polyenanthamide and polycapramide in a closed system

SOURCE: Vy*sokomolek. soyedin., v. 6, no. 4, 1964, 710-715

TOPIC TAGS: polymer, polyenanthamide, polycapramide, polyamide, thermal polyenanthamide decomposition, thermal polycapramide decomposition, amide bond hydrolysis, polyamide depolymerization, homolytic bond rupture, decomposition product, chromathermograph KhT 2M

ABSTRACT: A 45-60 g aliquot of semitechnical grade polyenanthamide (PEA) (mol. wt. 20 000) or of commerical grade polycapramide (PCA) (mol. wt. 18 000) contained in a test tube was placed in a 0.5-liter autoclave filled with nitrogen, and was heated for 4-5 hours at various temperatures. After cooling, the gaseous, liquid, and solid decomposition products were analyzed with the chromathermograph KhT-2M, the infrared spectrophotometer, by conductometric and potentiometric titration, etc. Heating the PEA at 350C yielded practically no gaseous products, but did

ACCESSION NR: AP4032571

produce depolymerization from an initial viscosity (in cresol) of 1.5 to 0.4, the product remaining fully soluble. Heating the PEA at 370-380C brought about mainly the liberation of NH_3 and CO_2 and the formation of a polyamide with a molecular weight of 2600, of some lactams, nitriles, and pyrroles. Heating of either PEA or PCA at 390-420C resulted in a complete decomposition of the polyamide macromolecule, yielding 8-13% of ammonium carbonate and carbamines, a larger amount of gaseous products, some water (3%), other fluid destruction products, and 10-12% of a solid insoluble black mass. The latter was presumably a polycondensation product of earlier decomposition compounds. Infrared analysis of the liquid fraction showed the presence of CN and NH units. In the opinion of the authors, hydrolysis seems to be the dominant trend in thermal destruction of the polyamides, most of the water originating from secondary reactions. The desamination and decarboxilation of the end groups, and the homolytic rupture of various bonds are also involved in the processes of thermal destruction of the polymers. V. I. Yermakova participated in the experimental work and N. A. Chumayevskiy conducted the infrared analysis. Orig. art. has: 1 table, 2 charts, and 2 formulas.

ACCESSION NR: AP4032571

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Organoelemental Compounds, AN SSSR)

SUBMITTED: 07May63 DATE ACQ: 11May64 ENCL: 00

SUB CODE: OC, MM NO REF SOV: 003 OTHER: 001

Card 3/3

[illegible]; [illegible], [illegible]; [illegible]
[illegible]

[illegible] of polymers. [illegible]
[illegible]

PAVLOV, A.V.; BRESLER, S. Ye.; RAFIKOV, S.R.

Molecular weight distribution of poly-ε-caproic amide, a product of anionic polymerization. Vysokom. soed. 6 no.11:2068-2072 N '64. (MIRA 18:2)

1. Institut elementoorganicheskikh soyedineniy AN SSSR i Institut vysokomolekulyarnykh soyedineniy AN SSSR.

BARIKOV, I.V.; RODE, V.V.; RAFIKOV, S.R.

Synthesis of pyrocatechol phosphite. Izv. AN SSSR Ser. khim. no.11: 2115 N '64 (MIRA 18:1)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

L 21210-65 EWG(j)/EWT(m)/EWP(j)/EWA(h)/EWA(1) Pc-4/Peb/Pi-4 SSD(c)/
AFTC(a)/ESD(gs)/ESD(t) WH/RM

ACCESSION NR: AP5001481 S/0190/64/006/012/2168/2173

AUTHOR: Rode, V. V.; Yarov, A. S.; Rafikov, S. R. B 15

TITLE: Chemical transformations of polymers 20. The photochemical decomposition of selected polyarylates

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 6, no. 12, 1964, 2168-2173

TOPIC TAGS: polyester stability, polyarylate stability, polymer film, thermal stability, ultraviolet irradiation, photochemical decomposition, phenolphthalein polycondensation, terephthalic acid, isophthalic acid, infrared spectrum, polymer crosslinking, chain transfer

ABSTRACT: Polyesters of high thermal stability, prepared by polycondensation of phenolphthalein with terephthalic or isophthalic acid by the method of V. V. Korshak et al., were studied for their stability in a vacuum under ultraviolet light. Thin films were deposited from chloroform solution, dried, exposed for up to 120 hrs. to the light of a mercury vapor lamp (6.3 quanta/sec·cm^2), and analyzed by infrared spectroscopy. The gaseous products were identified as carbon monoxide and dioxide by gas chromatographic analysis. The coloration of the films increased and both tensile strength and relative elongation decreased with increasing irradiation time, but decomposition as indicated by the studied parameters was

L 21210-65
ACCESSION NR: AP5001481

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shown to take place primarily during the first 50-60 hrs. of irradiation. A mechanism for crosslinking, chain transfer, and chain termination by photochemical reactions is proposed, and crosslinking was shown to be favored by the cleavage of lactone rings in the studied polymers. The decrease in decomposition rates with irradiation time was related to the formation of quinoid compounds and their stabilizing activity." The authors thank V. V. Korshak, S. V. Vinogradova and S. N. Salazkin for supplying the specimens." Orig. art. has: 3 tables, 5 figures and 1 formula.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute for Heteroorganic Compounds, AN SSSR)

SUBMITTED: 19Feb64 ENCL: 00 SUB CODE: MT

NO REF SOV: 006 OTHER: 005

Card 2/2

GLADYSHEV, G.P.; RAFIKOV, S.R.

Mass polymerization of vinyl monomers at high degrees of conversion. Trudy Inst. khim. nauk AN Kazakh. SSR 11:5-15 '64. (MIRA 17:11)

RAFIKOV, S.R.; SECHKOVSKAYA, V.A.; GLADYSHEV, G.P.

Photopolymerization of acrylonitrile in solutions of zinc chloride and calcium chloride. Trudy Inst. khim. nauk AN Kazakh. SSR 11:16-18 '64. (MIRA 17:11)

RAF[illegible], [illegible]; [illegible], [illegible]; KHISANOVA, [illegible]; [illegible]KOVA, N.V.

Effect of the nature of initiator on the mass polymerization of methyl methacrylate. Trudy Inst. khim. nauk AN Kazakh. SSR 11:19-24 '64.
(MIRA 17:11)

L 21337-65 EPA(s)-2/EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4/Pt-10
RPL WW/JW/RM

ACCESSION NR: AT5001006 S/2850/64/011/000/0036/0041

45
44

AUTHOR: Zhubanov, B.A., Rafikov, S.R., Pavletenko, L.V., Moshkevich, S.A., Akimova, N.I.

15 B+1

TITLE: Studies in the field of polymer synthesis. Part 15. Synthesis of polyamides prepared from m- and p-xylylenediamine, adipic, sebacic and isophthalic acid

SOURCE: AN KazSSR. Institut khimicheskikh nauk. Trudy, v. 11, 1964. Sintez i issledovaniye vysokomolekulyarnykh soyedineniy (Synthesis and research of high-molecular compounds), 36-41

TOPIC TAGS: polycondensation, polyamide synthesis, xylylenedramine, adipic acid, sebacic acid, isophthalic acid, intrinsic viscosity, thermal stability

ABSTRACT: Poly-m-xylylene-adipamide, poly-p-xylylene-sebacamide, and poly-m-xylylene-isophthalamide were prepared from the diamines, acids, salts and acid chlorides, and also from dimethylsebacate, by solution; melt; or mixed-phase polymerization, and tested for intrinsic viscosity in cresol or sulfuric acid solution (deciliter/gram, Ubollodo) and for thermal stability. Maximum yields of 98% poly-m-xylylene-adipamide with a maximum viscosity of 1.1 were obtained by solution polymerization in m-cresol and subsequent melt

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L 21337-65

ACCESSION NR: AT5001006

polymerization at 260-265C. Thermal stability at 237-287C and the typical behavior of a crystalline polymer were indicated by thermal analysis. Solution polymerization and subsequent melt polymerization at 280-290C gave a 98% yield of poly-p-xylylenesebacamide with a viscosity of 1.36 in sulfuric acid; polycondensation yields with dimethylsebacate at 260-270C were 98% with a viscosity of 1.17 in sulfuric acid; mixed phase condensation in water-carbon tetrachloride gave a yield of 81.1% and viscosity of 0.3 in cresol. Thermal decomposition of poly-p-xylylene-sebacamide started at 340C, and this polymer was shown to be less crystalline than poly-m-xylylene-adipamide. The maximum yield of poly-m-xylylene-isophthalamide was 90%, the maximum measured viscosity 0.17, and severe conditions produced crosslinked and insoluble polymers. Decomposition of the amorphous polyamide started at 350C. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: Institut Khimicheskikh nauk, Akademiya Nauk Kazakhskoy SSR (Institute of Chemical Sciences, Academy of Sciences of the Kazakh SSR)

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

NO REF SOV: 001 OTHER: 004

Card 2/2

L 21338-65 EWT(m)/EPF(c)/EWP(j)/T Pc-4/Pr-4/Pa-4 RPL JW/RM

ACCESSION NR: AT5001007 S/2850/64/011/000/0042/0047

AUTHOR: Zhubanov, B.A., Derevyanchenko, V.P., Rafikov, S.R.

TITLE: Studies of the field of polymer synthesis. Part 16. A study of the polycondensation reaction of m-xylylenediamine with phthalic acid Б+1

SOURCE: AN KazSSR. Institut khimicheskikh nauk. Trudy, v. 11, 1964. Sintez i issledovaniye vysokomolekulyarnykh soyedineniy (Synthesis and research of high-molecular compounds), 42-47

TOPIC TAGS: polycondensation, phthalic acid, xylylenediamine, polyamide synthesis, cyclization 15

ABSTRACT: Polycondensation of m-xylylenediamine with o-phthalic acid at 212-280C in an inert atmosphere did not yield polyamides of high molecular weight but linear and cyclic oligomers; the amount of cyclic polymer increased and that of linear polymer decreased with an increase in temperature, and the amount of ammonia liberated was simultaneously increased whereas that of recovered m-xylylene-diamine was decreased. The polymers, which were light-yellow to dark brown in color, were fractionated by extraction with ethyl ether, ethyl alcohol, benzene, and acetone, and the benzene-soluble fraction was identified

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ACCESSION NR: AT5001007

as m-xylylenediamine diphthalylimide. Formation of ammonia may involve both the reaction of terminal aminogroups of polymer chains and the formation of a secondary amine from nonreacted m-xylylenediamine. The soluble fractions were shown to contain low-molecular and cyclic oligomers, and various paths and structures are proposed for the mechanism of cyclization. Orig. art. has: 3 tables and 9 chemical formulas.

ASSOCIATION: Institut khimicheskikh nauk, Akademiya nauk Kazakh skoy SSR (Institute of Chemical Sciences, Academy of Sciences of the Kazakh SSR)

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

NO REF SOV: 005 OTHER: 004

Card 2/2

[illegible] -33-1-35/49

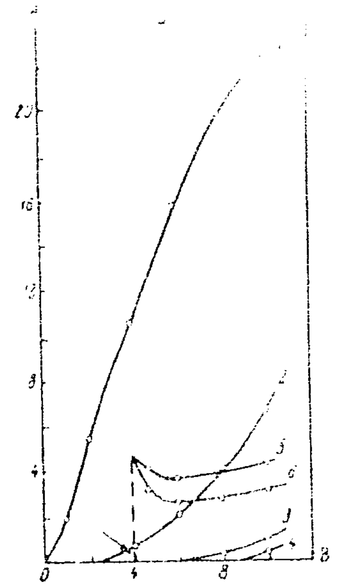

Fig. 5. Oxidation of I in the presence of p-phenylenediamine: 2 = 0.001; 3 = 0.005; 4 = 0.05; 5 = 0.25; 6 = 0.5; 7 = 5.0; 8 = 10.0.

Card 7/12

[illegible], SOV/80-33-1-36/49

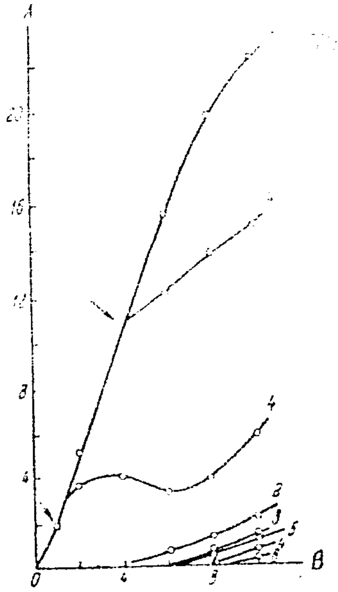

Fig. 6. Oxidation of I in the presence of p- and o-aminophenols: 2 = 0.001, 3 = 0.005, and = 0.025 for p-aminophenol; 5 = 0.005 and 6 = 0.025 for o-aminophenol.

[illegible], 20[illegible]0-33-1-10/49

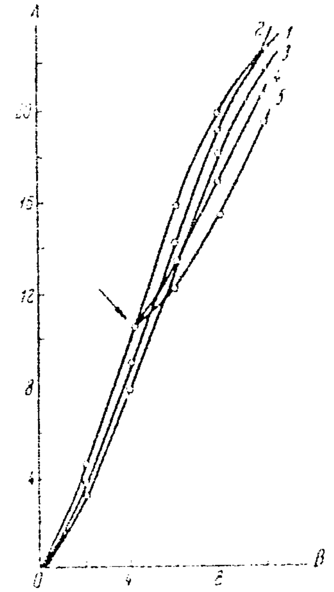

Fig. [illegible]. Oxidation of I in the presence of dimethyl ether of hydroquinone: 2 = 0.1; 3 = 0.5; 4 = 1.0; 5 = [illegible]

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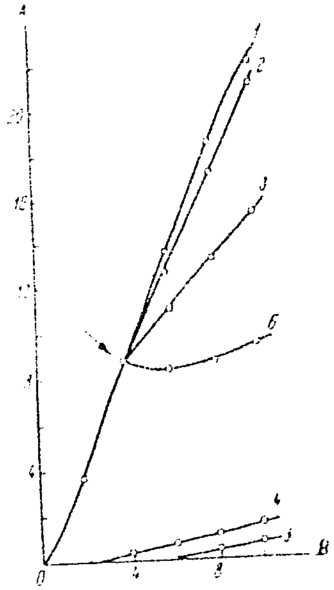

Fig. 6. Oxidation of I in the presence of diphenylamine: 2 = 0.001; 3 = 0.01; 4 = 0.05; 5 = 0.1; 6 = 1.0

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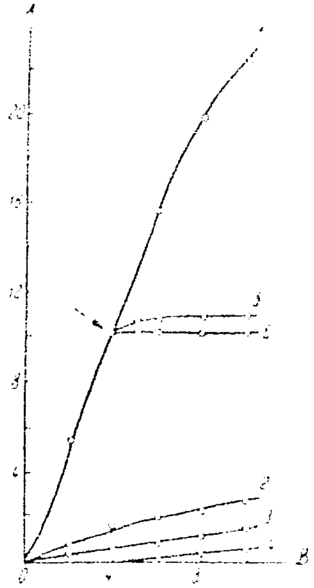

Fig. 9. Oxidation of I in the presence of dimethylaniline: 2 = 0.1; 3 = 0.5; 4 = [illegible]; 5 = 1.0; 6 = 5.0.

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SOV/80-33-1-30/49

There are 9 figures; 1 table; and 23 references, 12 Soviet, 3 German, 6 U.S., 2 U.K. The 5 most recent U.S. and U.K. references are: R. H. Rosenwald, Ind. Eng. Ch., 42, 162 (1950); G. S. Hammond, J. Am. Chem. Soc., 77, 3238 (1955); C. E. Boozer, et al., J. Am. Chem. Soc., 77, 3233 (1955); C. J. Pedersen Ind. Eng. Ch., 48, 1881 (1956); L. F. Fieser, A. E. Oxford, J. Am. Chem. Soc., 64, 2060 (1942).

SUBMITTED: May 25, 1959

Card 12/12

88724

S/190/61/003/001/003/020
B119/B216

15.8500

AUTHORS: Rafikov, S. R., Sorokina, R. A.

TITLE: Chemical changes in polymers. IV. Thermooxidative changes of polyamides

X

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 1, 1961, 21-29

TEXT: The authors point out the extremely small number of publications on the influence of oxygen on polyamides. The present work was undertaken with a view to elucidating the polymer changes produced by the action of oxygen at elevated temperatures. The following substances were used for the experiments: Anid (polyhexamethylene adipamide), granulated and in fibrous form; Caprone (polycaproamide) in the form of granulate, fibers and films (type ПК-4 (PK-4)); granulated and fibrous Enant (polyenanthamide) and Anid Г-669 (G-669), a copolymer made from caprolactam and the hexamethylene-diamine salts of adipic acid (salt АГ (AG)) and acelaic acid. Two series of experiments were performed: 1. The above-mentioned polyamides (fibers and films) were placed in a weak air

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S/190/61/003/001/003/020
B119/B216

Chemical changes in polymers...

stream and maintained at elevated temperatures below the melting point of the polymer for 8 hr. 2. Dried air or nitrogen, respectively, was blown through the polymer melt at various temperatures. The first test series showed that the changes of the physicochemical polymer properties increase with increased testing temperature: the specific viscosity of the solutions drops, the Huggins constant increases. These changes are insignificant at temperatures below 140°C. At temperatures above 200°C, infusible, insoluble, but swellable products are formed (branched, or rather three-dimensionally cross-linked molecules with reduced mechanical properties). At yet higher temperatures, the substances decompose (splitting off of volatile compounds, blackening of the polyamide which loses its ability to swell in cresol, increase of oxygen content and decrease of carbon- and hydrogen content of the substance). The chemical structure (in contrast to the degree of molecular orientation) of the polyamide has practically no influence on the type and extent of change during thermooxidation in the solid state. The second test series showed that passing N_2 through the polyamide melt causes no change in the initial product, even at temperatures above 260°C. When air is passed

X

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Chemical changes in polymers...

through the melt, black, insoluble and infusible products which have an increased oxygen content and are nonswellable in cresol are formed locally at the points where polyamide comes into contact with O_2. The authors assume the following reactions: primary addition of O_2 in the form of peroxide at corresponding points of the polyamide chain, which initiates a radical chain reaction. High temperature, however, lead to decomposition of the initial substance, of type and extent depending on its chemical structure (heterolysis, substitution). Hexamethylene-diamine containing polyamides split off pyrrol, among other substances. Mention is made of a work the first-mentioned author carried out in collaboration with B. A. Arbuzov. There are 1 figure, 2 tables, and 15 references: 9 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds of the AS USSR)

SUBMITTED: May 19, 1960

Card 3/3

88728

S/190/61/003/001/008/C20
B119/B216

15 8107

AUTHORS: Rafikov, S. R., Syuy Tszi-pin

TITLE: Chemical transformations of polymers. V. Photochemical transformations of polycaproamide in vacuo under the influence of ultraviolet light

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 1, 1961, 56-65

TEXT: The authors draw attention to the known fact that polyamide fibers and films rapidly lose their valuable properties under the combined influence of air, moisture and light. The present work was undertaken for the purpose of studying the effect of UV light under conditions excluding all other possibly active factors. 0.06 to 0.08 mm thick unidirectionally oriented Caprone films (type ПК-4 (PK-4)) of molecular weight approximately 13 000 were irradiated under vacuum (10^{-5} - 10^{6} mm Hg) in a quartz-molybdenum vessel by means of a mercury-quartz lamp (type ПРК-2 (PRK-2)). The films were wrapped immediately round the cylindrical lamp which was placed in the center of the irradiation vessel. Irradiation

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Chemical transformations of polymers...

time: 2 - 140 hr; temperature: 30±2°C. After irradiation, the films were examined by the following methods: Gas-chromatographic analysis of the volatile decomposition products in the ХТ-2М (KhT-2M) chromatograph over МСМ (MSM) silica gel; viscosity measurement of the Caprone in cresol solution, and from this, calculation of the molecular weight; end-group determination by conductometric titration with HCl and KOH, respectively; determination of solubility and ability to swell in cresol; by taking thermomechanical and strain curves (Polyani instrument); and, in some cases, by recording the UV-, IR and epr (electron paramagnetic resonance) spectra. These investigations showed that UV irradiation of Caprone films leads both to synthetic and destructive processes in the molecule. Irradiation with light of the near ultraviolet promotes particularly the latter processes. Decomposition occurs by homolytic photolysis of amide bonds with subsequent cleavage of CO and secondary transformations of the radicals produced. During this process, C-C bonds of the initial molecule are frequently ruptured with formation of lower hydrocarbons (C_2 - C_4). The occurrence of synthetic and cross-linking reactions (similarly as in cross-linking of polyethylene under the influence of radiative irradiation)

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is mainly due to the cleavage of H atoms and recombination of the macroradicals. In the absence of oxygen, UV irradiation, even in high doses, reduces the mechanical strength of Caprone by less than 30%. The material does not turn brittle. The author thanks V. V. Voyevodskiy and I. V. Obreimov for their cooperation in the spectroscopic studies (the former placed a magnetic radiospectrometer type ЭПР-2 (epr-2) developed at the laboratory of the IKhF AN SSSR (Institute of Chemical Physics AS USSR) at the authors' disposal. This apparatus enables epr spectra to be taken during sample irradiation with a UV high-pressure burner of the type СВДШ-250 (SVDSh-250). An electromagnetic stabilizer of the type СНЭ -220-0.5 (SNE-220-0.5) was used in the studies. There are 7 figures, 4 tables, and 21 references: 9 Soviet-bloc and 11 non-Soviet-bloc.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds, AS USSR)

SUBMITTED: May 30, 1960

Card 3/3

22562
S/190/61/003/005/005/014
B101/B218

15 8107 2209

AUTHORS: Rafikov, S. R., Zhubanov, B. A., Khasanova, R. N., Gumargaliyeva, K. Z., Sagintayeva, K. D.

TITLE: Studies in the field of polymer synthesis. I. Synthesis of polyamides on the basis of xylylene diamines

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 5, 1961, 699-705

TEXT: Proceeding from the fact that heat-resistant polyamides suitable for fiber and glass production are formed by symmetric, aliphatic-aromatic diamines, a study has been made of the reactions of m-xylylene diamine (A) and n-xylylene diamine (B) with adipic acid (1), azelaic acid (2), sebacic acid (3), o-phthalic acid (4), isophthalic acid (5), and terephthalic acid (6). The synthesis of esters of A with 1, 2, 4, and 5, and of B with 1 and 3 was performed by mixing diamine solutions and acid in 95% alcohol. B was synthesized with 2, 4, and 5 at the boiling temperature of the alcoholic solution. The resulting ester was filtered off. The precipitate was formed not before 24 hr. Since terephthalic acid is hardly soluble in organic solvents, synthesis A + 6 was effected by addition of the acid to the

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B101/B218

Studies in ...

aqueous diamine solution and by subsequent boiling. Alcohol + benzene (1 : 1) were used as solvent for the synthesis of A + 3 because the ester did not precipitate from 95% alcohol. Table 1 contains the yields and melting points of the esters synthesized. Polymerization occurred either in the melt or in a cresol solution. The ester B + 6 could not be polymerized this way on account of its insolubility in cresol and its high melting point. In this case, the polyamide was obtained from an equimolar mixture of dimethyl terephthalate and p-xylylene diamide. Tables 2 and 3 list data and properties of the polymers. Polycondensation of xylylene diamines with o-phthalic acid failed. 50% of a substance melting at 237-237.5°C was isolated. It was identified as diphthalyl xylylene diamine. The authors assume a rupture of the reaction chain by formation of a cyclic imide, owing to the neighboring position of the carboxyl groups. The intrinsic viscosity of polyamides indicates that their molecular weight varies between 10,000 and 20,000. The authors thank D. V. Sokol'skiy and B. V. Suvorov for the diamine put at their disposal. B. A. Poray-Koshits is mentioned. There are 2 figures, 3 tables, and 13 references: 6 Soviet-bloc and 7 non-Soviet-bloc. The 3 most important references to English-language publications read as follows: O. B. Edgar, E. Ellery, J. Chem. Soc., 1952, 2633;

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C. B. Edgar, R. Hill, J. Polymer Sci., 8, 1, 1952; E. F. Carlston, F. G. Lum; Industr. and Engng. Chem. 49, 1239, 1957.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences, AS Kazakhskaya SSR)

SUBMITTED: July 19, 1960

Табл. 1

(I) Диамин	(II) Кислота	(III) Выход соли, %	(IV) Т. пл. соли, °C
(А) м-Ксилилендиамин	① Адипиновая	93,0	186—187
(а) То же	② Азелаиновая	86,3	156—158
» »	Себациновая ③	—	64—67
» »	о-Фталевая ④	95,0	205—206
» »	⑤ Изофталевая	76,3	219—220
» »	⑥ Терефталевая	40,0	270
(Б) п-Ксилилендиамин	① Адипиновая	92,3	232—233
(б) То же	② Азелаиновая	93,0	200
» »	Себациновая ③	95,0	228
» »	о-Фталевая ④	95,0	205—206
» »	⑤ Изофталевая	98,0	262—264
» »	⑥ Терефталевая	87,0	340

KAGARLITSKIY, A.D.; SUVOROV, B.V.; RAFIKOV, S.R.

Oxidation of organic compounds. Report No.25: Oxidative ammonolysis of some monoalkylbenzenes. Trudy Inst.khim.nauk AN Kazakh.SSR 7:57-67 '61. (MIRA 15:8)
(Benzene) (Ammonolysis)

15 8620 2209

11.2217

25266

S/190/61/003/007/010/021
B101/B220

AUTHORS: Rafikov, S. R., Gladyshev, G. P.

TITLE: Studies in the field of the synthesis of polymers. II. Photo-oxidative activation of methyl methacrylate by ultraviolet light

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 7, 1961, 1034-1040

TEXT: The photopolymerization by means of UV light is made difficult by the fact that the exposure lasts long and special quartz vessels are needed. The aim of the present study was to utilize the post effect of methyl methacrylate (MMA) initiated by UV light and to effect the polymerization of MMA separated from its initiating. MMA distilled at 100-120 mm Hg was irradiated in a quartz cell by means of a ПРК-2 (PRK-2) mercury lamp (capacity 375 w). The irradiation intensity was found to be $2.4\cdot10^{16}$ quantums/ml.sec by using uranyl oxalate. The amount of oxygen consumed for the formation of peroxides was determined volumetrically. Furthermore, the amount of peroxides formed was determined

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iodometrically. These operations were performed in pure argon. Results: 1) The consumption of O_2 does not differ from that measured on thermal oxidation of MMA, the oxidation rate with UV irradiation is, however, higher by at least one order of magnitude. The absorption of O_2 is not dependent on its partial pressure. 2) The curves of the oxygen absorption become steeper with increasing temperature. The apparent activation energy was calculated to be 10 kcal/mole. If MMA is irradiated immediately after distillation, i.e., if it does not contain any traces of peroxides, the formation of peroxides occurs more slowly under the effect of irradiation. 3) The quantity of peroxides formed is directly proportional to the dose of irradiation. 4) The titanium reagent gave negative reactions with H_2O_2, oxyalkyl hydrogen peroxides, and acyl peroxides. After irradiation, the MMA was liberated from oxygen in a dilatometer by repeated freezing and evacuation to $2-3 \cdot 10^{-2}$ mm Hg, the dilatometer filled with Hg, and the polymerization effected in the thermostat. Reproducible data were only obtained if the polymerization was effected immediately after irradiation, the MMA thus having no contact with air. The kinetics of the polymerization as function of the temperature are shown in Fig. 5. The shape of the curves is similar to that obtained on normal polymerization by peroxides. The "gel effect" under UV irradiation appeared, however, only with higher degrees of conversion. This is explained by additional breaking of the chains, which has been proved, moreover, by the fact that the rate of polymerization decreases under very high doses of irradiation (Fig. 6), although the concentration of the peroxides increases. The macroradicals react with inhibiting compounds. The infrared spectra taken in the laboratoriya molekulyarnoy spektroskopii Instituta khimicheskikh nauk AN KazSSR (Laboratory of Molecular Spectroscopy of the Institute of Chemical Sciences, AS Kazakhskaya SSR) proved the existence of secondary decomposition products of the peroxides: carbonyl, carboxyl, and hydroxyl groups. Such compounds are characteristic also for the thermal decomposition of peroxides. The total activation energy was found to be 11.2 kcal/mole. It is lower than on polymerization of MMA in the presence of benzoyl peroxide (19.5 kcal/mole) or other initiators. From $E = 0.5E_{init} + (E_{incr} - 0.5E_{break})$, where E means the total activation energy, E_{init} the activation energy of the initiation, E_{incr} the activation energy of

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the increase of the chains (6.3 kcal/mole). E_{break} the activation energy of the breaking of the chains (2.8 kcal/mole). E_{init} was found to be 12.6 kcal/mole, thus less than the activation energy during thermal oxidation of MMA in the presence of peroxides (22±1 kcal/mole). For degrees of conversion of 5-15% a break of the kinetic curves was observed, which is due to the acceleration of the polymerization at the interface monomer-mercury. The results show that the UV irradiation of MMA can be used for the subsequent polymerization at low temperatures. N. A. Bakh is mentioned. There are 8 figures and 8 references: 7 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR
(Institute of Elemental-organic Compounds, AS USSR),
Institut khimii AN KazSSR (Institute of Chemistry, AS
Kazakhskaya SSR)

SUBMITTED: September 27, 1960

Card 4/5

RAFIKOV, S R

26227 S/190/61/003/007/021/021
B101/B230

15 8050

AUTHORS: Tsetlin, B. L., Medved', T. Ya., Chikishev, Yu. G., Polikarpov, Yu. M., Rafikov, S. R., Kabachnik, M. I.

TITLE: Radiation polymerization of tertiary monovinylphosphine oxides

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 7, 1961, 1117 - 1118

1117 1118

TEXT: This letter to the editor reports the synthesis of polymers on the basis of tertiary monovinylphosphine oxides (Ref. 1: M. I. Kabachnik, T. Ya. Medved', Yu. M. Polikarpov, Dokl. AN SSSR 135, 849, 1960; M. I. Kabachnik, Chang Jung-yü, Ye. N. Tsvetkov, Dokl. AN SSSR, 135, 603, 1960) to be of great importance due to the high thermal and chemical stability of phosphine oxides. Experiments to polymerize such monomers by applying initiators of the radical polymerization (benzoyl peroxide, azoisobutyric acid dinitrile) failed to produce satisfactory results. Oxides of the tertiary diallyl- and dimethallyl phosphines were, in the presence of

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this type of initiators, either not polymerized at all or their polymerization proceeded at an extremely low rate with very poor yield (Ref [illegible] see below). Authors conducted experiments to initiate polymerization of diethylvinylphosphine oxide (I) and diphenylvinylphosphine oxide (II) by radiation. As source of radiation an X-ray irradiation apparatus was used. Samples were exposed to irradiation in molten state in vacuum. In irradiation of (I) the dose rate was $4.5\cdot10^{16}$ ev/ml sec at an irradiation time of 30 hr at 70°C. As a product, a solid polymer was obtained having a molecular weight of ~13,000 (the monomer was distilled off under vacuum). Degree of conversion amounted to ~60 %, radiation yield G of the polymerization was 80 molecules of the monomer per 100 ev. The polymer is well soluble in water, ethanol, and benzene. In irradiation of (II), the dose rate was $4\cdot10^{15}$ ev/ml sec for a time of 50 hr at 130°C. A polymer was obtained having a molecular weight of ~30,000; degree of conversion ~60 %, radiation yield ~350 molecules per 100 ev. The polymer is soluble in ethanol and benzene when heated, and may be precipitated from alcohol by adding a small quantity of water. Vitrification temperature of the

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25177

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B101/B230

Radiation polymerization of....

reprecipitated polymer (II) is about 160°C (determined by thermomechanical method, Ref. 3: B. L. Tsetlin, V. I. Gavrilov, N. A. Velikovskaya, V. V. Kochkin, Zavodsk. lab., 22, 352, 1956). It has been proved hereby that the radiation polymerization is an efficient method to obtain polymers on the basis of oxides of monovinylphosphines. Mechanism of the process is being studied at present. [Abstracter's note: Complete translation.] There are 3 references: 2 Soviet-bloc and 1 non-Soviet-bloc. The reference to English-language publication reads as follows: Ref. 2: K. D. Berlin, G. B. Butler, J. Org. Chem., 25, 2006, 1960; K. D. Berlin, G. B. Butler, J. Amer. Chem. Soc., 82, 2712, 1960

SUBMITTED: February 23, 1961

X

Card 3/3

GLADYSHEV, G.P.; RAFIKOV, S.R.

Synthesis of polymers. Part 3: Photooxidative activation of methyl methacrylate in the visible region of the spectrum. Vysokom.soed. 3 no.8:1187-1190 Ag '61. (MIRA 14:9)

1. Institut khimicheskikh nauk AN KazSSR i Institut elementoorganicheskikh soyedineniy AN SSSR.
(Methacrylic acid) (Radiation)

20324

S/020/61/137/001/016/021
B101/B204

5.3830 2209 1234, 1153

AUTHORS: Gladyshev, G. P. and Rafikov, S. R.

TITLE: Initiation of polymerization by means of electric charges formed on the interface

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 1, 1961, 113-115

TEXT: After giving a survey of published data concerning interface polymerization, the authors presume that here the potential drop of the interface might play an important part, which causes an orientation of the molecules. Proceeding from the Arrhenius equation for the reaction rate V: $V = A_1 \exp(-E_1/RT)$ (1), the following is written down for the reaction on the interface: $V = A_2\exp(-E_2/RT)$ (2), where $A_2 > A_1$; $E_2 = E_1 - E_\varphi$; $E_\varphi = n23060(\varphi - Td\varphi/dT)$. The potential drop thus may increase the factor A, and decrease the activation energy. This assumption was checked by initiation of various polymerization processes on the interface at normal temperature and absence of the usual initiators and

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Initiation of polymerization...

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B101/B204

catalysts, and the results were compared with control tests (polymerization in a homogeneous system with benzoyl peroxide). The following experiments are described: A 1 - 2 cm thick layer of acrylonitrile (AN) on glycerin, containing 1 - 2% water, after 10 to 12 hr, gave noticeable flakes of polymer at 20-22°C, whose molecular weight was found viscosimetrically to be equal to 100,000 - 200,000. The air oxygen inhibiting the radical polymerization of AN produced no effect upon this process. On the interface AN - H_2O, a noticeable polymerization rate was observed only in CO_2 atmosphere. Methylmethacrylate (MMA) formed a polymer film on the interface with water or mercury after 30-40 hr. On the interface MMA - paraffin or MMA - glycerin, polymerization occurred after 4-5 hr. This reaction is accelerated in a CO_2 atmosphere. As the admixture of some substances increases the potential drop on the interface, the effect of 0.01% CH_3COOH, $CH_2ClCOOH$, and HCl was tested. In the system AN - glycerin (with 1% H_2O), this addition at 20°C led to a polymerization of from 25-30% after 15-20 hr. In AN - H_2O (1:1) the additional acid in nitrogen

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Initiation of polymerization...

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atmosphere after 100 hr gave 1.5% polymer with a molecular weight of 6,000,000. In the system AN - glycerin - acid, the polymerization rate was accelerated by water. Experiments, to electrify MMA by shaking (400-600 vibrations per minute), in the absence of all initiators led to an increase of viscosity and the forming of 5 - 10% polymer after 3 hr. The authors thus find their assumption concerning the effect of the potential drop on the interface to be confirmed. They assume that in this way also other non-saturated compounds may be polymerized. Although the data hitherto available permit no conclusion to be drawn as to the mechanism of the reaction, a radical mechanism is assumed to exist because of the reaction being inhibited by inhibitors. Mention is made of A. D. Abkin, V. A. Kargin, V. A. Kabanov, N. A. Plate, S. S. Medvedev, and N. N. Semenov. There are 14 references: 13 Soviet-bloc and 6 non-Soviet-bloc.

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk KazSSR (Institute of Chemical Sciences of the Academy of Sciences Kazakhskaya SSR)

PRESENTED: October 15, 1960, by N. N. Semenov, Academician

Card 3/4

20324

Initiation of polymerization...

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B101/B204

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SUBMITTED: October 15, 1960

Card 4/4

MANUKOVSKAYA, L. G.; SOLOMIN, A. V.; SUVOROV, B. V.; RAFIKOV, S. R.

Continuous method of production of terephthalic acid by the liquid phase oxidation of m-xylene. Neftekhimia 2 no.4:531-535 Jl-Ag '62. (MIRA 15:10)

1. Kazakhskiy gosudarstvennyy sel'skokhozyaystvennyy institut i Institut khimicheskikh nauk AN KazSSR, Alma-Ata.

(Terephthalic acid) (Xylene)

34994
S/190/62/004/003/014/023
B110/B144

15.8080

AUTHORS: Rafikov, S. R., Zhubanov, B. A., Gumargaliyeva, K. Z., Pavlitenko, L. V.

TITLE: Studies in the field of polymer synthesis IV. Synthesis of mixed polyamides on the basis of xylylene diamines, hexamethylene diamines and adipic acid

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 3, 1962, 41[illegible]-41[illegible]

TEXT: The authors studied mixed polyamides which arise when a mixture of p- and m-xylylene diamines (I) and/or hexamethylene diamines (II) is made to react with adipic acid (III). The thermal resistivity of mixed polyamides is assumed to be increased by the introduction of aromatic rings into the aliphatic polyamide chain of II and III of corresponding structure. The lawfulness in the change of the properties of mixed p- and m-I polyamides should therefore be studied. They were obtained by polycondensation of corresponding diamine salts mixed with III. The molar ratios of diamines were: 95:5, 80:20, 65:35, 50:50, 35:65, 20:80, and 5:95. The melting points of salts obtained from aqueous-alcoholic

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solutions were p-I + III = 233°C, m-I + III = 187°C, II + III = 195°C. Polycondensation was conducted in an N_2 stream at a temperature below 270°C but higher than the melting point. The thermomechanical curves were found with an apparatus by B. L. Tsetlin et al (Zavodsk. labor., 22, 352, 1956), the melting points were determined according to P. J. Flory, and the intrinsic viscosities in cresol or highly concentrated H_2SO_4 were also determined. All mixed I and III polyamides are hard, stable, hornlike, and insoluble in the usual solvents. Their melts yield semitransparent fibers which can be cold drawn by 300-400 %. Melting points and flow temperatures of m-I + III, p-I + III, and p-I + II + III polyamides increase continuously with the amount of I residue. This suggests isomorphous substitution of I residues in the crystalline region. The distinct minimum of the softening point - composition curve for m-I + III : p-I + III = 40 : 60 and II + III : p-I + III ≈ 30 : 70 is probably due to a larger amount of amorphous polymer and copolymer. Different dependences on the composition of mixed m-I, II, and III polyamides are probably due to: (1) great difference in the linear dimensions of diamines and (2) disturbance of axial symmetry of the macromolecule by

Studies in the field of...

S/190/62/004/003/014/023
B110/B144

the m-I nucleus. The intrinsic viscosity (0.5-1.3 dl/g) determined in cresol and concentrated H_2SO_4 showed normal concentration dependence. A polyamide (molecular weight 11,800) which arose from m-I, II, and III, (diamine ratio 1:1) dissolved in ethylene chlorohydrin, another one which arose from p-I, m-I, and III (diamine ratio 1:4) dissolved in a mixture of 60 % ethylene chlorohydrine and 40 % $CH_2ClCOOH$. There are 4 figures, 1 table, and 7 references: 4 Soviet and 3 non-Soviet. The most important reference to the English-language publication reads as follows: R. D. Evans, H. R. Mighton, P. J. Flory, J. Amer. Chem. Soc., 72, 2018, 1950.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences AS Kazakhskaya SSR)

SUBMITTED: March 2, 1961

Card 3/3

S/081/62/000/005/098/112
B166/B101

AUTHORS: Gutsalyuk, V. G., Samsonova, N. S. Rafikov, S. R.

TITLE: Effect of certain factors on the physicomechanical properties of polyvinyl chloride plastics

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 5, 1962, 607, abstract 5P30 (Izv. AN KazSSR. Ser. khim., no. 2(18), 1960, 100-107)

TEXT: In order to improve the corrosion-resisting plastics coatings of underground pipelines a study has been made of the effect of the main external factors (contact with petroleum and petroleum products, contact with mineralized water, the effect of ultraviolet irradiation) on the physicochemical properties of polyvinyl chloride plastics (PVC plastics). It is shown that prolonged contact (up to 20 months) between PVC plastics and petroleum and gasoline increases the tensile strength of the plastic but lowers its elasticity as a result of elution of the plasticizers; analogous changes occur under the effect of ultraviolet light and heat, in addition to which, for PVC plastics based on dibutyl phthalate the percent elongation decreases more sharply, which is due to its high

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S/081/62/000/005/098/112
B166/B101

volatility; the partial elution of plasticizers which occurs when PVC plastics come in contact with ground water does not lead to deterioration in the insulating properties of the plastics. [Abstracter's note: Complete translation.]

Card 2/2

S/190/62/004/006/011/026
B110/B138

AUTHORS: Rafikov, S. R., Hsü Chi-p'ing

TITLE: Chemical transformations of polymers. VI. Effect of ultraviolet radiation on polyamides in the presence of oxygen and water vapors

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 6, 1962, 851-859

TEXT: Light aging of polyamides was investigated under approximately atmospheric conditions (O_2; H_2O vapor). The effect of ultraviolet radiation was tested on a transparent film (30 - 40μ) of Г-669 (G-669) polyamide, which was polycondensed from caprolactam, and the salts АГ (AG) and АзГ (AzG) at a ratio of 2:1:1. The ПРК-2 (PRK-2) quartz lamp was used with and without pyrex glass filter (O_2 and H_2O vapor atmosphere). O_2 of half the O_2 partial pressure in air was used for collecting the gaseous products of the photo-oxidation. After irradiation at 30 and 70°C, the decomposition products were chromatographically analyzed with the ХТ-2М (KhT-2M) apparatus. After 100 hr irradiation, $[\eta]$ increased from 0.384

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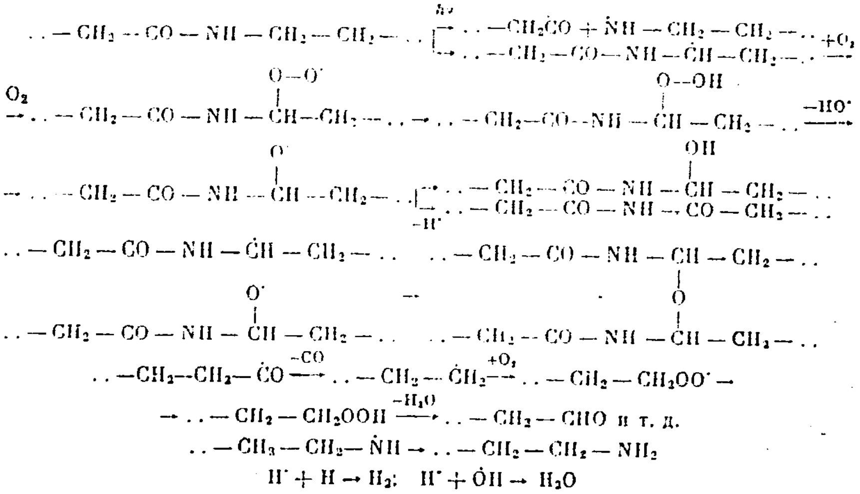
to 0.405. Since the CO separation was more intensive at 70°C than the H_2 separation, temperature increase causes rupture of the polyamide chain. After 50 hr irradiation at 70°C, photo-oxidation causes $[\eta]$ to decrease from ~0.391 to 0.270. The molecular weight rose from 13,000 to 21,300, since more symmetrically branched molecules were formed owing to the simultaneous processes of destruction and structure formation. This is indicated by the abrupt fall in percentage, elongation and total inability to crystallize during extension. C-separation during photo-oxidation is ten times higher than photolysis, which indicates the appearance of carbonyl-containing compounds in the molecule. The COOH content remains constant during photo-oxidation for 100 hr at 30°C, at 70°C it increases by 20% owing to partial oxidation of the carbonyl groups formed. The NH_2 content rises rapidly after 20 hr at 30°C and then drops continuously, since the NH_2 groups are bonded with CHO ones. Photo-oxidation is probably:



$$\ldots-CH_2-CO-NH-CH_2-CH_2-\ldots \xrightarrow{h\nu} \begin{cases} \ldots-CH_2\dot{C}O+\dot{N}H-CH_2-CH_2-\ldots \\ \ldots-CH_2-CO-NH-\dot{C}H-CH_2-\ldots \xrightarrow{+O_2} \end{cases}$$

$$\xrightarrow{O_2} \ldots-CH_2-CO-NH-\overset{O-O^{\cdot}}{\overset{|}{C}H}-CH_2-\ldots \rightarrow \ldots-CH_2-CO-NH-\overset{O-OH}{\overset{|}{C}H}-CH_2-\ldots \xrightarrow{-HO^{\cdot}}$$

$$\rightarrow \ldots-CH_2-CO-NH-\overset{O^{\cdot}}{\overset{|}{C}H}-CH_2-\ldots \begin{cases} \rightarrow \ldots-CH_2-CO-NH-\overset{OH}{\overset{|}{C}H}-CH_2-\ldots \\ \xrightarrow[-H^{\cdot}]{} \ldots-CH_2-CO-NH-CO-CH_2-\ldots \end{cases}$$

$$\begin{matrix} \ldots-CH_2-CO-NH-\dot{C}H-CH_2-\ldots \\ \overset{O^{\cdot}}{|} \\ \ldots-CH_2-CO-NH-CH-CH_2-\ldots \end{matrix} \rightarrow \begin{matrix} \ldots-CH_2-CO-NH-CH-CH_2-\ldots \\ | \\ O \\ | \\ \ldots-CH_2-CO-NH-CH-CH_2-\ldots \end{matrix}$$

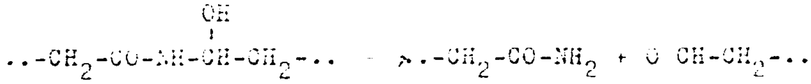
$$\ldots-CH_2-CH_2-\dot{C}O \xrightarrow{-CO} \ldots-CH_2-\dot{C}H_2 \xrightarrow{+O_2} \ldots-CH_2-CH_2OO^{\cdot} \rightarrow$$

$$\rightarrow \ldots-CH_2-CH_2OOH \xrightarrow{-H_2O} \ldots-CH_2-CHO \text{ и т. д.}$$

$$\ldots-CH_3-CH_2-\dot{N}H \rightarrow \ldots-CH_2-CH_2-NH_2$$

$$H^{\cdot}+H \rightarrow H_2; \quad H^{\cdot}+\dot{O}H \rightarrow H_2O$$

The CHO group can also develop according to:



$$\ldots\text{-}CH_2\text{-}CO\text{-}NH\text{-}\overset{OH}{\overset{|}{CH}}\text{-}CH_2\text{-}\ldots \rightarrow \ldots\text{-}CH_2\text{-}CO\text{-}NH_2 + O\,CH\text{-}CH_2\text{-}\ldots$$

With full spectrum irradiation at 30°C, photolytic processes are also important. Viscosity first decreases slightly and then increases rapidly. After 2 hr an insoluble gel is formed and after 5 hr cross linking is more intensive than during photolysis in vacuum. The rate of structure formation rises as radicals are accumulated by the chain. Accordingly, the molecular weight decreases from 13,000 to 12,100 after 30 min irradiation. As with photolysis, the ultraviolet spectra showed an absorption band at 2870 Å, corresponding to heterocyclic pyrrole compounds and the films turn yellowish-brown. During irradiation in the presence of O_2 and H_2O vapor, only one third CO is separated and a less insoluble gel is formed. The mechanical properties were not as good as with vacuum irradiation, but better than with irradiation with O_2. The inhibiting effect of H_2O vapor may be due to the reaction of H_2O with the radicals $\ldots CH_2\text{-}NH\ldots$ and $\ldots CH_2\text{-}CO\ldots$ developing by hydrolysis of the amide bonds. To test this

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irradiation was carried out in H_2O vapor (52 mm Hg, 50°C; 234 mm Hg, 70°C), without O_2 absence. The same gaseous products were obtained here as during photolysis, but in smaller quantities. In the presence of H_2O the macroradicals $...CH_2CONH\dot{C}HCH_2...$ change into methylol derivatives $...CH_2CONHCH(OH)CH_2...$, which decompose into amide and aldehyde. These react with amino groups and distort their analysis. There are 3 figures and 3 tables.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR
(Institute of Elemental-organic Compounds AS USSR)

SUBMITTED: April 26, 1961

Card 5/5

S/850/62/008/000/003/004
B119/B101

AUTHORS: Suvorov, B. V., Rafikov, S.R., Kagarlitskiy, A. D., Sabirova, A. A.~~, Svetasheva, V. A.~~

TITLE: Oxidation of organic compounds. Communication XXXIII. Oxidizing ammonolysis of p- and m-xylene mixtures

SOURCE: Akademiya nauk Kazakhskoy SSR. Institut khimicheskikh nauk. Trudy. v. 8. Alma-Ata, 1962. Kataliticheskiy sintez monomerov. 109-114

TEXT: The synthesis of terepththalic dinitrile (I) and isophthalic dinitrile (II) was investigated by reaction of mixtures of p- and m-xylene of various molar ratios in amounts of 40-70 g with 120-175 g of NH_3, 350-500 g of H_2O, and 2400-4800 liters of air per hour and per liter of catalyst, with contact times of 0.2 - 0.5 sec, at 350-410°C. Molten lead vanadate served as catalyst. The contents of I and II in the reaction product were determined by polarography. Results: The yields of I and II were only slightly affected by a change in the contact time and in the rate of adding the reaction mixture. When the reaction

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Oxidation of organic compounds...

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B119/B101

temperature is raised the yield of I + II reaches a maximum between 360 and 390°C, while the yield of gaseous substances increases steadily. The formation of I and II depends essentially on the molar ratio of the xylene isomers used: under otherwise equal reaction conditions, the yields of I were ~39, ~3, and ~52%, whilst those of II were ~35, ~3, and over 80% respectively, at the ratios m-xylene : p-xylene = 4:1, 1:1, and 1:9 (referring to the theoretical maximum yield). There are 5 figures.

√

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S/190/62/004/009/008/014
B101/B144

AUTHORS: Gladyshev, G. P., Rafikov, S. R.

TITLE: Investigation into polymer synthesis. VII. Photooxidative activation of the polyacrylate ester oligomer by the visible spectral region

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 9, 1962, 1351-1353

TEXT: The oligomer of МДФ-2 (MDF-2) poly-(diethylene glycol)phthalate-dimethacrylate with the structure

$H_2C=C(CH_3)-COOCH_2CH_2OCH_2CH_2O[OC-C_6H_4-COOCH_2CH_2OCH_2CH_2O-]_2\cdot OC=C(CH_3)-CH_2$;

n_D^{20} 1.5118 was irradiated with 4358 Å light in the presence of 0.084% by volume of diacetyl. Polymerization was then conducted in a dilatometer. Results: (1) Photopolymerization of MDF-2 activated in an inert atmosphere is very rapid. The apparent activation energy is 11.4 kcal. (2) When air is bubbled through the oligomer during irradiation peroxide compounds accumulate which initiate the polymerization after O_2 has been removed.

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(3) At 20°C the kinetics of the polymerization of MDF-2 activated by irradiation is similar to that of the oligomer activated by benzoyl peroxide. (4) The polymerization rate increases rapidly with the temperature at a peroxide concentration of $18.8\cdot10^{-2}$ g-equ/l. At this concentration the polymerization degree was approximately 30% after 250 min at 20°C, 65% at 30°C and 90% after $\sim$80 min at 60°C. (5) Qualitative experiments showed that other acrylate polyesters also are activated by irradiation in the presence of diacetyl. The polymerization of these substances may also be initiated by 1 - 5% methyl methacrylate activated by photooxidation. Conclusion: the photooxidative activation with visible light is suited for the polymerization of polyacrylate esters at low temperatures. There are 3 figures.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences AS KazSSR)

SUBMITTED: May 24, 1961

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S/190/62/004/009/007/014
B101/B144

AUTHORS: Rafikov, S. R., Gladyshev, G. P.

TITLE: Study of polymer synthesis. VI. Polymerization of methyl methacrylate activated by photooxidation in the presence of sensitizers

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 9, 1962, 1345-1350

TEXT: The activation of methyl methacrylate (MMA) in the presence of diacetyl (I) or benzyl (II) by exposure to the light of the 4358 Å Hg line was studied, and also the polymerization of activated MMA in an Hg dilatometer. Results: (1) MMA becomes activated by irradiation in the presence of I or II in an argon atmosphere. In the presence of 0.18% of I, the molecular weight was 76,500 and the degree of polymerization 22.6% after a 4-hr irradiation at 20°C. In the presence of II, the values obtained under the same conditions were 331,000 and 1.54%, respectively. (2) Bulk polymerization of MMA is possible with I. After irradiation for 18 - 20 hrs, the degree of polymerization was 75 - 80%. The activation energy was 11.5 kcal. (3) When oxygen is bubbled through MMA in the

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presence of I or II, peroxide compounds are formed and the polymerization is accelerated. A polymerization of almost 100% was reached after 85 hrs at 40°C with a peroxide concentration of $5.1\cdot10^{-2}$ g-equ/l. The molecular weight of the polymer was 364,000 at $5.1\cdot10^{-2}$ g-equ/l and 1,000,000 at $1.3\cdot10^{-2}$ g-equ/l. Between 20 and 40°C it was independent of the temperature. (4) The linear function $v_0 = f(\sqrt{c})$, where v_0 is the initial polymerization rate, and c is the concentration of peroxide compounds, confirms the radical nature of the reaction. (5) The concentration of free radicals determined by diphenyl picryl hydrazyl was 10^{16} radicals per gram after 30 min in an argon atmosphere, and 10^{15} radicals per gram after 500 - 1000 min. (6) As the "gel effect" is diminished as compared with that during polymerization in the presence of benzoyl peroxide, large bulk polymer products can be got. There are 6 figures.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences AS KazSSR)

SUBMITTED: May 24, 1961

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40729

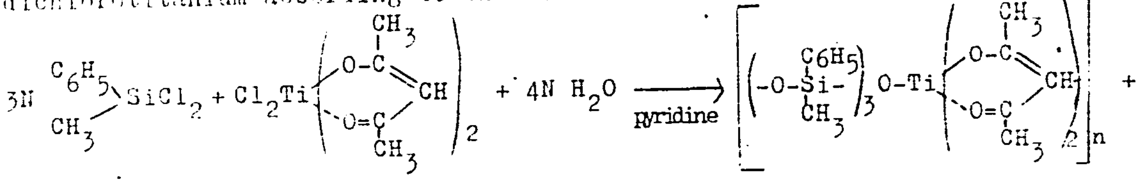
S/062/62/000/009/005/009
B119/B186

AUTHORS: Rafikov, S. R., Andrianov, K. A., Pavlova, S. A., Tverdokhlebova, I. I., and Pichkhadze, Sh. V.

TITLE: Study of polyorganotitanosiloxanes in solutions

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 9, 1962, 1581 - 1584.

TEXT: Poly-bis-(acetyl acetonate)titanophenyl methyl siloxane was produced by cohydrolyzing methyl phenyl dichlorosilane with bis-(acetyl acetonate) dichlorotitanium according to the reaction scheme



8N HCl. The reaction product was obtained by fractional precipitation from a 20 % solution in benzene n-heptane (1:1). The individual fractions

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B119/B186

Study of polyorganotitanosiloxanes in ...

were analysed into their elements; their molecular weight and viscosity were determined (solvent: dimethyl formamide, benzene, chlorobenzene, methyl ethyl ketone). Results: With minimum deviations, all the fractions show a relative homogeneity, and differ only in molecular weight. Maximum molecular weight found: 11,200; degree of polymerization n of this fraction = 17; characteristic viscosity (depending on the solvent used and the rate of flow through the capillary tube of the viscosimeter): 0.01 - 0.04. There are 6 figures and 1 table.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR)

SUBMITTED: February 17, 1962

Card 2/2

44420
S/190/62/004/010/004/010
B144/B186

AUTHORS: Hsü Chi-p'ing, Rafikov, S. R.

TITLE: Chemical conversion of polymers. Rate of gas evolution and quantum yield in the photolysis of polycaproamide

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 10, 1962, 1474-1478

TEXT: The rate of gas evolution was studied from 0.04 mm ПК-4 (PK-4) films exposed in vacuo to light of 2537 Å from 6 БУВ-15 (BUV-15) lamps symmetrically arranged at a distance of 50 mm round the sample tube; total wattage: 90 w. After irradiation the gas volume was measured and the gas was chromatographically analyzed. Then the sample was again exposed and the energy absorption determined actinometrically with uranyl oxalate. The test was repeated with a one-layer film wrapped around the tube. The energy absorption was found from the difference between the $H_2C_2O_4$ contents in the actinometer. Whereas H evolution is constant, CO evolution drops sharply at the beginning and becomes almost constant after 20 hrs of irradiation. This phenomenon has been

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Chemical conversion of polymers. Rate ... S/190/62/004/010/004/010
B144/B186

previously explained by the authors (Vysokomolek. soyed. 3, 56, 1961; ibid. 4, 851, 1962). The absence of branching is deduced from the linear course of the H_2 and CO evolution curves. The quantum yield equals $9.4 \cdot 10^{-4}$ during the initial period, and $6.1 \cdot 10^{-4}$ at a constant evolution rate. This is in good agreement with the authors' data on the exposure of polycaproamide to the total spectrum of ПРК-2 (PRK-2) lamps (making allowance for the difference between the spectra of the 2 types of lamp) and with data on polyethylene terephthalate by K. I. Osborn (J. Polymer Sci., 38, 357, 1959) and on polymethyl methacrylate by M. I. Frolova, A. V. Ryabov (Vysokomolek. soyed., 1, 1953, 1959). The quantum yield obtained by photolysis of polycaproamide is by two orders of magnitude lower than that obtained by hard radiation. There are 1 figure and 2 tables.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds AS USSR)

SUBMITTED: May 26, 1961

Card 2/2

S/190/62/004/011/003/014
B119/B186

AUTHORS: Rafikov, S. R., Chelnokova, G. N., Sorokina, R. A.

TITLE: Chemical reactions of polymers. VIII. Degradation of polyhexamethylene adipamide at high temperatures

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 4, no. 11, 1962, 1639 - 1646

TEXT: Polyhexamethylene adipamide of molecular weight 23,500 was subjected to heat treatments at 350°C (in N_2 current) and at 380 and 400°C (in an autoclave and N_2 atmosphere) for several hours each, and the resulting decomposition products were investigated. At 350°C, a steric (three-dimensional) crosslinking of the polymer occurs with cleavage of NH_3 and CO_2. At 380°C and over, a primary hydrolytic cleavage of the amide bonds sets in, followed by a separation of CO_2, cyclopentanone, amines, and NH_3. The presence of CO and low hydrocarbons in the decomposition product points to an additional homolytic cleavage of the -CO-NH- bonds. The

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Chemical reactions of polymers...
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hydrolysis of the polymer is initiated by the presence of minimum amounts of moisture in the dried initial product. It is maintained by the formation of H_2O in the self-condensation of cyclopentanone and its condensation with amines and NH_3. The end product of this condensation is an insoluble and nonfusible polymeric substance. There are 3 figures and 3 tables. The most important English-language references are: B. G. Achhammer, J. Appl. Chem., 1, 301, 1951; J. Research NBS, 46, 389, 1951; S. Straus, L. A. Wall. J. Research NBS, 60, 39, 1958; 63A, 269, 1959; B. Kamerbeek, G. H. Kroes, W. Grolle, Thermal degradation of some polyamides. Report delivered at the Conference on Heat-resisting Polymers, September 1960, London.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Elemental Organic Compounds AS USSR)

SUBMITTED: June 9, 1961

Card 2/2

S/844/62/000/000/084/129
D423/D307

AUTHORS: Tsetlin, B. L., Rafikov, S. R., Plotnikova, L. I. and Glazunov, P. Ya.

TITLE: Radiation grafting of polymeric chains to the surface of mineral particles

SOURCE: Trudy II Vsesoyuznogo soveshchaniya po radiatsionnoy khimii. Ed. by L. S. Polak. Moscow, Izd-vo AN SSSR, 1962, 497-500

TEXT: The work was carried out with a view to forming and grafting polymer chains to the surface of mineral powders for use in e.g. fillers. The experiments were carried out with ZnO, MgO and BeO powders exposed to the vapor of methylmethacrylate at a temperature of 100°C, in thin-walled glass ampoules whilst the entire apparatus was rotated by an electric motor. The radiation source was a 700 kv electron accelerator. There was no evidence for the formation of grafted polymers in the control, nonirradiated experiment, but with a radiation intensity of 1.2×10^{18} ev/cm^3.sec and an exposure time

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Radiation grafting of ...

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D423/D307

of 75 mins, 51.3% by weight on MgO of total polymer was formed, with 20.7% as grafted polymer. Results for BeO with 6×10^{18} ev/[illegible] sec and only 5 min irradiation time yielded 24% of the grafted polymer. The relationship between total quantity of polymer formed and intensity of radiation was shown to correspond to a bimolecular mechanism for rupture of kinetic chains due to recombination of the growing macroradicals, and confirmed the radical mechanism of the polymerization process. Experiments carried out with ZnO did not lead to positive results. This is explained as being due to the property of electron semiconduction, so that the ion-radical of O^- formed is an acceptor of free electrons and its concentration is quite small in ZnO. There are 3 figures and 1 table.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AS SSSR; Institut fizicheskoy khimii AN SSSR (Institute of Elemental Organic Compounds, AS USSR; Institute of Physical Chemistry, AS USSR)

Card 2/2

RAFIKOV, S.R.; SEMBAYEV, D.Kh.; SUVOROV, B.V.

Oxidation of organic compounds. Part 28: Oxidative ammonolysis of acrolein. Zhur.ob.khim. 32 no.3:839-841 Mr '62. (MIRA 15:3)

1. Institut khimicheskikh nauk AN Kazakhskoy SSR.
(Acrolein) (Acrylonitrile)

PROKOF'YEVA, M.V.; RAFIKOV, S.R.; SUVOROV, B.V.

Interaction of aromatic acid nitriles with alcohols in the presence of hydrogen chloride. Zhur.ob.khim. 32 no.4:1318-1323 Ap '62. (MIRA 15:4)

1. Institut khimicheskikh nauk AN Kazakhskoy SSR. (Nitriles) (Alcohols)

3

RAFIKOV, S.R.

38110
S/020/62/144/002/023/028
B101/B110

15.5540

AUTHORS: Vlasov, A. V., Glazunov, P. Ya., Mikhaylov, N. V., Rafikov, S. R., Tokareva, L. G., Tsetlin, B. L., and Shablygin, M. V.

TITLE: Formation of oriented structures in radiation-induced polymerization of vinyl monomers on fibers

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 382 - 383

TEXT: An attempt was made to obtain oriented polymers by polymerizing the monomer from the gas phase on oriented macromolecules of fibers acting as "matrices". The experiments were made with a two-chamber apparatus as used for graft polymerization of vinyl monomers on mineral particles (cf. B. L. Tsetlin et al., Tr. 2-go Vsesoyuzn. soveshch. po radiatsionnoy khimii, Izd. AN SSSR, 1962). One chamber contained caprone cord fiber heated to 80°C, and the other contained completely anhydrous acrylonitrile (40°C). Irradiation was made with X-rays (dose rate, $3\cdot10^{15}$ ev/cm^3·sec) for 3 - 6 hrs at 10^{-4} - 10^{-5} mm Hg. The weight of the fiber increased by 15 - 33 %. The perpendicular dichroism in the -C≡N stretching vibrations (2235 cm^{-1}),

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Formation of oriented structures in ...
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B101/B110

detected by spectroscopy, proved the orientation of the polymer. Experiments with acrylonitrile and non-oriented fiber as well as with liquid acrylonitrile and oriented fiber showed no dichroism. The liquid monomer molecules are assumed to prevent orientation. Further experiments with polymers, man-made and natural fibers used as "matrices" are under way. There is 1 figure.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR). Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (All-Union Scientific Research Institute of Synthetic Fibers)

PRESENTED: January 19, 1962, by V. A. Kargin, Academician

SUBMITTED: January 12, 1962

Card 2/2

RAFIKOV, S.R.; ANDRIANOV, K.A.; PAVLOVA, S.A.; TVERDOKHLEBOVA, I.I.

Polyorganotitanosiloxanes in solutions. Izv. AN SSSR.Otd.khim.nauk no.9:1581-1584 S '62. (MIRA 15:10)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.
(Titanium organic compounds) (Siloxanes)

L 17146-65 EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4 WW/RM

ACCESSION NR: AR4049275 S/0081/64/000/015/S021/S021

SOURCE: Ref. zh. Khimiya, Abs. 15S119

B

AUTHOR: Zhubanov, B.A., Rafikov, S.R., Gumargaliyeva, K.Z., Pavlitenko, L.V.

TITLE: Research in the field of polymer synthesis. Article 10. Mixed polyamides 15 based on m-xylylene diamine, isophthalic and terephthalic acid

CITED SOURCE: Izv. AN KazSSR. Ser. khim., vy*p. 2(22), 1962, 88-91

TOPIC TAGS: polymer synthesis, polyamide synthesis, mixed polyamide, xylylene diamine, isophthalic acid, terephthalic acid, polyamide solubility, polyamide mechanical property

TRANSLATION: The authors investigated the properties of mixed polyamides based on m-xylylene diamine (I) and a mixture of isophthalic (II) and terephthalic (III) acids, which made it possible to obtain more heat-resistant and transparent polymeric glasses than are possible with homopolymers of I and II. The mixed polyamides were synthesized by heating a mixture of salts of I with II or III for 5-6 hours in an argon flow, then for 30-60 minutes at low vacuum to complete the reaction. The mixed polyamides were characterized in terms of melting temperatures and thermomechanical curves. When the

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L 17146-65
ACCESSION NR: AR4049275

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concentration of III in a mixture with II is increased to an equimolecular ratio, the mixed polyamides formed were transparent and slightly tinted solid substances. A further increase in the content of III in the reactive mixture resulted in the formation of an opaque and horny polymer. Most mixed polyamides are insoluble in organic solvents or in concentrated sulfuric acid. Analysis of the thermomechanical curves indicates that the mixed polyamides obtained have an amorphous structure. See abstract 15S111 for Article 9. B. Englin

ASSOCIATION: none

SUB CODE: OC, MT ENCL: 00

Card 2/2

TSYAN' ZHEN'-YUAN' [Ch'ien Jên-yüan], prof.; RAFIKOV, S.R., prof., red.; DUBROVSKAYA, N.A., red.; LAVROVA, I.N., red.; KHOMYAKOV, A.D., tekhn.red.

[Determination of the molecular weights of polymers] Opredelenie molekuliarnykh vesov polimerov. Pod red. S.R.Rafikova. Moskva, Izd-vo inostr.lit-ry, 1962. 234 p. Translated from the Chinese. (MIRA 15:5)

(Polymers) (Molecular weights)

KORSHAK, Vasiliy Vladimirovich; FRUNZE, Tat'yana Mikhaylovna; RAFIKOV, S.R., doktor khim. nauk, otv. red.; ZHULIN, V.M., red.; LOSKUTOVA, I.P., red.; TIKHOMIROVA, S.G., tekhn. red.

[Synthetic heterochain polyamides] Sinteticheskie geterotsepnye poliamidy. Moskva, Izd-vo Akad. nauk SSSR, 1962. 523 p. (MIRA 15:7)

(Polyamides) (Macromolecular compounds)

ARKHIPOVA, I.A.; RAFIKOV, S.R.; SUVOROV, B.V.

Production of nicotinic and isonicotinic acids and their amides by the hydrolysis of nitriles. Zhur.prikl.khim. 35 no.2:389-393 F '62. (MIRA 15:2)

1. Institut khimicheskikh nauk AN KazSSR.
(Nicotinic acid) (Isonicotinic acid) (Nitriles)

IZEL'SON, Ya.Z.; RAFIKOV, S.R.; SUVOROV, B.V.

Oxidation of organic compounds. Report No.34: Dissociation of vanadium pentoxide. Izv.AN Kazakh. SSR. Ser,tekh.i khim.nauk no.1:11-15 '64. (MIRA 17:3)

EPEL'BAUM, Kh.I.; GUTSALYUK, V.G., RAFIKOV, S.R.

Effect of cracked stocks of the thermal cracking process on the rheological properties of paraffin oils at lower temperatures. Izv.AN Kazakh. SSR. Ser.tekh.i khim.nauk no.1:28-35 '63.

(MIRA 17:3)

GUTSALYUK, V.G.; EPEL'BAUM, Kh.I.; RAFIKOV, S.R.

Depression properties of tarry residues from petroleum refining. Izv. AN Kazakh. SSR. Ser. tekh. i khim. nauk no.2:26-33 '63. (MIRA 17:2)

RAFIKOV, S.R.

S/062/63/000/003/005/018
B101/B186

AUTHORS: Tverdokhlebova, I. I., Pavlova, S. A., and Rafikov, S. R.

TITLE: Dependence of the properties of solutions on polymer structures. Communication 4. Solutions of polyphenylaluminosiloxane

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye khimicheskikh nauk, no. 3, 1963, 488 - 493

TEXT: Polyphenyl-alumino-siloxane was synthesized by reaction of phenyl-sodium-oxy-dihydroxy-silane with aluminum sulfate. The substance showed an intramolecular cyclic-network structure, softening point 160°C. By fractionated precipitation with petroleum ether from benzene solution fractions of the polymer were precipitated which had the same composition; intrinsic viscosity was determined in chlorobenzene and in benzene, and the exponent a in the function $[\eta] = k \cdot M^{a}$ was calculated. At 20°C a was 0.17 in chlorobenzene, 0.345 in benzene. This slight dependence of the intrinsic viscosity on the molecular weight confirms the dense network structure of the polymer. There are 8 figures and 5 tables.

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S/062/63/000/003/005/018
B101/B186

Dependence of the properties of ...

ASSOCIATION: Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR (Institute of Elemental Organic Compounds of the Academy of Sciences USSR)

SUBMITTED: May 22, 1962

Card 2/2

L 10625-63 EPR/EPF(c)/EWP(j)/EWT(m)/BDS--ASD--Ps-4/Pr-4/Pc-4--RM/WW
ACCESSION NR: AP3000696 S/0190/63/005/005/0700/0702

71
69

AUTHOR: Glady*shev, G. P.; Rafikov, S. R.

TITLE: Investigations in the field of polymer synthesis. VIII. Methyl methacrylate polymerization in the presence of 2,3-butanedione under the influence of visible light

SOURCE: Vy*sokomolekulyarny*ye soyedineniya, v. 5, no. 5, 1963, 700-702

TOPIC TAGS: photopolymerization, initiator, kinetics, methyl methacrylate

ABSTRACT: The photopolymerization kinetics of methyl methacrylate (MM) in the presence of 1,3-butanedione as initiator has been studied. Light of $\lambda = 436$ mμ and intensity 0.13×10^{17} quantum/min cm^2 from a mercury arc lamp was used. The reaction was conducted at 30, 0, and -50C in the presence of 0.03 to 0.01% of the dione in the absence of oxygen to a degree of conversion of 2 to 3%. The reaction rate (v) was determined dilatometrically. The mean free radical lifetime (τ) was determined by the rotating sector method to be 2.5 sec. From τ, v, and the MM concentration the k_p/k_t ratio, where k_p and k_t are rate constants of propagation and termination, respectively, was calculated to be 14×10^{-6} at 30C, 6.5×10^{-6} at 0C, and 1.3×10^{-6} at -50C. The value of E_p-E_t, where E_p and E_t are the

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ACCESSION NR: AP3000696

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appropriate activation energies, was calculated to be 4.3 kcal/mol in the 0 to 30C range. Determination of the intrinsic viscosity of the polymer in benzene indicated that, in agreement with Semenov's (N. N. Semenov, Khimiya i tekhnologiya polimerov, No. 7-8, 196, 1960) collective interaction concept, the mol. wt. of the polymer prepared at -50C exceeds that of the polymer synthesized at 0 or 30C. Orig. art. has: 3 formulas and 2 figures.

ASSOCIATION: Institut khimicheskikh nauk AN Kaz SSR (Institute of Chemical Sciences, AN Kaz SSR); Institut elementoorganicheskikh soyedeneniy AN SSSR (Institute of Organoelemental Compounds, AN SSSR)

SUBMITTED: 28Oct61 DATE ACQ: 17Jun63 ENCL: 00

SUB CODE: CH NO REF SOV: 005 OTHER: 001

ch/
Card 2/2

L 10513-63 EPF(c)/EWP(j)/EWT(m)/BDS--ASD--Pc-4/Pr-4--RM/WW
ACCESSION NR: AP3000697 S/0190/63/005/005/0703/0705

AUTHOR: Rafikov, S. R.; Sechkovskaya, V. A.; Glady*shev, G. P.

67
64

TITLE: Investigation in the field of polymer synthesis. IX. Polymerization of acrylonitrile under the influence of the visible region of the spectrum in the presence of chlorine

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 5, no. 5, 1963, 703-705

TOPIC TAGS: photopolymerization, acrylonitrile, polyacrylonitrile, chlorine, initiator, wet spinning

ABSTRACT: Photopolymerization of acrylonitrile (AN) in the presence of chlorine as the initiator has been studied. The polymerization was carried out in a dimethylformamide (DMF) solution irradiated with the visible region of the spectrum from a mercury arc lamp. The intensity of the $436\text{-m}\mu$ line was 0.4×10^{17} quantum/min x cm^2. Prior to the addition of chlorine, argon was blown through the mixture. The reaction was also carried out in a $ZnCl_2$ or $CaCl_2$ aqueous solution. It was found that the polyacrylonitrile (PAN) yield increased linearly with AN concentration in DMF. The effect of irradiation time

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ACCESSION NR: AP3000697

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$[Cl_2]$, and reaction temperature on PAN yield was studied in 10% AN solutions in DMF. It was found that with a proper selection of $[Cl_2]$ and irradiation time considerable yields could be obtained. Thus, with 2.2 mol % Cl_2 on AN and ~ 7-hr irradiation, the yield was ~ 33% at 20C. The optimum conditions with regard to yield were 50C and 3 mol % Cl_2. PAN with the highest mol. wt. was also obtained at 50C. Solution polymerization can yield polymer solutions suitable for wet spinning. Orig. art. has: 1 figure and 4 formulas.

ASSOCIATION: Institut khimicheskikh nauk AN KazSSR (Institute of Chemical Sciences, AN KazakhSSR); Institut elementoorganicheskikh soyedeneniy AN SSSR; (Institute of Organoelemental Compounds, AN SSSR)

SUBMITTED: 28Oct61	DATE ACQ: 17Jun63	ENCL: 00
SUB CODE: CH	NO REF SOV: 002	OTHER: 001

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Card 2/2

VLASOV, A.V.; MIKHAYLOV, N.V.; TOKAREVA, L.G.; RAFIKOV, S.R.;
TSETLIN, B.L.; GLAZUNOV, P.Ya.

Radiation-induced graft polymerization from the gas phase.
Khim.volok no. 6:24-28 '63. (MIRA 17:1)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut iskusstvennogo volokna (for Vlasov, Mikhaylov, Tokareva). 2. Institut elementoorganicheskikh soyedineniy AN SSSR (for Rafikov, TSetlin). 3. Institut fizicheskoy khimii AN SSSR (for Glazunov).

L 12720-63 EPF(c)/EWP(j)/EWT(m)/BDS Pr-4/Pc-4 RM/WW
ACCESSION NR: AP3002296 S/0062/63/000/006/1118/1120

66
65

AUTHOR: Buchachenko, A. L.; Sdobnov, Ye. I.; Rafikov, S. R.; Neyman, M. B.

TITLE: Reactivity of diethyl phosphite in radical reactions with tritertiary butyl phenoxyl

SOURCE: AN SSSR. Izv. Otdeleniye khimicheskikh nauk, no. 6, 1963, 1118-1120

TOPIC TAGS: diethyl phosphite, tritertiary butyl phenoxyl, dimerization, kinetic method, degree of solvation

ABSTRACT: The reaction of tertiary butyl phenoxyl with diethyl phosphite proceeds with abstraction of the phosphine hydrogen from monomeric tautomer containing pentavalent phosphorous. The rate constant in benzene at 20 degrees was found to be k sub 1 = 1.2 x 10 sup -25 cc/sec and the equilibrium constant for the dimerization of diethyl phosphite, K = 7.5 x 10 sup -21 cm sup -3. The procedure developed provides a general kinetic method for determining degree of solvation of the reaction center. Orig. art. has: 3 figures.

ASSOCIATION: Institut khimicheskoy fiziki Akademii nauk SSSR (Institute of Chemical Physics); Institut elementoorganicheskikh soyedineniy Akademii nauk SSSR

Card 1/~~2~~1

ZHUBANOV, B.A.; RAFIKOV, S.R.; MOSHKEVICH, S.A.

Synthesis of polymers. Part 11: Mixed polyamides based on m-xylylenediamine, adipic, aminoenanthic, and aminoundecanoic acids. Vysokom. soed. 5 no.9:1325-1328 S '63. (MIRA 17:1)

1. Institut khimicheskikh nauk AN KazSSR.

KORSHAK, V.V.; BEKASOVA, N.I.; CHIKISHEV, Yu.G.; ZAMYATINA, V.A.;
TSETLIN, B.L.; RAFIKOV, S.R.

Radiation synthesis of borazole-based polymers. Vysokom.
soed. 5 no.10:1447-1450 O '63. (MIRA 17:1)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

S/048/63/027/001/037/043
B125/B102

AUTHORS: Yatsenko, E. A., Gutsalyuk, V. G., and Rafikov, S. R.

TITLE: Investigation of the tarry substances in mineral oils from their infrared absorption spectra

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 27, no. 1, 1963, 107 - 110

TEXT: The relationship between the tarry substances in different types of crude oil from the Ural deposition Munayly and Karaton and their infrared absorption spectra is described. Such spectra were taken of 5% solutions of these mineral oils in CCl_4, on plates 30 μ thick, using an ИКС-14 (IKS-14) spectroscope. Strong absorption bands exist at 2861, 2926, 2956 cm^{-1} in the region of the stretching vibrations of the C-H bonds in the spectra of the tarry fractions. The fractions precipitated from solutions in carbon tetrachloride show more intense absorption bands than those precipitated from alcohol-benzene solutions. The aliphatic chains of the tar fractions precipitated with acetone have the highest degree of ramification, the tars of

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the alcohol-benzene fraction the lowest. The narrow band at 1050 cm^{-1} is probably due to the components with saturated cycles. Other bands indicate the existence of arylalkyl ketone, diaryl ether, and substituted mono and polycyclic aromatic structures. The most important structural elements of the tar molecules are probably bi- and polycondensed aromatic groups. Various tar fractions differ by the amount and the structure of their aromatic structures. There are 3 figures and 1 table.

S/079/63/033/002/007/009
D204/D307

AUTHORS: Arkhipova, I.A., Rafikov, S.R. and Suvorov, B.V.

TITLE: Hydrolysis of terephthalodinitrile with aqueous ammonia under pressure

PERIODICAL: Zhurnal obshchey khimii, v. 33, no. 2, 1963, 637 - 641

TEXT: The above reaction was studied to determine the possibility of selectively preparing the desired intermediate products. Terephthalodinitrile (TDN), prepared by the oxidative ammonolysis of p-xylene of Pb vanadate, was reacted with aqueous ammonia (taken in various TDN: ammonia:water molar ratios, n) at 200-300°C, in a stainless steel autoclave under pressures from 5 to 40atm., over 3 hours. For n = 1:14:210, the yields of the diammonium salt of terephthalic acid (I) increased from ~ 30 % at 200°C to ~ 100 % at 300°C, whilst the yields of $NH_4COOC_6H_4CONH_2$ (II) fell from ~50 % at 200°C to ~10 % at 250°C. At 200°C, with TDN:H_2O = 1:210, increasing the molar ratio of NH_3:TDN to $\gtrsim 8$ favored the formation of I and II, whilst 30-40 % of

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S/079/63/033/002/007/009
Hydrolysis of terephthalodinitrile ... D204/D307

each of $NH_2COC_6H_4CN$ and $NH_2COC_6H_4CONH_2$ was formed at NH_3:TDN = 1-2. A small amount of ammonium p-cyanobenzoate was also formed with low concentrations of NH_3. At 250°C, increased concentrations of water promoted the rate of reaction and favored the formation of the final products of hydrolysis. During the formation of - $CONH_2$ from - CN, the ammonia behaved only as a catalyst; in the conversion of - $CONH_2$ to $COONH_4$ however, considerably higher concentrations of NH_3 were required. There are 3 figures.

ASSOCIATION: Institut khimicheskikh nauk Akademii nauk Kazakhskoy SSR (Institute of Chemical Sciences of the Academy of Sciences of the Kazakh SSR)

SUBMITTED: March 14, 1962

Card 2/2

BUCHACHENKO, A.L.; SDOBNOV, Ye.I.; RAFIKOV, S.R.; NEYMAN, M.B.

Reactivity of diethyl phosphite in radical reactions with tritert-butylphenoxyl. Izv. AN SSSR. Otd.khim.nauk no.6:1118-1120 Je '63. (MIRA 16:7)

1. Institut khimicheskoy fiziki AN SSSR i Institut elementoorganicheskikh soyedineniy AN SSSR.
(Phosphorous acid) (Radicals (Chemistry))

SUVOROV, B.V.; RAFIKOV, S.R.; ZHUBANOV, B.A.; KOSTROMIN, A.S.; KUDINOVA, V.S.; KAGARLITSKIY, A.D.; KHMURA, M.I.

Catalytic synthesis of the dinitrile of terephthalic acid. Zhur. prikl. khim. 36 no.8:1837-1847 Ag '63. (MIRA 16:11)

KAGARLITSKIY, A.D.; SUVOROV, B.V.; RAFIKOV, S.R.; KOSTROMIN, A.S.

Catalytic synthesis of benzonitrile by means of the oxidative ammonolysis of aromatic compounds. Zhur. prikl. khim. 36 no.8:1848-1852 Ag '63. (MIRA 16:11)

ACCESSION NR AM4016117 BOOK EXPLOITATION S/

Rafikov, Sagid Raufovich; Pavlova, Sil'viya Aleksandrovna; Tverdokhlebova Iraida Ivanovna

Methods of determining molecular weights and the polydispersion of high molecular weight compounds (Metody* opredeleniya molekulyarny*kh vesov i polidispersnosti vy*sokomolekulyarny*kh soyedineniy), Moscow, Izd-vo AN SSSR, 1963, 334 p. illus., biblio. Errata slip inserted. 5,000 copies printed. Sponsoring Agency: Akademiya nauk SSSR. Institut elementoorganicheskikh soyedineniy.

TOPIC TAGS: high molecular compound, molecular weight, diffusion, light diffusion, sedimentation, osmometry, ebullioscopy, crioscopy, end group, viscosimetry

TABLE OF CONTENTS [abridged]:

Card 1/2

RAFIKOV, S.R.; CHELNOKOVA, G.N.; RODE, V.V.; ZHURAVLEVA, I.V.; SOROKINA, R.A.

Chemical transformations of polymers. Part 15: Specific features of the thermal degradation of polyenanthamide. Vysokom. soed. 6 no.4:652-654 Ap '64. (MIRA 17:6)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

S/0190/64/006/004/0710/0715

ACCESSION NR: AP4032571

AUTHORS: Chelnokova, G. N.; Rafikov, S. R.

TITLE: Chemical transformations of polymers. 16. High temperature destruction of polyenanthamide and polycapramide in a closed system

SOURCE: Vy*sokomolek. soyedin., v. 6, no. 4, 1964, 710-715

TOPIC TAGS: polymer, polyenanthamide, polycapramide, polyamide, thermal polyenanthamide decomposition, thermal polycapramide decomposition, amide bond hydrolysis, polyamide depolymerization, homolytic bond rupture, decomposition product, chromathermograph KhT 2M

ABSTRACT: A 45-60 g aliquot of semitechnical grade polyenanthamide (PEA) (mol. wt. 20 000) or of commerical grade polycapramide (PCA) (mol. wt. 18 000) contained in a test tube was placed in a 0.5-liter autoclave filled with nitrogen, and was heated for 4-5 hours at various temperatures. After cooling, the gaseous, liquid, and solid decomposition products were analyzed with the chromathermograph KhT-2M, the infrared spectrophotometer, by conductometric and potentiometric titration, etc. Heating the PEA at 350C yielded practically no gaseous products, but did

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produce depolymerization from an initial viscosity (in cresol) of 1.5 to 0.4, the product remaining fully soluble. Heating the PEA at 370-380C brought about mainly the liberation of NH_3 and CO_2 and the formation of a polyamide with a molecular weight of 2600, of some lactams, nitriles, and pyrroles. Heating of either PEA or PCA at 390-420C resulted in a complete decomposition of the polyamide macromolecule, yielding 8-13% of ammonium carbonate and carbamines, a larger amount of gaseous products, some water (3%), other fluid destruction products, and 10-12% of a solid insoluble black mass. The latter was presumably a polycondensation product of earlier decomposition compounds. Infrared analysis of the liquid fraction showed the presence of CN and NH units. In the opinion of the authors, hydrolysis seems to be the dominant trend in thermal destruction of the polyamides, most of the water originating from secondary reactions. The desamination and decarboxilation of the end groups, and the homolytic rupture of various bonds are also involved in the processes of thermal destruction of the polymers. V. I. Yermakova participated in the experimental work and N. A. Chumayevskiy conducted the infrared analysis. Orig. art. has: 1 table, 2 charts, and 2 formulas.

ACCESSION NR: AP4032571

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute of Organoelemental Compounds, AN SSSR)

SUBMITTED: 07May63 DATE ACQ: 11May64 ENCL: 00

SUB CODE: OC, MM NO REF SOV: 003 OTHER: 001

Card 3/3

[illegible]

[illegible] ation of polymers. [illegible]

PAVLOV, A.V.; BRESLER, S. Ye.; RAFIKOV, S.R.

Molecular weight distribution of poly-ε-caproic amide, a product of anionic polymerization. Vysokom. soed. 6 no.11:2068-2072 N '64. (MIRA 18:2)

1. Institut elementoorganicheskikh soyedineniy AN SSSR i Institut vysokomolekulyarnykh soyedineniy AN SSSR.

BARIKOV, I.V.; RODE, V.V.; RAFIKOV, S.R.

Synthesis of pyrocatechol phosphite. Izv. AN SSSR Ser. khim. no.11: 2115 N '64 (MIRA 18:1)

1. Institut elementoorganicheskikh soyedineniy AN SSSR.

L 21210-65 EWG(j)/EWT(m)/EWP(j)/EWA(h)/EWA(1) Pc-4/Peb/Pi-4 SSD(c)/
AFTC(a)/ESD(gs)/ESD(t) WH/RM

ACCESSION NR: AP5001481 S/0190/64/006/012/2168/2173 21

B

15

AUTHOR: Rode, V. V.; Yarov, A. S.; Rafikov, S. R.

TITLE: Chemical transformations of polymers 20. The photochemical decomposition of selected polyarylates

SOURCE: Vysokomolekulyarnyye soyedineniya, v. 6, no. 12, 1964, 2168-2173

TOPIC TAGS: polyester stability, polyarylate stability, polymer film, thermal stability, ultraviolet irradiation, photochemical decomposition, phenolphthalein polycondensation, terephthalic acid, isophthalic acid, infrared spectrum, polymer crosslinking, chain transfer

ABSTRACT: Polyesters of high thermal stability, prepared by polycondensation of phenolphthalein with terephthalic or isophthalic acid by the method of V. V. Korshak et al., were studied for their stability in a vacuum under ultraviolet light. Thin films were deposited from chloroform solution, dried, exposed for up to 120 hrs. to the light of a mercury vapor lamp (6.3 quanta/sec·cm^2), and analyzed by infrared spectroscopy. The gaseous products were identified as carbon monoxide and dioxide by gas chromatographic analysis. The coloration of the films increased and both tensile strength and relative elongation decreased with increasing irradiation time, but decomposition as indicated by the studied parameters was

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ACCESSION NR: AP5001481

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shown to take place primarily during the first 50-60 hrs. of irradiation. A mechanism for crosslinking, chain transfer, and chain termination by photochemical reactions is proposed, and crosslinking was shown to be favored by the cleavage of lactone rings in the studied polymers. The decrease in decomposition rates with irradiation time was related to the formation of quinoid compounds and their stabilizing activity." The authors thank V. V. Korshak, S. V. Vinogradova and S. N. Salazkin for supplying the specimens." Orig. art. has: 3 tables, 5 figures and 1 formula.

ASSOCIATION: Institut elementoorganicheskikh soyedineniy AN SSSR (Institute for Heteroorganic Compounds, AN SSSR)

SUBMITTED: 19Feb64 ENCL: 00 SUB CODE: MT

NO REF SOV: 006 OTHER: 005

Card 2/2

GLADYSHEV, G.P.; RAFIKOV, S.R.

Mass polymerization of vinyl monomers at high degrees of conversion. Trudy Inst. khim. nauk AN Kazakh. SSR 11:5-15 '64. (MIRA 17:11)

RAFIKOV, S.R.; SECHKOVSKAYA, V.A.; GLADYSHEV, G.P.

Photopolymerization of acrylonitrile in solutions of zinc chloride and calcium chloride. Trudy Inst. khim. nauk AN Kazakh. SSR 11:16-18 '64. (MIRA 17:11)

RAF'YEV, G.F.; [illegible], G.[illegible]; KHUSANOVA, N.P.; [illegible]KOVA, N.V.

Effect of the nature of initiator on the mass polymerization of methyl methacrylate. Trudy Inst. khim. nauk AN Kazakh. SSR 11:19-24 '64. (MIRA 17:11)

L 21337-65 EPA(s)-2/EWT(m)/EPF(c)/EPR/EWP(j)/T Pc-4/Pr-4/Ps-4/Pt-10
RPL WW/JW/RM

ACCESSION NR: AT5001006 S/2850/64/011/000/0036/0041 45

44

AUTHOR: Zhubanov, B.A., Rafikov, S.R., Pavletenko, L.V., Moshkevich, S.A., Akimova, N.I. 15 B+1

TITLE: Studies in the field of polymer synthesis. Part 15. Synthesis of polyamides prepared from m- and p-xylylenediamine, adipic, sebacic and isophthalic acid

SOURCE: AN KazSSR. Institut khimicheskikh nauk. Trudy, v. 11, 1964. Sintez i issledovaniye vysokomolekulyarnykh soyedineniy (Synthesis and research of high-molecular compounds), 36-41

TOPIC TAGS: polycondensation, polyamide synthesis, xylylenedramine, adipic acid, sebacic acid, isophthalic acid, intrinsic viscosity, thermal stability

ABSTRACT: Poly-m-xylylene-adipamide, poly-p-xylylene-sebacamide, and poly-m-xylylene-isophthalamide were prepared from the diamines, acids, salts and acid chlorides, and also from dimethylsebacate, by solution; melt; or mixed-phase polymerization, and tested for intrinsic viscosity in cresol or sulfuric acid solution (deciliter/gram, Ubollodo) and for thermal stability. Maximum yields of 98% poly-m-xylylene-adipamide with a maximum viscosity of 1.1 were obtained by solution polymerization in m-cresol and subsequent melt

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L 21337-65

ACCESSION NR: AT5001006

polymerization at 260-265C. Thermal stability at 237-287C and the typical behavior of a crystalline polymer were indicated by thermal analysis. Solution polymerization and subsequent melt polymerization at 280-290C gave a 98% yield of poly-p-xylylenesebacamide with a viscosity of 1.36 in sulfuric acid; polycondensation yields with dimethylsebacate at 260-270C were 98% with a viscosity of 1.17 in sulfuric acid; mixed phase condensation in water-carbon tetrachloride gave a yield of 81.1% and viscosity of 0.3 in cresol. Thermal decomposition of poly-p-xylylene-sebacamide started at 340C, and this polymer was shown to be less crystalline than poly-m-xylylene-adipamide. The maximum yield of poly-m-xylylene-isophthalamide was 90%, the maximum measured viscosity 0.17, and severe conditions produced crosslinked and insoluble polymers. Decomposition of the amorphous polyamide started at 350C. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: Institut Khimicheskikh nauk, Akademiya Nauk Kazakhskoy SSR (Institute of Chemical Sciences, Academy of Sciences of the Kazakh SSR)

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

NO REF SOV: 001 OTHER: 004

Card 2/2

L 21338-65 EWT(m)/EPF(c)/EWP(j)/T Pc-4/Pr-4/Pa-4 RPL JW/RM

ACCESSION NR: AT5001007 S/2850/64/011/000/0042/0047

AUTHOR: Zhubanov, B.A., Derevyanchenko, V.P., Rafikov, S.R.

TITLE: Studies of the field of polymer synthesis. Part 16. A study of the polycondensation reaction of m-xylylenediamine with phthalic acid B+1

SOURCE: AN KazSSR. Institut khimicheskikh nauk. Trudy, v. 11, 1964. Sintez i issledovaniye vysokomolekulyarnykh soyedineniy (Synthesis and research of high-molecular compounds), 42-47

TOPIC TAGS: polycondensation, phthalic acid, xylylenediamine, polyamide synthesis, cyclization 15

ABSTRACT: Polycondensation of m-xylylenediamine with o-phthalic acid at 212-280C in an inert atmosphere did not yield polyamides of high molecular weight but linear and cyclic oligomers; the amount of cyclic polymer increased and that of linear polymer decreased with an increase in temperature, and the amount of ammonia liberated was simultaneously increased whereas that of recovered m-xylylene-diamine was decreased. The polymers, which were light-yellow to dark brown in color, were fractionated by extraction with ethyl ether, ethyl alcohol, benzene, and acetone, and the benzene-soluble fraction was identified

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as m-xylylenediamine diphthalylimide. Formation of ammonia may involve both the reaction of terminal aminogroups of polymer chains and the formation of a secondary amine from nonreacted m-xylylenediamine. The soluble fractions were shown to contain low-molecular and cyclic oligomers, and various paths and structures are proposed for the mechanism of cyclization. Orig. art. has: 3 tables and 9 chemical formulas.

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

NO REF SOV: 005 OTHER: 004

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