KAMENSKIY, I.V.; KOMLEV, V.K.; KORSHAK, V.V.

Synthesis of esters of 2-furylacrylic acid. Plast.massy no.4:
9-11 '61. (MIRA 14:4)

(Furanacrylic acid)

15.8130

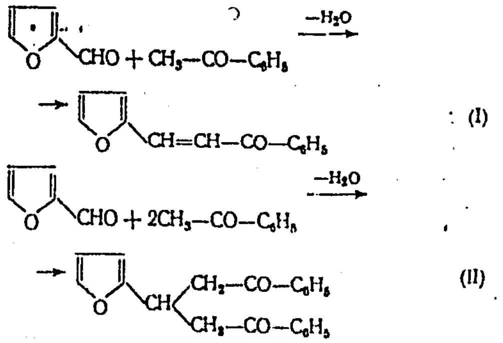
S/191/61/000/008/002/006
B110/B201

AUTHORS: Kamenskiy, I. V., Itinskiy, V. I., Teplov, N. Ye.
Andrianov, B. V.

TITLE: Synthesis and study of monomeric and polymeric reaction products of acetophenone with furfurole

PERIODICAL: Plasticheskiye massy, no. 8, 1961, 12 - 15

TEXT: Reaction products of acetophenone with furfurole are as follows:



(A)

Card 1/8

(II) is obtained with considerable excess of acetophenone only. (I) is prepared by condensation of equimolecular amounts of furfurole and acetophenone by means of sodium ethylate in alcohol in a yield of 60 - 80 %. In consideration of the fact that the production of resins by means of benzene sulfonic acid catalysts and resulting resin products had been hitherto insufficiently described, their description was the aim of the present work. The authors used (1) furfurole, (2) acetophenone. The polymers were obtained (I) directly from the reaction mass without separation from monofurfurylidene acetophenone (MFAP), (II) by way of resinification of MFAP. The product produced by Harvey's method (Ref. 8: USA Patent 2,461,510 (1949)) loses fluidity on the passage to the B stage. Hardening takes place at 250°C during 30 minutes with the separation of 50 % of volatile parts. The authors washed the reaction mass with cold water, dried it at 100°C and 15 mm Hg during 3 hr, thus obtaining a brown oily liquid. A vacuum distillation yielded: 14 % furfurole, 16 % acetophenone, 60 % MFAP, 10 % resin. After 3.5 hr of heating at 250°C a fusible black resin (dropping point 65°C) was obtained. On addition of 5 % benzene sulfonic acid (50 % acetone solution) the resin is hardened during 19 minutes at 250°C under separation of 40 % of volatile parts and

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Synthesis and study of monomeric... B110/B201

formation of foaming products. Table 1 shows that in MFAP production under optimum, equimolecular conditions, a temperature drop (experiments 1 - 5) reduces the resin formation and at the same time retards the MFAP formation. An increase of the catalyst amount (experiments 4,6,7,9-12) and a concentration increase of its aqueous solution (experiments 10 - 11), however, speed it up. At room temperature (experiments 8 - 12), MFAP is obtained without resin. 20 g KOH in 20 g H_2O were added by drops to 96 g furfurole and 120 g acetophenone within 20 - 30 minutes, neutralized with 0.5 N HCl, washed with H_2O until Cl^- ions were removed completely, and dried in vacuum. MFAP is bright-yellow, fine-crystalline with the melting point 41.8°C, and 89 % of the theoretical yield, soluble in all organic solvents (to 12 % in petroleum ether). Its specific gravity was 1.1120, the boiling point 186°C at 11 mm Hg, 181°C at 9 mm Hg. The molecular weight, cryoscopically determined in dioxan was 196.8, the oxime number was 560, since benzylidene acetophenone compounds add two hydroxyl amine molecules. Resinification took place (I) thermally, (II) in the presence of a catalyst. According to Table 3, resinification takes place at high temperatures (250°C) with 95 - 97 % yield. Since benzene sulfonic acid (BSA) and H_2SO_4

Card 3/8

(Table 4)dissolve in the monomer, the latter was heated to 80° C in a three-necked flask, and 1 - 5 % catalyst was added under vigorous stirring. The resin obtained in a yield of 98 % was brittle at room temperature. 0.25 M (49.5 g) monomer in 100 ml toluene yielded with 5 % BSA (referred to the monomer) a viscous, rubber-like mass which gradually hardened to a non-melting, unsoluble polymer. All resins were black, with a shining surface, and a specific gravity of 1.1 - 1.5. The dropping point of the resin obtained without BSA was 71°C; that of resin prepared with 1 % BSA was 78°C. The resins were found to be well soluble in benzene, its derivatives, dioxan, chlorohydrocarbon, various ketones (cyclohexanone), scarcely in alcohols and ethers. Fractionating allowed recognizing a polydisperse character. Four fractions were separated from a 10 % acetone solution: (1) insoluble residue, (2) and (3) were separated by addition of 10 ml H_2O to a 100 ml solution, (4) by means of 1000 ml H_2O. Infrared spectra for resins produced without (I) and with (II) catalyst yielded CO bands (1685 1665 cm^{-1}) and double bond bands (1647 - 1621 cm^{-1}) in the conjugate -C=C-O-system. The double bond peaks were, however, found to be weaker particularly with (I). The peak of ethylene bond(1285 - 1310 cm^{-1}) exists only with monomer and (II). The absorption band of the furan ring

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Synthesis and study of monomeric... S/191/61/000/008/002/006
B110/B201

(1131 - 1189 cm^{-1}) is weaker with (I) and (II) than with the monomer. The peaks of the benzene nucleus (1110 - 1070 cm^{-1}) appear in the three spectra, whereas the furan ring bound in α,α'-position (1378 cm^{-1}) was found only with (I) and (II). There are 1 figure, 5 tables, and 15 references: 6 Soviet-bloc and 9 non-Soviet-bloc. The references to English-language publications read as follows: Ref. 7: US Patent 2,461,508 (1949); Ref. 8: US Patent 2,461,510 (1949); Ref. 9: US Patent 2,768,408 (1956)

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Card 5/8

28190
S/191/61/000/010/003/008
B101/B110

15.8130

AUTHORS: Kamenskiy, I. V., Peshekhonova, A. L., Itinskiy, V. I.

TITLE: Furfural- and hexamethylentetramine-base resins

PERIODICAL: Plasticheskiye massy, no. 10, 1961, 15-19

TEXT: A short review of different methods for obtaining furfural resins and a report on the production of resins from commercial furfural (boiling point, 158-162°C, d^{20}_{20} = 1.1514, h^{20}_{D} = 1.5280) and hexamethylentetramine (purity, 98.5 %) are given. At a ratio of 3-8 moles of furfurole per mole of hexamethylentetramine, a fusible and soluble resin forms within 5-12 hr., according to the ratio. It becomes infusible and insoluble at temperatures $\geqslant$250°C within 3-3.5 min. The optimum ratio with 100 % yield is 6 : 1. This polymer is termed ФГ-1 (FG-1) resin (molecular weight, 350; hardening within 2 min at 250°C). Moreover, another resinous product (95 % yield) was synthetized at a ratio of 15 : 1 (viscosity: 40-45 sec in the B3-4 (VZ-4) viscosimeter). On thermal treatment, the volatile products are distilled off, and a hard, brittle,

28190
S/191/61/000/010/003/008
Furfural- and hexamethylentetramine-base... B101/B110

black resin is obtained, which dissolves readily in acetone, partially in alcohol, and is insoluble in water. Further heating makes it insoluble and infusible. This product is termed ФГ-2 (FG-2) (molecular weight, 452; hardening within 4 min at 250°C). Solvents for both resins are: acetone, furfural, ethyl cellosolol, furyl alcohol, dioxane and acetic acid. Residual hexamethylenetetramine was with water, residual furfural with petroleum ether. They were dried, purified with ethyl alcohol, extracted in acetone, dissolved in dioxane and precipitated with water. The following fractions were obtained by successive dissolution in ethanol, acetone, and dioxane and precipitating with water:

solvent	percentage of the fraction in FG-1	in FG-2
ethanol	24.20	10.55
acetone	36.50	51.70
acetone (fraction 3)	-	18.30
dioxane	28.40	17.40
dioxane (fraction 4)	9.15	-

Molding powder was produced from FG-2. Kaolin impregnated with a 50 %

Card 2/4

28190
S/191/61/000/010/003/008
Furfural- and hexamethylentetramine-base... B101/B110

solution of FG-2 in acetone served as filler. The heat resistance was determined by means of S. N. Zhurkov's device (Trudy I i II konferentsii VMS (Papers of the First and the Second Conference on High-molecular Compounds), Izd. AN SSSR, 1945). Optimum method: Heating of the molding powder at 120°C for 2.5 hr; tableting under 1250 kg/cm^2; before pressing, heating at 200°C (1-2 min per mm of tablet thickness), pressing at 300°C and 250-300 kg/cm^2. A heat resistance of up to 400°C (0.055 % deformation) has been found. FG-2 plastics are stable in 40 % NaOH, 50 % H_2SO_4, but are destroyed by 58 % HNO_3. The water absorption was 0.65 % in cold water (24 hr), and 0.432 % in boiling water (30 min). Glass-reinforced СФГ-2 (SFG-2) plastics were made with T-90 п/з (T-90 p/z) glass fabric containing 2.5 % paraffin lubricant. Glass fabric was impregnated with a 45 % FG-2 solution in acetone, and dried for 24 hr at room temperature. Then, it was heated at 120°C for 2.5 hr, and pressed at 300°C and 10 kg/cm^2. The impact strength of the glass-reinforced plastic was 260 kg·cm/cm^2, and the static bending strength was 2073-2380 kg/cm^2. Combination with epoxy resins is recommended to prevent the lamination observed. The dielectric constant of SFG-2 was 4.9-5.2 between 20 and 300°C. As compared with

Card 3/4

23190
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Furfural- and hexamethylentetramine-base... B101/B110

bakelite powder, the use of FG-2 as a binding agent for quartz sand in the manufacture of molds for precision casting resulted in a reduced separation of gas (11.4 cm^3). Hu Lan-chieh assisted in the experiments. There are 4 figures, 6 tables, and 17 references: 4 Soviet and 13 non-Soviet. The two most recent references to English-language publications read as follows: G. Mains, M. Phillips, Chem. Met. Eng., 24, 661 (1921); US Patent 1909784.

Card 4/4

PESHEKHONOVA, A.L.; KAMENSKIY, I.V.; KORSHAK, V.V.; KOVARSKAYA, B.M.;
BELOVA, A.A.

Study of the conditions of the formation of spatial structures in furfurole hexamethylenetetramine polymers. Plast. massy no.12: 9-13 '64. (MIRA 18:3)

KAMENSKIY, I. Z.

KAMENSKIY, I. Z. "Method of determining the hidden infestation of grain with weevils," In the symposium: Soobshch. i referaty (Vsesoyuz. nauch. - issled. in-t zerna i produktov ego pererabotki), Moscow, 1949, p. 61-62

SO: U-5240, 17Dec53, (Letopis 'Zhurnal 'nykh Statey, No. 25, 1949).

KAMENSKIY, I.Z.; YAKOVLEV, I.N.; DOBRUSINA, R.Ye.

Rodenticide. Patent U.S.S.R. 77,586, Dec. 31, 1949.
(CA 47 no.19:10172 '53)

USMANOV, Z.; KAMENSKIY, I.V.; TADZHIYEVA, M.

Process of polymer formation based on polyene furan aldehydes and some of their analogs. Uzb. khim. zhur. 7 no.6:76-79 '63.
(MIRA 17:2)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni Mendeleyeva i Institut khimii polimerov AN UzSSR.

MAN'KOVSKIY, G.I.; DAVYDOV, V.V.; ODINOKOVA, L.V.; KAMENSKIY, I.V.;
OGNEVA, N.Ye.; KOGAN, N.N.; GOGUADZE, TS.A.

Solution for binding rocks. Gor. zhur. no.9:75 S '63.
(MIRA 16:10)

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L 305-65
ACCESSION NR: AP5000746

ical changes and catalytic curing. The latter was studied at 120-250C with Petrov's catalyst, benzenesulfonic acid, or zinc chloride, which gave better results than the other catalysts. Generally, deformation of catalytically cured specimens started at lower temperatures than that of samples obtained by thermal treatment at higher temperatures. A decrease in the nitrogen content of thermally cured polymers was shown to be significant for the reaction mechanism, indicating formation of a rigid steric structure involving not only the double [illegible] furan heterocycles, and the partial destruction and [illegible] 16 figures recombination

ASSOCIATION: None

SUBMITTED: 00

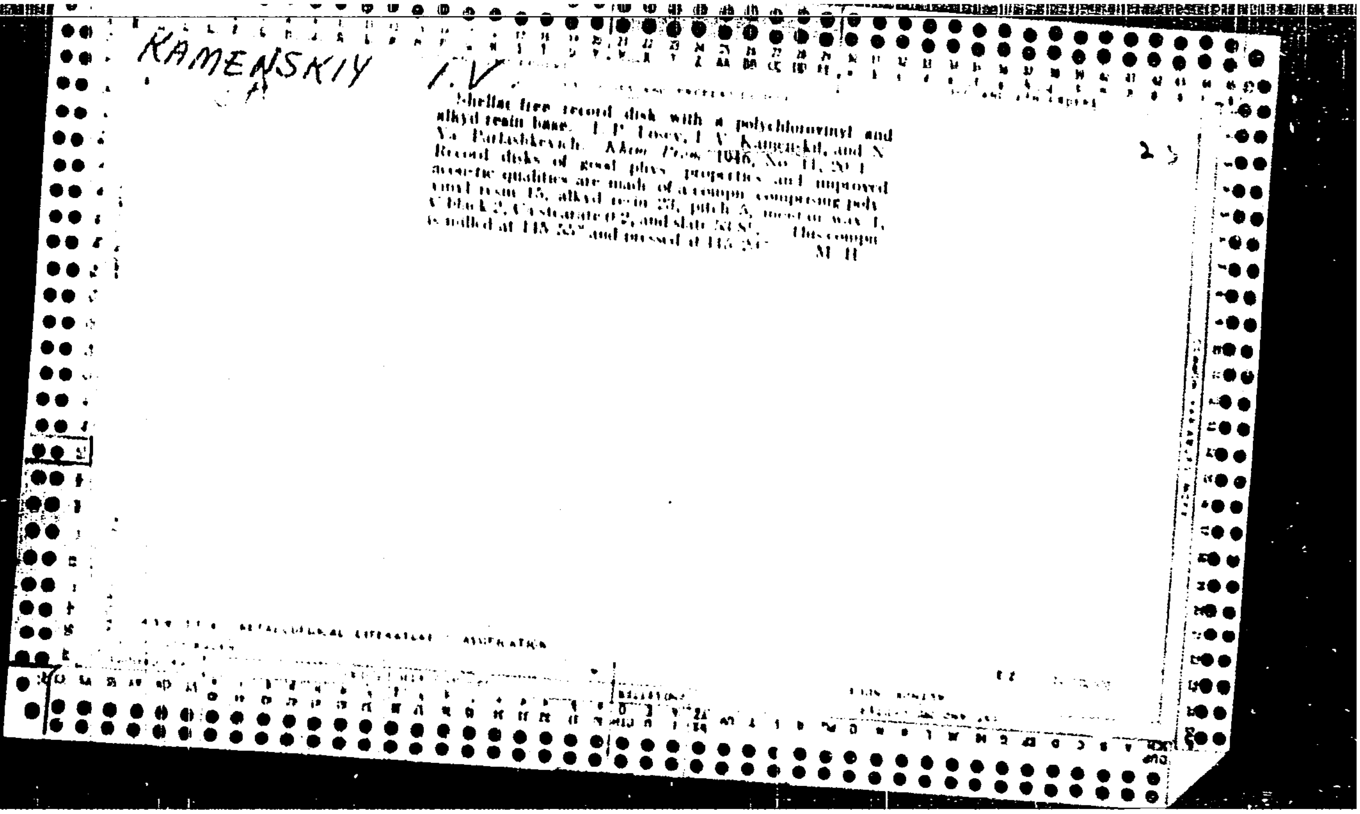
ENCL: 00

SUB CODE: MT

NO REF SOV: 011

OTHER: 005

Card 2/2



KAMENSKIY I.V.

Shellac-free record disk with a polychlorovinyl and alkyd resin base. I. P. Losev, I. V. Kamenskii, and N. Ya. Parlashkevich. *Khim. Prom.* 1946, No. 11, 20-1. Record disks of good phys. properties and improved acoustic qualities are made of a compn. comprising polyvinyl resin 15, alkyd resin 23, pitch 5, montan wax 1, C black 2, Ca stearate 0.2, and slate 53.8. This compn. is milled at 118-25° and pressed at 115-20°. M. H.

METALLURGICAL LITERATURE CLASSIFICATION

KAMENSKIY, I.V., dotsent, kandidat tekhnicheskikh nauk

"Faolit" I.A.Egorov, M.I.Nazarova. Reviewed by I.V.Kamenskii. Khim. prom.no.2:64-p.3 of cover. F'47.
(Plastics) (Egorov, I.A.) (Nazarova, M.I.) (MIRA 8:12)

MAKOTINSKIY, M.P., kand.arkh.; MUNTS, V.O., kand.arkh.; CHERKINSKIY, Yu.S.; KAMENSKIY, I.V., kand.tekhn.nauk, nauchnyy red.; GURVICH, E.A., red.izd-va; GOLOVKINA, A.A., khudozh. i tekhn.red.

[Use of polymers in the construction industry] Polimernye materialy v stroitel'stve. Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1959. 67 p. (MIRA 12:10)
(Polymers)

85711

S/081/60/000/018/007/009
A006/A001

15-8105

Translation from: Referativnyy zhurnal, Khimiya, 1960, No. 18, p. 543, # 75440

AUTHORS: Kamenskiy, I. V., Grigor'yev, A. P.

TITLE: Production of Organic Glass 15 on Allyl Ester Base

PERIODICAL: Tr. Mosk. khim-tekhnol. in-ta im. D. I. Mendeleyeva, 1959, No. 20, pp 50-54

TEXT: The authors studied the possibility of obtaining scale-resistant and mechanically durable organic glasses on diethylene glycol diallyldicarbonate (I) base. It is established that polymerization proceeds according to a radical mechanism using benzoyl peroxide (2% of the ester weight). The cracking of blocks cannot be prevented by introducing various admixtures and plasticizers into I. Copolymerization of I with methyl methacrylate ($\geqslant$ 50%) causes the formation of transparent colorless or light-yellow non-cracking blocks with a Martens scale resistance of 110 - 115°C and a Brinell hardness as high as 25 - 26 kg/cm^2. Conditions are given for the copolymerization and solidification of blocks. The specimens obtained withstand heating at 180°C for 2 - 3 hours

Card 1/2

85547

15.8106

S/081/60/000/020/010/014
A006/A001

Translation from: Referativnyy zhurnal, Khimiya, 1960, No. 20, p. 510, # 83017

AUTHORS: Petrov, G.S., Kamenskiy, I.V., Andrianov, B.V.

15

TITLE: On the Problem of Obtaining Thermoactive Phenol-Aldehyde Compounds Suitable for Pressure Casting

PERIODICAL: Tr. Mosk. khim.-tekhnol. in-ta im. D.I. Mendeleyeva, 1959, No. 29, pp. 34-49

TEXT: A method was developed of obtaining a new type of formaldehyde polymers (I) containing hexamethylene tetramine (II) or furfuramide and being complex compounds. According to this method the aqueous solution of I was concentrated in a vacuum to a 75 - 80% solution and subsequently, during mixing at 40 - 50°C, 5, 15, 25 and 40% II (GF polymer) or 40, 60% furfuramide (FF polymer) were added. The products formed were dried at 18 - 20°C, crushed and screened through a "No. 20" sieve. With an increasing amount of II the moisture content and loss of I decreased in the final product. Properties of GF and FF are noticeably different from the properties of mechanical mixtures of the same composition. GF and FF

Card 1/2

KAMENSKIY, I.V.; GRIGOR'YEV, A.P.

Synthesis of organic glass from allyl esters. Trudy MKHTI no.29:50-54 '59. (MIRA 13:11)

(Allyl alcohol) (Glass reinforced plastics)

85815
S/081/60/000/019/005/012
A006/A001

15.7140 2109,2209,1460

Translation from: Referativnyy zhurnal, Khimiya, 1960, No. 19, pp. 515-516, # 79330

AUTHORS: Kamenskiy, I. V., Tsvetkov, V. N.

TITLE: Interaction of Phenol With Hexamethylene Tetramine. Information 2. Preparation of Hexaphenol Resins in Aqueous and Aqueous-Alcoholic Media

15

PERIODICAL: Tr. Mosk. khim-tekhnol. in-ta im. D. I. Mendeleyeva, 1959, No. 29, pp. 55-62

TEXT: The authors investigated the reaction of phenol (I) with hexamethylene tetramine (II) in a liquid medium. Resins were investigated, obtained at a different content of water in the initial mixture of I and II used at a 1 : 0.3 ratio. Optimum amount of water was 100 % with respect to I. The duration of resin formation is 29 - 30 min depending on the amount of water introduced, the Ubbelohde drop point is 111°C, hardening rate at 160°C is 87 sec, the content of nitrogen bound is 5%. Resins are described obtained in the presence of 0.1 - 3% KOH with respect to I. They are soluble in acetone, dioxane and alkalis and not

Card 1/2

KAMENSKIY, I.V.; SMIRNOVA, G.P.; TSEPELEV, A.S.

Melamine-acetone-formaldehyde resins. Trudy MKHTI no.29:108-113
'59. (MIRA 13:11)
(Resins, Synthetic) (Melamine) (Acetone) (Formaldehyde)

KAMENSKIY, I.V.; MURAV'YEV, V.S.

Use of soluble silicate glass in the preparation of abrasives.
Trudy MKHTI no.29:119-125 '59. (MIRA 13:11)
(Glass) (Abrasives)

5(1,3) SOV/153-2-1-17/25

AUTHORS: Kamenskiy, I. V., Itinskiy, V. I., Korzeneva, Yu. I.

TITLE: Thermally Stable Resins and Plastics on the Basis of the Interaction Products of Furfurol With Substances Containing a Keto Group (Termostoykiye smoly i plastiki na osnove produktov vzaimodeystviya furfurola s veshchestvami, soderzhashchimi ketogruppu)

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i khimicheskaya tekhnologiya, 1959, Vol 2, Nr 1, pp 89-95 (USSR)

ABSTRACT: Plastics with increased thermal stability would permit the solution of complicated technical problems in designing new constructions. The plastics presently being produced can be used at 200-250° only for a limited time. The investigations presently being made (Refs 1-13) in search of suitable plastics are mentioned. The latest papers (Refs 14-22) concern furfurol resins. Cast furfurol products with acid hardening agents are not combustible, but polymerize readily. Since these polymers are neither soluble nor meltable, it is not possible to produce from them products suited for technical purposes. Ketones, however, which enter readily reaction with furfurol, form meltable and soluble resins. Thus, it is possible to ob-

Card 1/4

SOV/153-2-1-17/25

Thermally Stable Resins and Plastics on the Basis of the Interaction Products of Furfurol With Substances Containing a Keto Group

tain solid, thermally stable products. This article serves the purpose of explaining the dependence of the structure of ketones condensing with furfurol on the thermal stability of the resultant condensation products. The method of the experiment is described. The article is then divided into two paragraphs: 1) production of resins from furfurol and ketone in molar ratio. The following ketones were used: acetone, methyl-ethyl ketone, cyclohexanone, diacetone alcohol, quinone ,anthraquinone, camphor, p,p'-dimethyl benzophenone, and benzanthrone. The table (not numbered, inserted between p 92 and 93) shows the conditions of reaction, the properties of the monomers, soluble resins and plastics produced on their basis. From the results of this table the author drew conclusions concerning the course of reaction and the structure of the resultant compounds. 2) Resins from various molar ratios of furfurol and ketone. As was confirmed in the last paragraph, the condensation products of furfurol and acetone exhibit the highest thermal stability. The afore-mentioned table contains

Card 2/4

also results of these experiments. Figure 1 illustrates the deformation of the pressed material of the last-mentioned condensation products. Figure 2 contains the same data for the resins F2A, BF-4, AG-4 and K-211-3, and figure 3 contains the same data for the combined resins F2A, ED-6, K-18-2 and K-15-2.The hardening of resin was investigated by means of the plastometer (plastomer) of the system I. F. Kanaveta. The authors arrived at the following conclusions: The increased thermal stability depends not only on the reaction conditions but chiefly on the structure of the reacting component contained in the keto group. The thermal stability dependent on the ketones used decreases in the following manner: acetone (molar with furfurol) 1:4, 1:2, 1:1; mesityl oxide, acetophenone, diacetone alcohol and methyl-ethyl ketone, cyclohexanone and acetone (molar to furfurol) 2:1. The thermal stability of the hardened furfurol-ketone resins increases with rising temperature of the reaction and decreasing volume of the reacting components with increasing coke number and specific weight of the hardened products. Meltable and soluble

SOV/153-2-1-17/25

Thermally Stable Resins and Plastics on the Basis of the Interaction Products of Furfurol With Substances Containing a Keto Group

resins with low molecular weight are produced from furfurol with acetone. Various thermally stable plates, impregnating agents, coatings, foam-pore masses and other materials are obtained from hardened resins. There are 4 figures, 1 table, and 23 references, 3 of which are Soviet.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskiy institut imeni D. I. Mendeleyeva; Kafedra tekhnologii plasticheskikh mass (Moscow Institute of Chemical Technology imeni D. I. Mendeleyev, Chair of the Technology of Plastics)

SUBMITTED: December 16, 1957

Card 4/4

CHERKINSKIY, Yuliy Samuilovich; KAMENSKIY, I.V., kand.khim.nauk, nauchnyy red.; GURVICH, E.A., red.izd-va; TEMKINA, Ye.L., tekhn.red.

[Polymer-cement concrete] Polimer - tsementnyi beton. Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1960. 146 p. (MIRA 14:2)
(Concrete) (Polymers)

GARBAR, Mikhail Ivanovich; RASTANIN, Ivan Vasil'yevich; KAMENSKIY, I.V.,
kand.khim.nauk, nauchnyy red.; GOMOZOVA, N.A., red.; TEMKINA,
Ye.L., tekhn.red.

[Plastics and synthetic resins in construction] Plastmassy i
sinteticheskie smoly v stroitel'stve. Moskva, Gos.izd-vo lit-ry
po stroit., arkhit. i stroit.materialam, 1960. 262 p.
(MIRA 13:11)

(Plastics) (Resins, Synthetic)

88317

S/191/60/000/002/004/012
B027/B058

15.8112

AUTHORS: Kamenskiy, I. V., Smirnova, Ye. P., Teepelev, A. S.

TITLE: Melamine Acetone Formaldehyde Resins

PERIODICAL: Plasticheskiye massy, 1960, No. 2, pp. 17-19

TEXT: The disadvantage of melamine formaldehyde resins is their insolubility in organic solvents and their low stability while storing, thus making a modification of these products necessary. V. S. Kiselev and M. F. Sorokin (Ref. 2) studied the modification of melamine formaldehyde resins with alcohol. K. V. Lukina (Ref. 4) produced resins from dimethyl melamine and diethanol aniline which show higher stability in water and good dielectric properties. This study deals with the modification of melamine formaldehyde resins by acetone. Commercial melamine with a melamine content of 99.07%, formalin with a formaldehyde content of 40.3% and acetone with a boiling temperature of from 55.5 to 56.5°C served as initial materials. Best modification was obtained with acetone, if this product was introduced into the reaction after the formation of the methyl derivatives of melamine. The reaction was carried out in neutral or

Card 1/2

KAMENSKIY, I.V.; MURAV'YEV, V.S.

Using synthetic resins in the manufacture of abrasive cloth.
Plast.massy no.2:52-55 '60. (MIRA 13:6)
(Abrasives) (Resins, Synthetic)

87880

S/191/60/000/005/006/020
B004/B064

15.8114

AUTHORS: Kamenskiy, I. V., Sanin, I. K., Itinskiy, V. I., Krylova, G. D.

TITLE: Polymers on the Basis of Reaction Products of Furfurole With Diacetone Alcohol and Boron-containing Ester of Diacetone Alcohol

PERIODICAL: Plasticheskiye massy, 1960, No. 5, pp. 15 - 17

X

TEXT: The authors proceed from joint investigations of the MKhTI im. Mendeleyeva (Moscow Institute of Chemical Technology imeni Mendeleyev) and NIIPM (Scientific Research Institute of Plastics) which showed (Refs. 5, 6) that the reaction of furfurole with compounds containing ketone groups yields monomers which are transformed into heat-resistant polymers under the action of heat. This investigation aims at studying the effect of the presence of boron upon the heat resistance of these polymers. First, the condensation of furfurole with diacetone alcohol is described. The molar ratio of the two components was 1:1, and condensation was conducted in the presence of 2 % NaOH as catalyst. The yield in resin was 65 - 70 %. When heated to 200°C without hardener, the resin became

Card 1/2

83415

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B004/B054

15.3000 also 2111
5.3830

AUTHORS: Itinskiy, V. I., Kamenskiy, I. V., Oster-Volkov, N. N.

TITLE: Organomineral Cement-free Concrete

PERIODICAL: Plasticheskiye massy, 1960, No. 6, pp. 19 - 22

TEXT: The authors report on experiments made by the Laboratoriya kafedry tekhnologii plasticheskikh mass MKhTI imeni Mendeleyeva (Laboratory of the Chair of Plastics Technology of the Moscow Institute of Chemical Technology imeni Mendeleyev) and the Nauchno-issledovatel'skiy institut plasticheskikh mass (Scientific Research Institute of Plastics). Polymers of monomeric compounds of furfurol with ketones, especially acetone, showed high thermostability, incombustibility, resistance to water, and chemical resistance. Samples of concrete in the form of БТО-10 (BTO-10) blocks, Р-1 (R-1) timbers, СТК (STK) tubings, and pressure water lines (Fig. 1) were produced from the furfurol acetone monomer ФА (FA) (containing about 20% of difurylidene acetone) in test plants of the Upravleniye moskovskogo Metrostroya (Administration for the Construction of the Moscow Subway) and the Skuratovskaya eksperimental'naya baza

Card 1/4

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Organomineral Cement-free Concrete

S/191/60/000/006/007/015
B004/B054

TsNIIPodzemshakhtstroya (Skuratovo Experimental Basis of the Central Science Research Institute of Underground and Shaft Mining). The BTO-10 blocks were produced at the zavod ZhBK (Reinforced-concrete Construction Works) of the Administration for the Construction of the Moscow Subway. The production of FA was started by the Ferganskiy gidroliznyy zavod (Fergana Hydrolysis Works), Lisichanskiy opytnyy zavod (Lisichansk Experimental Plant), and others. Investigations by the Kafedra organicheskoy khimii (Chair of Organic Chemistry) of the Dnepropetrovskiy sel'skokhozyaystvennyy institut (Dnepropetrovsk Agricultural Institute) show that the production costs of furfurol can be reduced to one-half or one-third. Polymerization of FA is realized at 110-180°C by dehydration; a mixture of dimers of furylidene acetone and trimers of difurylidene acetone forms an intermediate. As dehydration leads to the formation of pores, the intermediate is to be used for concrete production. Hardening is done by sulfonic acids (e.g. benzene sulfonic acid), certain mineral acids (H_3PO_4), or metallic salts, in which acids form due to hydrolysis. The hardening process depends on the amount of hardening agent used, and is controllable within wide limits. With the use of acid slags or waste

Card 2/4

83415

of the hydrofluoric acid production as fillers, the addition of hardening agent can be reduced from 3 to 0.7%. Sparingly wettable minerals (talcum, sulfur, graphite, pyrite, etc.) were not used as fillers. Clay minerals form no concrete without previous treatment (e.g. with Fe salts). Clays containing $CaCO_3$ or $MgCO_3$ cannot be used because of the liberation of CO_2. Building sand was wetted with furfurol in the concrete mixer, then FA, and finally the hardening agent, were added. Fig. 2 shows that optimum concrete hardness is attained with 12% of FA. The setting of concrete in air is shown in Fig. 3, the setting in water in Fig. 4. Materials used for reinforcement were: glass fiber, glass tissue, metal rods, metal mesh, wood, and reed. Glass can only be used after treatment with furyl silicate resin. Investigations by the NIIKhIMMASh (Scientific Research Institute of Chemical Machinery) showed that plastic concrete is resistant to acids, bases, salt solutions, and polar and nonpolar solvents, while it is decomposed by hot oxidizing agents (HNO_3, H_2CrO_4, 33% H_2O_2). Cold and X-rays do not influence the properties. Plastic

X

S/193/60/000/007/001/012
A005/A001

AUTHORS: Itinskiy, V. I., Kamenskiy, I. V.

TITLE: Heat-Resistant Plastic Materials

PERIODICAL: Byul. tekhniko-ekonom. informatsii, 1960, No. 7, pp. 10-13

TEXT: The Kafedra tekhnologii plasticheskikh mass Moskovskogo ordena Lenina khimiko-tekhnologicheskogo instituta im. D. I. Mendeleyeva (Department of Technology of Plastic Materials of the Moscow "Order of Lenin" Institute of Chemical Technology im. D. I. Mendeleyev (MKhTI)) and the Nauchno- issledovatel'skiy institut plasticheskikh mass (Scientific Research Institute of Plastic Materials) synthesized jointly in 1951-1959 monomeric compounds of condensation products of furfural and acetone, which are transformed into polymeric compounds of high heat-resistance by additional treatment and can be applied to the production of pressed articles, impregnation, and coating of porous organic materials. The monomeric compound of furfural and acetone is a liquid of the specific weight 1.084 with the boiling point between 180 and 240°C, and pH of about 4, and consists of 80% furylidene acetone and 20% difurylidene acetone, the mixture of which ("Monomer ФА (FA)") is the initial product of the heat-resistant materials. The thermosetting

Card 1/3

resin FA is a solid product obtained by the compression of monomer FA or by the immediate interaction between furfural and acetone; it is provided for pressed materials, glass textolite, shell molds of metal castings, impregnations, lacquers of high heat resistance. The characteristics are as follows: specific weight 1.14-1.29; weakly acid reaction; the solubility is perfect in acetone and ethylcellosolve; in alcohol insoluble; drop point according to Ubbelohde 100°C; softening point according to Kremer-Sarnov 65-77°C. As fillers served: glass fiber ФАС (FAS), asbestos ФАА (FAA), graphite ФАГ (FAG). The mechanical and electrical properties of pressed materials with fillers are presented in 1 table and 1 graph. - The FA-resin increases considerably the heat-resistance of phenol-formaldehyde and epoxide resins. The pressed material FAS is a heat-resistant structural material and can be applied at long-time operation temperatures of up to 330-350°C and short-time operation at 1,200-2,700°C. The FAA-material is a heat-resistant friction material. The FAG-material is a heat-resistant chemical material. Block-graphite impregnated with FA yields a material impermeable for gas and water with high heat conductivity. - At the end of 1957, the Kineshemskiy leso-khimicheskiy zavod (Kineshma Wood Pulp Chemistry Plant) installed for long-time tests components of caps made of impregnated graphite into the column of acetic acid rectification; no deformation or destruction were observed hitherto.

Card 2/3

S/193/60/000/007/001/012
A005/A001

Heat-Resistant Plastic Materials

Wood, slabs of woody shavings, wood fiber slabs, and porous organic materials gain, by impregnation or covering with the FA-monomer, the properties of incombustibility and imputrescibility with simultaneously increasing hydrophobic nature. A table shows the comparative properties of slabs with and without treatment with FA. The raw material base of the furfural production is practically unlimited (agricultural waste products, turf, reeds). There are 2 tables and 1 figure.

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Card 3/3

S/191/60/000/008/003/014
B004/B056

AUTHORS: Kamenskiy, I. V., Ungurean, N. V.

TITLE: Polymers on the Basis of Condensation Products of Furfurol With Acetone. Report I. Production of Furfurylides- and Difurfurylidene Acetones From Resins on Their Basis in the Presence of an Alkaline Catalyst

PERIODICAL: Plasticheskiye massy, 1960, No. 8, pp. 17-19

TEXT: It was the aim of this study to work out a method of synthesizing furfurylidene acetone 15 (FA) 15 and difurfurylidene acetone (DFA), 15 and to investigate the properties of their resins. For FA the following is given: A mixture of 6 moles of acetone and 1 mole of furfurol is dropped with cooling into 0.1 mole of 1 - 3% alkaline solution, so that the temperature does not exceed 20°C. The alkaline solution is then neutralized with acetic acid, and the lower layer of oil is distilled in vacuum at a maximum of 65°C. Yield: 70% referred to furfurol. DFA: 2 moles of furfurol and 1 mole of acetone are dropped into a 10% aqueous-alcoholic solution of NaOH, while being intensively stirred. Maximum temperature: 20 - 25°C.

Card 1/3

Polymers on the Basis of Condensation Products of Furfurol With Acetone. Report I. Production of Furfurylides- and Difurfurylidene Acetones From Resins on Their Basis in the Presence of an Alkaline Catalyst

S/191/60/000/008/003/014
B004/B056

The crystals of DFA are re-crystallized from petroleum ether. Yield: 96-97%. The resins are formed from 34 g of FA or 27 g of DFA in 150-200 ml of benzene or alcohol after an addition of 1 - 4 g of NaOH (in the case of FA), 40 g of NaOH (in the case of DFA) (in the form of a 33% aqueous solution) at boiling temperature, after which they are precipitated in water and dried in vacuum. In the case of FA resinification is brought about by interaction of the carbonyl group of furfurol with the methyl group of acetone and by separation of water (about 0.5 mole of H_2O per mole of monomer). The resins are yellow or brown-yellow, brittle substances. Their molecular weight does not exceed 1200-1300 (Table). The oxime number of the fractions obtained from FA by precipitation by means of petroleum ether shows that 40-52% of the keto groups remain conserved. The high bromine number proves that the double bounds of the furane ring take no part in the reaction. In the case of DFA, resinification takes place by polymerization on the ethylene double bounds; and in the case of FA, condensation reactions occur in addition. The physical properties of these resins are comparable with those of Novolac phenolformaldehyde resins.

Card 2/3

87431

S/191/60/000/010/003/017
B004/B060

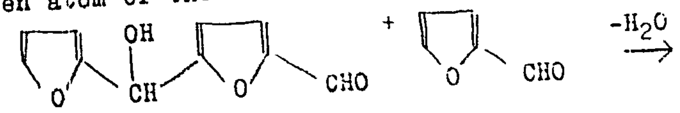
15.8111

AUTHORS: Kamenskiy, I. V., Ungurean, N. V., Itinskiy, V. I.

TITLE: The Process of Resin Formation From Furfurole

PERIODICAL: Plasticheskiye massy, 1960, No. 10, pp. 8-12

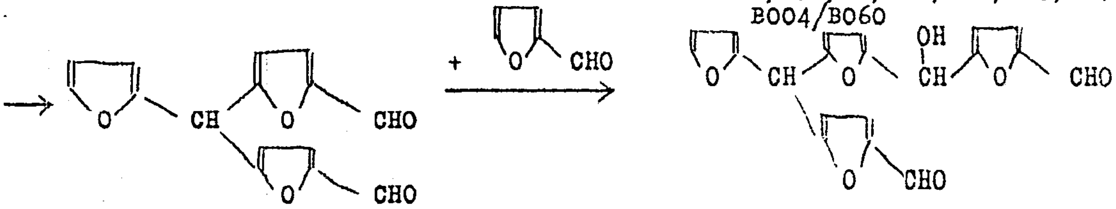
TEXT: The authors wanted to clarify the resinification process of furfurole. The latter was resinified in the presence of 1% benzene sulfonic acid at 70-130°C either without solvent or dissolved in toluene or water. The number of aldehyde groups, the bromine number, acidity, oxime number, and amount of water liberated in the reaction were determined, and the resulting resin was subjected to an elementary analysis. In boiling toluene furfurole is resinified within 12 hours, 0.35 mole H_2O being separated per mole of furfurole. A reaction of the aldehyde group with the α-hydrogen atom of the furan ring is assumed to have the following course:



Card 1/3

87431

The Process of Resin Formation From Furfurole S/191/60/000/010/003/017
B004/B060



This scheme was confirmed by a study of the resinification of the following compounds. 5-methyl furfurole : this one resinifies more slowly than furfurole under separation of 1 mole H_2O per 2 moles of 5-methyl furfurole. Tetrahydro furfurole : At 100°C this one yields a soluble resin which is hardened only at a higher temperature (130-160°C) under separation of 1 mole H_2O per 2 moles of tetrahydro furfurole.

Furfurylidene glycol acetate: this compound condenses at 100°C under separation of glycol and gives rise to a resin with a ramified structure, in which the furan rings are interconnected in α,α'-position. The furan ring is conserved in all resins. Resinification in water in the presence of benzene sulfonic acid confirmed the data contained in the literature. In this case the furan ring is expected to split and the resulting amber

Card 2/3

87645

15.8111

S/191/60/000/012/004/016
B020/B066

AUTHORS: Kamenskiy, I. V., Ungurean, N. V., Kovarskaya, B. M., Itinskiy, V. I.

TITLE: Polymers on the Basis of Condensation Products of Furfurole With Acetone. Report No. 2. Hardening of Furfurylidene- and Difurfurylidene Acetone in the Presence of Acid Catalysts

PERIODICAL: Plasticheskiye massy, 1960, No. 12, pp. 9 - 13

TEXT: Investigations carried out in resent years by the kafedra plasticheskikh mass MKhTI im. D. I. Mendeleyeva (Department of Plastics of the Moscow Institute of Chemical Technology imeni D. I. Mendeleyev) and NIIPM (Nauchno-issledovatel'skiy institut plasticheskikh mass = Scientific Research Institute of Plastics) revealed that condensation products of furfurole with various ketone form hardening resins in the presence of mineral acids. In the present paper, results of an investigation of the formation and cure of polymers on the basis of furfurylidene- and difurfurylidene acetone are given, which are formed in the condensation of furfurole with acetone. The effect of ionic catalysts was thoroughly

Card 1/4

87645

Polymers on the Basis of Condensation Products of Furfurole With Acetone. Report No. 2. Hardening of Furfurylidene- and Difurfurylidene Acetone in the Presence of Acid Catalysts

S/191/60/000/012/004/016
B020/B066

studied, as these catalysts permit the production of cured polymers. The experiments were made at 70 - 100°C up to resinification, and at 160 - 200°C up to complete cure. The results of studying the effect of some ionic catalysts are presented in Table 1. $CdCl_2$ and $CaCl_2$ do not promote resinification, but give with the monomer an infusible complex which is insoluble in organic solvents and decomposes with water. Sulfuric acid is a good catalyst for the cure. The best ionic catalysts were aromatic sulfonic acids. Benzene sulfonic acid has many advantages compared with all other catalysts. It was found by experiments that the cure of furfurylidene acetone proceeds in three steps under the action of ionic catalysts, mainly benzene sulfonic acid: 1) Transition of furfurylidene acetone to a resinous state. The resin is soluble in acetone, dioxane, and other organic solvents; the reaction rate depends on the quantity of catalyst and on temperature. The resin is low-molecular in this state (Fig. 1); transition from the vitreous to the viscous state takes place in a narrow range of temperature. A range of high elasticity could not

Card 2/4

87645

Polymers on the Basis of Condensation Products of Furfurole With Acetone. Report No. 2. Hardening of Furfurylidene- and Difurfurylidene Acetone in the Presence of Acid Catalysts

S/191/60/000/012/004/016
B020/B066

be found. The bromine number of the resin in this state was 254, as compared to 345 in the case of furfurylidene acetone (Table 2), whereas the oxime number dropped from 422 to 210. The molecular weight of the resin does not exceed 1200. Polycondensation takes place under water separation (Table 3). 2) In the second stage, a resin is formed which is not soluble and only swells in organic solvents. On prolonged cure, an intenser cross-linking of molecules takes place, and deformation of samples decreases (Fig. 2). The conditions for curing samples whose thermomechanical characteristics were determined, are given (Table 4). The rate of curing is temperature-dependent. 3) In the third stage, the cured resin is infusible and insoluble which is characteristic of spatially interlaced polymers. Difurfurylidene acetone polymerizes at 180°C without a catalyst, and is cured in the presence of catalysts, which takes place as well in three steps. Fig. 3 shows the thermomechanical characteristics of three samples whose curing conditions are given in Table 4, and Fig. 4 shows the thermomechanical curves, recorded by a dynamometric scale, for samples obtained by heating to 80°C for 10 - 150 min. Table 6 gives the

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Card 3/4

87645

Polymers on the Basis of Condensation Products of Furfurole With Acetone. Report No. 2. Hardening of Furfurylidene- and Difurfurylidene Acetone in the Presence of Acid Catalysts

S/191/60/000/012/004/016
B020/B066

bromine and oxime numbers for difurfurylidene acetone and resin in the first stage of cure. The thermomechanical curves for difurfurylidene resin in the second (Fig. 5) and in the third (Fig. 6) stage of cure are presented. The elementary composition of the cured difurfurylidene acetone resin is given in Table 7. There are 6 figures, 7 tables, and 4 Soviet references.

Card 4/4

83979

S/080/60/033/009/012/021
A003/A001

5.3400 also 2209

AUTHORS: Kamenskiy, I.V., Ungurean, N.V.

TITLE: Tetrahydrofurfurole and Its Interaction With Acetone

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol. 33, No. 9, pp. 2121-2127

TEXT: Various methods were tested to obtain tetrahydrofurfurole. The best results were obtained with the oxidation of tetrahydrofuryl alcohol in the vapor phase by air over a silver catalyst on pumice. The optimum reaction mixture consisted of 85 g tetrahydrofuryl alcohol and 15 g of water. The yield of tetrahydrofurfurole was 54.3% based on the initial amount of alcohol and 60.2% based on the amount of reacted alcohol. The physical characteristics of tetrahydrofurfurole are given. The study of the interaction of tetrahydrofurfurole with acetone showed that the reaction in an alkaline medium takes place more slowly than with furfurole. In the case of an excess of acetone the first reaction product is tetrahydrofurylbutanol-1-on-3 which loses water and is then transformed to tetrahydrofurfurylideneacetone. The final product is a mixture of both substances. Tetrahydrofurfurylideneacetone has a pronounced tendency to polymerization. There are 3 tables, 3 figures and 3 non-Soviet references.

SUBMITTED: November 27, 1959

Card 1/1

KAMENSKIY, I.V.; MURAV'YEV, V.S.

Use of synthetic resins in the manufacture of abrasive cloth.
Plast.massy no.3:42-43 '61. (MIRA 14:3)
(Resins, Synthetic) (Abrasives)

21142

S/191/61/000/004/003/009
B110/B208

15.8105 2209, 1372

AUTHORS: Kamenskiy, I. V., Komlev, V. K., Korshak, V. V.

TITLE: Synthesis of esters of 2-furyl acrylic acid

PERIODICAL: Plasticheskiye massy, no. 4, 1961, 9-11

TEXT: Polyfunctional monomers with furan ring are used for the preparation of heat-resistant polymers. It was found by the Departments of Plastics Technology of Moskovskiy khimiko-tekhnologicheskiy institut (MKhTI) (Moscow Institute of Chemical Technology) and of nauchno-issledovatel'skiy institut plasticheskikh mass (NIIPM) (Scientific Research Institute of Plastics) that plastics based on furfurol and also their condensation products with ketones (acetone) are highly resistant to heat and fire, and, with reinforcing fillers, they have a high mechanical strength. The solidified polymeric condensation products (e.g., mono- and difurfurylidene acetones) are, however, brittle and not sufficiently adhesive in pure state. To obtain more elastic and more adhesive plastics, the authors synthesized polymer resins on the basis of 2-furyl acrylic esters and glycols (diethylene glycol and 1,4-butanediol). Cation exchangers (polystyrene sulfo

Card 1/4

21142

S/191/61/000/004/003/009
B110/B208

Synthesis of esters of...

acids) were used as catalysts for the preparation of monoesters which is difficult even with excess glycol (30-32 % yield). For the purpose of temperature control and removal of the formed water as an azeotropic mixture, esterification was carried out in toluene. The incomplete esters were obtained in melts at 180-200°C under standard pressure and with excess acid. Furyl acrylic acid was condensed from furfurol and malonic acid. Diethylene glycol (melting point 117°C at 1 mm Hg; $n_D^{20} = 1.4471$) and 1,4 butanediol (melting point 108°C at 2 mm Hg; $n_D^{20} = 1.4462$) were used. 3.5 mg-equiv./g of the СБС-1 СОЕ (SBS-1 SOYe) cation exchange resin with 40 % swelling, which was converted to the H-form by treatment with 6 % HCl for 24 hr, was used as catalyst. It was then washed free from Cl' and dried at 60-80°C. To synthesize the monoesters, furyl acrylic acid and diethylene glycol were heated in a ratio of 1:6 with 10-15 % cation exchanger and 300-400 ml of toluene per mole of acid to 125-140°C for 16-24 hr. When the reaction was completed (cessation of water formation), it was filtered, neutralized with sodium bicarbonate, washed with sodium chloride solution, and dried with annealed sodium sulfate. The end product obtained in a yield of 45-50 % is a transparent, light yellow,

Card 2/4

21142

S/191/61/000/004/003/009
B110/B208

Synthesis of esters of...

slightly mobile liquid boiling at 158-159°C, which is well soluble in acetone, alcohol, and benzene, $n_D^{20} = 1.5555$. Instead of diethylene glycol, also 1,4-butanediol may be used. The end product (60-70 % yield) is a light yellow, slightly mobile liquid boiling between 170 and 172°C, which is well soluble in acetone, benzene, alcohol, and ether; $n_D^{20} = 1.5560$. The complete ester from 2-furyl acrylic acid and diethylene glycol was obtained by heating both substances to 180-200°C in a ratio of 2.5:1. The separated crystals were treated with $NaHCO_3$, repeatedly washed, and recrystallized from alcohol and petroleum ether. The light yellow crystals melted at 83-85°C, dissolved in acetone and ether, and, when heated, in alcohol. The yield was 46 %. The complete butanediol ester was obtained in a similar way, recrystallized twice from methyl alcohol, and treated with animal charcoal. The light yellow crystals (46-48 % yield) were soluble in dioxane, benzene, acetone, and, when heated, in alcohol; they melt at 107.5-108.5°C. Under the action of temperature and catalyst, the esters of 2-furyl acrylic acid give non-meltable and insoluble polymers of high chemical and heat resistance. A resistance to

X

Card 3/4

21142

Synthesis of esters of...

S/191/61/000/004/003/009
B110/B208

250-320°C was obtained on Zhurkov's apparatus, depending on the curing temperature. The resins on the basis of the esters described may be combined with other polymers. There are 4 tables and 7 references: 5 Soviet-bloc and 2 non-Soviet-bloc. The most recent reference to English-language publication reads as follows: M. I. Astle, B. Schoeffer, C. Obenland, J. Am. Chem. Soc., 77, no. 13, 3643 (1955).

Card 4/4

KAMENSKIY, I.V.; ITINSKIY, V.I.; TEPLOV, N.Ye.; ANDRIANOV, B.V.

Synthesis and study of monomeric and polymeric products of the reaction of acetophenone with furfural. Plast.massy no.8:12-15 '61. (MIRA 14:7)
(Acetophenone) (Furaldehyde)

KAMENSKIY, I.V.; PESHEKHONOVA, A.L.; ITINSKIY, V.I.

Resins based on furfurole and hexamethylenetetramine. Plast.massy no.10:15-19 '61. (MIRA 15:1)
(Resins, Synthetic) (Furaldehyde) (Hexamethylenetetramine)

DAVYDOV, V.V.; KAMENSKIY, I.V.; OGNEVA, N.Ye.; KHMEL', G.V.; SOLOV'YEVA, L.K.

Strengthening of water-saturated sandy rocks with resin solutions.
Plast.massy no.10:39-41 '61. (MIRA 15:1)
(Rocks) (Resins, Synthetic)

34946
S/191/62/000/003/004/010
B101/B147

15,8170

AUTHORS: Kamenskiy, I. V., Sanin, I. K., Korshak, V. V.

TITLE: Polymers based on silicon-containing furan compounds. Synthesis of esters of furfuryl alcohol and ortho-silicic acid

PERIODICAL: Plasticheskiye massy, no. 3, 1962, 8-12

TEXT: (1) The synthesis of tetrafurfuryl oxysilane (I) in the presence of KOH by alcoholysis of tetraethoxy silane (TES) with furfuryl alcohol is described. To avoid resinification, the alcohol is first only mixed with half the TES, after evaporation of 20% of the theoretical C_2H_5OH amount with the next quarter, and after evaporation of 35% C_2H_5OH with the rest. The reaction is continued until evaporation of 75% C_2H_5OH at 115-140°C. The yield is 80-82%, the substance consists of yellowish crystals, m.p. 38-39°C, b.p. 204-206°C (4 mm Hg), d^{40} 1.231, n_D^{40} 1.5025. A by-product is the hitherto unknown ethoxy trifurfuryl oxysilane, a yellowish liquid, b.p.

Card 1/4

152-154°C (1 mm Hg), d_4^{20} 1.1400, n_D^{20} 1.4890. (2) Synthesis of I by esterification of $SiCl_4$ with furfuryl alcohol. $SiCl_4$ is added dropwise to alcohol dissolved in benzene, excess pyridine is admixed as HCl acceptor. Pyridine hydrochloride was separated (a) by washing, dehydration of the benzene layer by $CaCl_2$, distillation of I in vacuo, or (b), with higher yields (94%), by filtering off the pyridine hydrochloride. (3) Synthesis of tetrahydrofurfuryl orthosilicate (II) by alcoholysis of TES with tetrahydrofurfuryl alcohol in the presence of lead monoxide at 120-145°C for 4 hrs. The product (75% yield) was a heavy, colorless liquid, b.p. 215-216°C (1.5 mm Hg), d_4^{20} 1.1399, n_D^{20} 1.4680. (4) Synthesis of II by esterification of $SiCl_4$, ratio $SiCl_4$: tetrahydrofurfuryl alcohol : pyridine = 1.1 : 4 : 4.8, 4 hrs at 10°C, 80% yield referred to alcohol. (5) Synthesis of ethyl furfuryl oxysilanes by alcoholysis, similar to (1), of ethyl triethoxy silane or diethyl diethoxy silane with furfuryl alcohol during 5 hrs. The product was ethyl trifurfuryl ethoxy silane (54.5%), b.p. 159.5-160°C (1 mm Hg), d_4^{20} 1.1743, n_D^{20} 1.4988; and diethyl difurfuryl oxysilane (48%), b.p. 138-139°C (3 mm Hg), d_4^{20} 1.0835, n_D^{20} 1.4845. (6) Synthesis of alkyl(aryl)furfuryl oxysilanes by esterification of methyl, ethyl, or phenyl trichloro silane, dimethyl, diethyl dichloro silane, or trimethyl chloro silane with furfuryl alcohol, similar to (1). Products obtained: methyl trifurfuryl oxysilane (90%), b.p. 157-158°C (1 mm Hg), d_4^{20} 1.1801, n_D^{20} 1.4992; dimethyl difurfuryl oxysilane, b.p. 102-103 (1 mm Hg), d_4^{20} 1.1021, n_D^{20} 1.4809; trimethyl furfuryl oxysilane (89%), b.p. 39.0-39.5°C (1 mm Hg), d_4^{20} 0.9519, n_D^{20} 1.4449; ethyl trifurfuryl oxysilane (91%), b.p. 159.5-160°C, d_4^{20} 1.1743, n_D^{20} 1.4988; diethyl difurfuryl oxysilane (89%), b.p. 138-139°C (3 mm Hg), d_4^{20} 1.0835, n_D^{20} 1.4845; and phenyl trifurfuryl oxysilane (59%), b.p. 199.5-200°C, d_4^{20} 1.2040, n_D^{20} 1.5358. (7) Esterification of methyl chlorosilanes with tetrahydrofurfuryl alcohol produced (in 88-90% yields): methyl-tri-(tetrahydrofurfuryl)-oxysilane, b.p. 179-181°C (2 mm Hg), d_4^{20} 1.1068, n_D^{20} 1.4648;

Polymers based on silicon ...

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B101/B147

dimethyl-di-(tetrahydrofurfuryl)-oxysilane, b.p. 123-125°C (1 mm Hg), d_4^{20} 1.0324, n_D^{20} 1.4505; and trimethyl-(tetrahydrofurfuryl)-oxysilane, b.p. 172-173°C (760 mm Hg), d_4^{20} 0.9214, n_D^{20} 1.4271. The infrared spectra of the compounds are shown. Papers by Yu. K. Yur'yev (ZhOKh, 28, 3 (1958)) and A. L. Mdzhoyan (DAN ArmSSR, 27, 305 (1958)) are mentioned. There are 7 figures, 1 table, and 25 references: 8 Soviet and 17 non-Soviet. The four most recent references to English-language publications read as follows: H. Olson, Ind. Eng. Chem., 47, 1411 (1955); K. Q. Wilks, J. Am. Chem. Soc., 72, 1208 (1950); US Patent 2601497 (1952); US Patent 2569455, C. A., 46, 3084 (1952).

SUBMITTED: October 19, 1960

Card 4/4

36191
S/191/62/000/004/004/017
B110/B138

15·8350

AUTHORS: Kamenskiy, I. V., Tsepelev, A. S., Kogan, N. N., Andrianov, B. V.

TITLE: Urea acetone formaldehyde resins

PERIODICAL: Plasticheskiye massy, no. 4, 1962, 9-12

TEXT: МФА-1 (MFA-1) with 72 % dry residue, 620 sec viscosity and 1 % free formaldehyde was tested for suitability as a basis for glues and as a binder for glass textolite and shell molds. Catalysts used were: 10 % aqueous oxalic acid, 50 % orthophosphoric acid, 10 % hydrochloric acid, and 30 % NH_4Cl. Activity decreases in the order: NH_4Cl, orthophosphoric acid, hydrochloric acid, oxalic acid. The hardened films are only stable with oxalic or orthophosphoric acid. The lifetime of resin hardened with 10 % aqueous oxalic acid (2 % referred to dry resin) was 7.5 hr, at 10°C, 0.6 hr at 50°C. With 2 % catalyst, it was 4.5 hr, with 10 %, 0.5 hr. 1.6 % volatiles with 5 % formaldehyde and 95 % H_2O were separated by hardening with 2 % oxalic acid. 0.5 N aqueous KOH caused

Card 1/2

Urea acetone formaldehyde resins

S/191/62/000/004/004/017
B110/B138

swelling and cracking, 25 % H_2SO_4 destroyed the sample. Films hardened with oxalic acid remained unchanged in very moist air, keeping their luster. The ultimate tensile strength was 48.4 kg/cm^2. Glass textolite (ГОСТ 8481-57 (GOST 8481-57)) was hot or cold molded with resin, ratio 6:4. Glass fabric impregnated with resin (dry residue 70 %) was dried for 1.5-2.5 hr at 100-110°C. Non-laminated specimens were obtained at 160°C, 250 kg/cm^2, and 4 min/mm. Glass fabric impregnated with the resin and 50 % orthophosphoric acid was held at room temperature for 1.5-2 hr, and pressed at 1.5-2 kg/cm^2 for 8-24 hr. The resulting glass textolite had: 0.5 % hygroscopicity after 1 day, 1.1 % after 5 days, 108°C Martens thermal stability, 205 kg·cm/cm^2 specific impact toughness, and 1350 kg/cm^2 tensile strength in bending. 100 parts by weight of sand (K100/200) and 6 parts by weight of resin (dry residue 41 %, viscosity 4-18 sec) were mixed for producing shell molds and rods for casting. Tensile strength was 26.6-68.2 kg/cm^2 in tension and 82.4-123.0 kg/cm^2 in bending. There are 6 figures and 2 tables. The most important English-language reference reads as follows: Hodgins, Hovey, Ind. Eng. Chem., 33, no. 6, 769 (1941).

Card 2/2

39636
S/191/62/000/008/002/013
B124/B138

15.8090

AUTHORS: Kamenskiy, I. V., Tseytlin, G. M.

TITLE: Polymer materials based on condensation products of aldehydes with alicyclic ketones. Synthesis and investigation of cyclopentanone formaldehyde resins

PERIODICAL: Plasticheskiye massy, no. 8, 1962, 12-14

TEXT: Polycondensation of cyclopentanone (C) with formaldehyde (F) was conducted in aqueous-alcoholic solution with soda as catalyst. The highest yields of polycondensate (119% by weight of the used C) were obtained with F:C = 1:1.5. Table 2 shows the properties of the products obtained. All resins obtained from equimolar mixtures or those with excess F are thermo-setting and this process is made faster by basic catalysts. The products have high heat resistance (about 300°C), they are water-resistant and chemically very stable. The resins synthesized from mixtures with excessive C are thermoplastic but can also be set by adding basic catalysts. There are 2 figures and 2 tables. The English-language reference is: US Patent 1985870.

X

Card 1/3

S/191/62/000/008/002/013
B124/B138

Polymer materials based on ...

Table 2. Properties of cyclopentanone formaldehyde resins. Legend: (A) Property, (B) resin obtained with a C-F ratio of, (C) appearance and color, (D) molecular weight, (E) OH groups, %, (F) elementary composition, %, (G) carbon, (H) hydrogen, (J) drop point, °C, (K) setting time on plate at 200°C, min, (L) of pure resin, (M) resin with 1% NaOH, (N) solubility: soluble in, (P) insoluble in, (R) vitreous, brittle, red-brown product, (S) maximum 95°C, (T) not thermosetting, (U) water-benzene mixture (20:80), acetic acid, (V) chlorinated hydrocarbons, dioxane, ethers, ketones, (W) white powders whose aqueous-alcoholic solutions give colorless films after drying on glass, the films turning yellow above 140°C, (X) softens without melting, (Y) ethyl- and butyl alcohol, acetone, (Z) chlorinated hydrocarbons, ethers (petroleum and sulfuric ether), dioxane, aromatic hydrocarbons (benzene, toluene, chlorobenzene, etc.).

Card 2/3

Polymer materials based on ...

S/191/62/000/008/002/013
B124/B138

Показатели (A)	(B) Смола, полученная при молярном соотношении циклопентанон : формальдегид		
	2 : 1	1 : 1	1 : 1,5
Внешний вид и окраска . . . (C)	Стеклообразный, хрупкий, красно-коричневый продукт (R)	(W) Белые порошки, спиртовые растворы которых, будучи нанесены на стекло, при высыхании дают совершенно бесцветные пленки, желтеющие при температуре выше 140°C	
(D) Молекулярный вес	481	612	863
Содержание OH-групп, % (E) .	0,19	8,21	7,59
Элементарный состав, % (F)			
(G) углерод . .	73,48	69,19	69,88
(H) водород . .	8,52	8,33	8,36
Температура каплепадения, °C . . (J) .	(S) Не более 95°C	(X) Размягчается, не плавясь	(X) Размягчается, не плавясь
Время отверждения на плитке при 200 °C, *мин* (K)			
чистой смолы (L) .	(T) Не отверждается	68	7,5
смолы с 1% NaOH (M)	109	16,5	4,0
Растворимость:			
растворяется . . . (N)	(U) В спирто-бензольной смеси (20:80), уксусной кислоте	(Y) В этиловом и бутиловом спиртах, ацетоне	
не растворяется . (P)	(V) В хлорированных углеводородах, диоксане, эфирах, кетонах		

Table 2

Card 3/3

KAMENSKIY, I.V.; ITINSKIY, V.I.; KUZNETSOV, A.N.

Polymers on the basis of condensation products of furfurole with acetone. Copolymers of difurfurylidereacetone with methyl methacrylate and styrene. Plast. massy no.12:21-22 '62. (MIRA 16:1)

(Pentadienons) (Methacrylic acid) (Styrene)

S/0081/63/000/021/0490/0490

ACCESSION NR: AR4015668

SOURCE: RZh. Khimiya, Abs. 21S116

AUTHOR: Usmanov, Z.; Kamenskiy, I. V.; Losev, I. P.; Kovarskaya, B. M.

TITLE: Synthesis and study of the condensation products of furfural with higher aliphatic ketones and the polymers based on them. Parts 1-3.

CITED SOURCE: Sb. Fizika i khimiya prirodn. i sintetich. polimerov. Tashkent, AN UzSSR, vy*p. 1, 1962, 105-130

TOPIC TAGS: furfural, furfural condensation, aliphatic ketone, higher aliphatic ketone, ketone polycondensation, ketone based polymer crystallization

ABSTRACT: The authors studied the polycondensation of furfurylidene methylethyl- (I), furfurylidene methylpropyl- (II) and furfurylidene methylbutyl- (III) ketones. When heated to 240C in the presence of alkaline reagents, I forms a soluble and fusible polymer, which can be hardened under the influence of ionic catalysts (H_2SO_4, benzenesulfonic acids (IV), Lewis acids). According to data from thermomechanical studies, hardening in the presence of IV proceeds in 3 stages: 1) a fusible, low-molecular, soluble tar; 2) a high-molecular tar, swelling in solvents; 3) an infusible and insoluble stereospecific polymer. Hardened tar prepared from

Card 1/2

ACCESSION NR: AR4015668

I shows increased thermal stability (up to 300C). Tars can be prepared from II and III in the presence of ionic catalysts and require longer heating periods due to the spatial effect of the alkyl radicals. V. Nemirovskiy

DATE ACQ: 09Dec63 SUB CODE: CH ENCL: 00

KAMENSKIY, I.V.; TSEYTLIN, G.M.

Preparation and properties of glass-reinforced plastics based on cyclopentanone-formaldehyde resins. Plast.massy no.1:20 '63. (MIRA 16:2)

(Glass-reinforced plastics)
(Cyclopentanone) (Formaldehyde)

KAMENSKIY, I.V.; VOROB'YEV, B.P.; ITINSKIY, V.I.; OSTER-VOLKOV, N.N.

Polymers based on the condensation products of furfurole with acetone. Plastic materials based on difurfurylideneacetone. Plast. massy no.3:17-19 '63. (MIRA 16:4)

(Plastics) (Butenone)

L 12966-63 EWP(j)/EPF(c)/EWT(m)/BDS AFFTC/ASD Pc-4/Pr-4 RM/WW

ACCESSION NR: AP3000397 S/0191/63/000/005/0019/0023

AUTHOR: Kamenskiy, I. V.; Tseytlin, G. M.

64

TITLE: Polymer materials based on the products of condensation of aldehydes with alicyclic ketones. Concerning the structure of cyclopentanone-formaldehyde resins

15

SOURCE: Plasticheskiye massy*, no. 5, 1963, 19-23

TOPIC TAGS: aldehydes, alicyclic ketones, cyclopentanone-formaldehyde resins, polymers

ABSTRACT: In view of the lack of data in the literature on the chemical steps involved in obtaining cyclopentanone-formaldehyde resins, the authors studied the resin-yielding reactions occurring with an excess of cyclopentanone (thermoplastics) and of formaldehyde (thermosets). They have described the procedures used and the properties of the resins obtained in an earlier publication (Plasticheskiye massy*, no. 8, 1962). After fractional precipitation of the products with water from 10% acetone solution, the empirical formulas, molecular weight, and hydroxyl group content of the fractions were determined and their infrared spectra compared. The results indicated that the intermediate products formed in the process of cyclopentanone formaldehyde resin production with excess formaldehyde have the following structure: 2,5-dihydroxymethyl-2,5-di-(2'-cyclopentanonylmethyl)-cyclo-

Card 1/2

L 12966-63
ACCESSION NR: AP3000397

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pentanone. When the same reaction is carried out with excess cyclopentanone, the intermediate products have the probable structure: 2,2,5,5-tetra-(2'-cyclopentanonylmethyl)-cyclopentanone. It is hypothesized that increased molecular weight results from further polycondensation of these compounds. The three-dimensional structure of cyclopentanone-formaldehyde resins is ascribed to the role in high-temperature resin formation of the polymer's hydroxyl and carbonyl groups, the latter being unaffected in the melted and soluble resin stage. Orig. art. has: 6 figures, 6 formulas, 1 table.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 10Jun63 ENCL: 00

SUB CODE: MA NO REF SOV: 002 OTHER: 004

Card 2/2

ACCESSION NR: AP3001576 S/0191/63/000/006/0018/0020

AUTHOR: Kamenskiy, I. V.; Tseytlin, G. M.; Renard, T. L.; Vy*godskiy, Ya. S.

TITLE: Polymeric materials based on condensation products of alicyclic ketones with aldehydes. Synthesis and investigations of polymers based on 2,2,6,6-tetra-(oxymethyl)cyclohexanol and 2,2,5,5-tetra(oxymethyl)cyclopentanone.

SOURCE: Plasticheskiye massy, no. 6, 1963, 18-20

TOPIC TAGS: alicyclic ketones, aldehydes, polymers

ABSTRACT: Polymers were made and characterized using different molar ratios of 2,2,6,6-tetra(oxymethyl)cyclohexanol or 2,2,5,5-tetra(oxymethyl)cyclopentanone with adipic acid. Increasing the molar portion of acid in the original component mixture increased rate of product strengthening. Addition of acid or basic compounds to the synthesised products does not affect strengthening rate since diisocyanates accelerate the process at that time. Thermomechanical curves for 2,2,6,6-tetra(oxymethyl)cyclohexanol adipate and 2,2,5,5-tetra(oxymethyl)cyclopentanone adipate indicate the addition of 25% of 2,4-toluylene diisocyanate increases ther-

hexanol adipate were not destroyed with prolonged heating at 250-300C. Orig. art. has: 3 figures, 3 tables and 1 equation.

Card 1/2

ACCESSION NR: AP3001576

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 003 OTHER: 006

Card 2/2

ACCESSION NR: AP4010564 S/0291/63/000/006/0076/0079

AUTHOR: Usmanov, Z.; Kamenskiy, I. V.; Tadzhiyeva, M.

TITLE: Investigation of the process of forming polymers based on polyene furan aldehydes and some of their analogs. I. Investigation of the process of hardening polymers based on: 2-methyl-3-(alpha-furyl)propene-2-ol, 2-ethyl-3-(alpha-furyl) propene-2-ol, and 5-(alpha-furyl)pentadiene-2,4-ol

SOURCE: Uzbekskiy khimicheskiy zhurnal, no. 6, 1963, 76-79

TOPIC TAGS: polyene furan aldehyde resin, polymer formation, furfurylidenealdehyde resin, furfurylidenealdehyde condensation

ABSTRACT: The furfurylidenealdehydes form infusible and insoluble resins in the presence of ionic catalysts or on heating. In a reaction with benzensulfonic acid (less exothermic than with H_2SO_4), the solidification is faster with higher temperature and larger amount of catalyst. The strength and thermal stability

Card 1/2

ACCESSION NR: AP4010564

of the polymers obtained are lowered with increasing alkyl chain length, and increased with a greater number of ethylene groups in the side chain. Resinification and hardening of furfurylidenealdehydes are apparently realized by the condensation of the carbonyl groups with active hydrogen atoms of the furan ring, and also by partial exposure of the side ethylene group. Orig. art. has: 3 equations, 3 tables and 1 figure.

ASSOCIATION: Moskovskiy khimiko-tekhnologicheskiy institut im. Mendeleyeva Institut khimii polimerov AN UzSSR (Moscow Chemical Engineering Institute, Institute of Polymer Chemistry, AN UzSSR)

SUBMITTED: 17May63 DATE ACQ: 11Feb64 ENCL: 00

SUB CODE: CH NO REF SOV: 001 OTHER: 003

Card 2/2

KAMENSKIY, I.V.; TSEYTLIN, G.M.; RENARD, T.L.; FILIMONOVA, S.M.

Synthesis of acrylic esters of 2,2,5,5-tetra(oxymethyl) cyclopentanone. Zhur. prikl. khim. 36 no.11:2557-2558 N '63.
(MIRA 17:1)

Card 1/2

L 38285-65

ACCESSION NR: AR5003009

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are of considerable interest for the manufacture of plastics. The

Card 2/2

Card 1/2

L 19422-65

ACCESSION NR: AR4048161

[illegible] the original resistance to static bending was low,

SUB CODE: MT ENCL: 00

Card 2/2

AUTHOR: Sanin, I. K.; Kamenskiy, I. V.

TITLE: Synthesis and investigation of silicon-boron-, and titanium-containing compounds of furan

SOURCE: AN SSSR. Institut neftekhimicheskogo sinteza. Sintez i svoystva monomerov (The synthesis and properties of monomers). Moscow, Izd-vo Nauka, 1964, 115-[illegible]

TOPIC TAGS: furan derivative, silicon containing furan, boron containing furan, titanium containing furan, furfuryloxysilane, styrene copolymer, methyl methacrylate copolymer, vinylacetate copolymer, heteroorganic polymer

ABSTRACT: This investigation dealt with the preparation and application of furfuryloxy-
[illegible] compositions based on tetrafurfuryloxysilane (TFS)

Card 1/2

L 22665-65
ACCESSION NR: AT5002119

even after 300 hours; moreover, the viscosity increased with the TFS content. Polymeripolymers. Orig. art. has

ASSOCIATION: None

SUBMITTED: 30Jul64

ENCL: 00

SUB CODE: OC, GC

NO REF SOV: 014

OTHER: 008

Card 2/2

LAPITSKIY, V.A. [Lapyts'kyi, V.A.]; KAMENSKIY, I.V. [Kamens'kyi, I.V.]

Furan plastics, a new heat and chemically resistant material. Khim. prom. [Ukr.] no.3:24-25 Jl-S '64.

(MIRA 17:12)

ACCESSION NR: AP4012187 S/0191/64/000/002/0025/0027

AUTHORS: Kamenskiy, I. V.; Sanin, I. K.; Komlev, V. K.

TITLE: Adhesive compositions based on furfuryl hydroxy silanes

SOURCE: Plasticheskiye massy*, no. 2, 1964, 25-27

TOPIC TAGS: furfuryl hydroxy silane, infusible polymer, insoluble polymer, cold hardening adhesive, gluing, durability of gluing, gelatinization time, dimethyl dichlorosilane, shearing strength

ABSTRACT: Synthesized furfuryl hydroxy silanes have exhibited the ability for 100% conversion into infusible and insoluble polymers in the presence of small quantities of ion type catalysts at low temperatures. This suggested them as cold hardening adhesives. Best results are attained with gluing of wood, graphite and various plastics; adhesion of the composition based on furfuryl hydroxy silanes to metallic surfaces is not high enough. Specified compositions were tested for durability of gluing of various plastics at normal temperatures and without pressure, leading to recommendations for adhesives for various non-metallic surfaces. Properties studied

Card 1/2

ACCESSION NR: AP4012187

were: dependence of gelatinization time on quantity of catalyst; dependence of gelatinization time on amount of dimethyl dichlorosilane; shearing strength of glued seams of foam plastic specimens; and change of durability of specimens during aging. Orig. art. has: 2 Tables and 5 Figures.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 26Feb64 ENCL: 00

SUB CODE: MA NR REF SOV: 005 OTHER: 000

Card 2/2

ACCESSION NR: AP4035110 S/0191/64/000/005/0067/0068

AUTHOR: Kamenskiy, I. V.; Tsepelev, A. S.; Yakushina, T. V.

TITLE: Textolite based on melamine-formaldehyde resin modified with acetone

SOURCE: Plasticheskiye massy*, no. 5, 1964, 67-68

TOPIC TAGS: textolite, melamine formaldehyde resin, modified melamine formaldehyde resin, acetone modified melamine formaldehyde resin, mechanical strength, impact strength, tensile strength, breakdown voltage, electrical property, heat stability, light stability, dielectric property, water resistance

ABSTRACT: A textolite was prepared from an acetone-modified melamine-formaldehyde resin, more stable in concentrated solvents than the unmodified, made according to earlier findings (I. V. Kamenskiy, Ye. P. Smirnova, A. S. Tsepelev, Plast. massy*, no. 2, 1960), and its physical mechanical and dielectric properties were investigated. A melamine-formaldehyde resin containing 9.9% formaldehyde and 2.3% acetone was formed at 70-75 C in 35-45 minutes at a pH of 7-7.5 using 2% (on the weight of the melamine) of a 25% solution of ammonia. The textolite containing 50% resin was made from cotton sheeting pressed at 150 C under 135 kgs/cm^2

Card 1/2

ACCESSION NR: AP4035110

pressure with 5 minutes/mm holding. Water resistance of the textolite increased somewhat with increase in molding temperature. It has highly decorative properties and practically does not change upon prolonged irradiation by quartz mercury vapor lamps and under natural conditions. Its impact strength is 23 kgs.cm/cm^2, tensile strength 843 kgs/cm^2, Martens heat stability 187 C, specific surface resistance 5.6 x 10^{13} ohm, specific volume resistance 1.4 x 10^{13} ohm cm., dielectric permeability 5.4, breakdown voltage 10.9 kv/mm and arc resistance 4 seconds (at 10 milliamps). Orig. art. has: no graphics.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 26May64 ENCL: 00

SUB CODE: MT,OC NO REF SOV: 001 OTHER: 000

Card 2/2

USMANOV, Z.; KAMENSKIY, I.V.; LOSEV, I.P. [deceased]

Synthesis and study of the condensation products of furfurole with higher aliphatic ketones and polymer on their basis. Uzb.khim.zhur. 8 no.1:60-66 '64. (MIRA 17:4)

1. Institut khimii polimerov AN UzSSR.

KAMENSKIY, I.V., mladshiy nauchnyy sotrudnik

Study of the epizootiology of the Ligula infestation of fishes in Kakhovka Reservoir. Trudy VIGIS 11:62-70 '64.

Diplostomum infestation of trout in the "Skhodnia" Fish Farm. Ibid.:194-198 (MIRA 18:12)

KAMENSKIY, I.V., mladshiy nauchnyy sotrudnik; PONOMAREVA, E.V.

Study of fish helminths in Istra Reservoir. Trudy VIGIS 11:
71-76 '64. (MIRA 18:12)

ACCESSION NR: AP4035112 S/0291/64/000/002/0058/0061

AUTHOR: Tadzhiyeva, M.; Usmanov, Z. U.; Kamenskiy, I. V.

TITLE: Investigation of the process of forming polymers based on polyene furan aldehydes and some of their analogs. Communication II: Investigation of the process of forming polymers based on furfural and butyraldehyde

SOURCE: Uzbekskiy khimicheskiy zhurnal, 8- no. 2, 1964, 58-61

TOPIC TAGS: furfural butyraldehyde condensation product, polymerization, furylpropenal, preparation, curing, heat polymerization, radical initiator, ionic catalyst, alkali catalyst

ABSTRACT: The preparation and curing of polymers based on the condensation product of furfural with butyraldehyde was investigated. It was established that the 2-ethyl-3-(alpha-furyl)-propen-2-al can form polymers under suitable conditions. The temperature required for heat polymerization was above 250C. Radical initiators, specifically benzoyl peroxide, were found to have no effect on

Card 1/2

L 41156-65
ACCESSION NR: AT5002137

3

formed in the presence of ionic catalysts

pp
2/2

L 55013-65
ACCESSION NR: AP5010258

soluble in organic solvents; 3) products are nonfusible and are insoluble in organic solvents. The time required to harden the

[illegible]

ASSOCIATION: none

SUBMITTED: 19Sep61 ENCL: 00 SUB CODE: OC, GC

NO REF SOV: 000 OTHER: 000 ATD PRESS: 3211

Card 1/1