ETKIN, Valentin Semenovich; GERSHENZON, Yevgeniy Mikhaylovich. Prinimali uchastiye LAVUT, A P.; LYUBIMOVA, T.F.; SOINA, N.V.; KHOTUNTSEV, Yu.L.; ROZHKOVA, G.I.; KAR[illegible]NOVA, Ye.S.; STRUKOV, I.A.; VYSTAVKIN, A.N., retsenzent; ARONOV, V.L., retsenzent; MASHAROVA, V.G., red.

[Superhigh-frequency parametric systems using semiconductor diodes] Parametricheskie sistemy SVCh na poluprovodnikovykh diodakh. Moskva, Sovetskoe radio, 1964. 351 p.
(MIRA 17:11)

ETKIN, V.S.

Analysis of systems with modulated parameters and some nonlinear systems by means of oriented graphs. Izv. vys. ucheb. zav.; radiofiz. 7 no.5:1006-1009 '64. (MIRA 18:2)

1. Moskovskiy gosudarstvennyy pedagogicheskiy institut imeni V.I. Lenina.

L 38113-65 EWT(1)/EEC(b)-2/EED-2/EWA(h) Peb

ACCESSION NR: AP5006026 S/0141/64/007/006/1150/1155

26
24
B

AUTHOR: Etkin, V. S.

TITLE: Contribution to the theory of modulated circuits

SOURCE: IVUZ. Radiofizika, v. 7, no. 6, 1964, 1150-1155

25

TOPIC TAGS: network theory, parametric amplifier, modulator, demodulator, integral equation, Carson equation

ABSTRACT: In view of the reviving interest in the analysis of circuits with variable parameters, resulting from the increasing use of parametric amplifiers with more than two operating frequencies, the author develops, on the basis of Carson's theory, a procedure which makes it possible to examine from a unified point of view an arbitrary system with periodically modulated parameters, by solving the integral equations of the forced oscillations and representing the results in a frequency formulation convenient for the analysis of microwave devices. The system is regarded as consisting of two parts, one with fixed parameters and one with purely periodic parameters, the latter being regarded as a

Card 1/2

L 38113-65

ACCESSION NR: AP5006026

2

feedback loop enclosing the system with a fixed parameter. An integral equation is derived in the frequency domain for this system and is used to obtain the spectrum of the response in the system with modulated parameters. A harmonic modulator and demodulator are treated from this point of view as examples. "The author thanks A. P. Lavut for help and advice." Orig. art. has: 1 figure and 22 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy pedagogicheskiy institut im. V. I. Lenina (Moscow State Pedagogical Institute)

SUBMITTED: 26Sep63 ENCL: 00 SUB CODE: EC

NR REF SOV: 015 OTHER: 015

Card 2/2

L 38121-65 EEO-2/EWT(d)/EEC-4/EED-2 Pm-4/Pac-4
ACCESSION NR: AP5006027 S/0141/64/007/006/1156/1161

AUTHOR: Karmanova, Ye. S.; Etkin, V. S.

TITLE: Contribution to the theory of the "modulator-demodulator" amplifier

SOURCE: IVUZ. Radiofizika, v. 7, no. 6, 1964, 1156-1161

TOPIC TAGS: amplifier system, modulator, demodulator, transfer function, noise figure

ABSTRACT: The results obtained by one of the authors in a companion paper in the same source (Etkin, Izv. vyssh. uch. zav. - Radiofizika v. 7, 1150, 1964; Accession AP5006026) are employed to determine the transfer function and the noise figure of an amplifier consisting of a modulator with nonlinear capacitance and a demodulator with nonlinear resistance, commonly called a "modulator-demodulator" amplifier and developed by several investigators (D. K. Adams, Proc. NEC v. 18, 399, 1962, and others). The calculation is based on the assumption that the heterodyne voltage amplitudes in the modulator and demodulator appreciably exceed the signal voltage, so that both modulator and demodulator can be regarded as devices

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L 38121-65
ACCESSION NR: AP5006027

with periodically varying capacitance and resistance. The results show that the transfer function of the system depends on the phase difference between the heterodyne voltages in the modulator and demodulator, and has a maximum when the contribution of the demodulator noise is minimal. The main advantages of such an amplifying system is the practical absence of regeneration, the simplicity of the apparatus, and the fact that the output frequency is equal to the signal frequency. Orig. art. has: 2 figures and 34 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy pedagogicheskiy institut im. V. I. Lenina (Moscow State Pedagogical Institute)

SUBMITTED: 26Sep63 ENCL: 00 SUB CODE: EC

NR REF SOV: 003 OTHER: 003

Card 2/2

L 6642-65 ASD(a)-5/ESD(t)/RAEM(t)

ACCESSION NR: AP4038632 S/0109/64/009/004/0757/0760

AUTHOR: Strukov, I. A.; Etkin, V. S. 45

TITLE: On the investigation of dynamic breakdown of microwave semiconductor diodes 42

SOURCE: Radiotekhnika i elektronika, v. 9, no. 4, 1964, 757-760

TOPIC TAGS: semiconductor diode, dynamic breakdown, effective noise temperature, minority carrier cascade multiplication

ABSTRACT: The breakdown occurring frequently in diodes operating at a frequency whose period is shorter than the lifetime of the carriers was investigated at 3 cm at high power (1 W). The investigation covered the voltage-current characteristics of the diodes, the diode radiation spectrum, and the diode noise radiation spectrum. The voltage-current characteristics exhibited sharp peaks due to the discrete spectrum of the generated oscillations, and the premature breakdown may be due to the detection of the oscillations produced when microwave power is applied. Voltage-current characteristics without peaks were also observed, and in this case the breakdown was not accompanied by oscillations. Tests of the noise radiation and of the noise temperature rise indicated that the increase in

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L 6642-65

ACCESSION NR: AP4038632

3

the effective noise temperature of reactance microwave amplifiers with diodes is due to parasitic oscillation occurring when microwave power is applied to the diodes. Even in the case of a 'smooth' voltage-current characteristic the noise temperature can be raised by the appreciable current flowing in the p-n junction, the nature of which is not yet clear. The processes occurring during the breakdown can also increase the effective noise temperature, but not to the same extent as parasitic oscillation. "We are grateful to V. L. Aronov, V. M. Val'd-Perlov, and Ye. M. Gershenzon for a discussion of this work." Orig. art. has: 3 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 04Mar63 ENCL: 02

SUB CODE: EC, SS NR REF SOV: 003 OTHER: 004

Card 2/4

L 6642-65

ACCESSION NR: AP4038632

ENCLOSURE: 01

O

| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| № диод. | $I_{обр}$, мка | $U_{см.обр}$, в | КСВ | $P_{изб}$ в kT |
| 1 | —10 | 2,5 | 3 | 0,1 |
| 2 | —25 | 2,6 | 1,4 | 0,5 |
| 3 | —38 | 2,5 | 2,5 | 1,5 |
| 4 | —10 | 2,5 | 3 | 0,3 |
| 5 | —80 | 2,6 | 3 | 6 |

Results of measurement of excess noise radiation at a frequency close to 10 Gc

1 - Diode number, 2 - $I_{inv}$, μA

3 - Inverse bias voltage, 4 - SWR

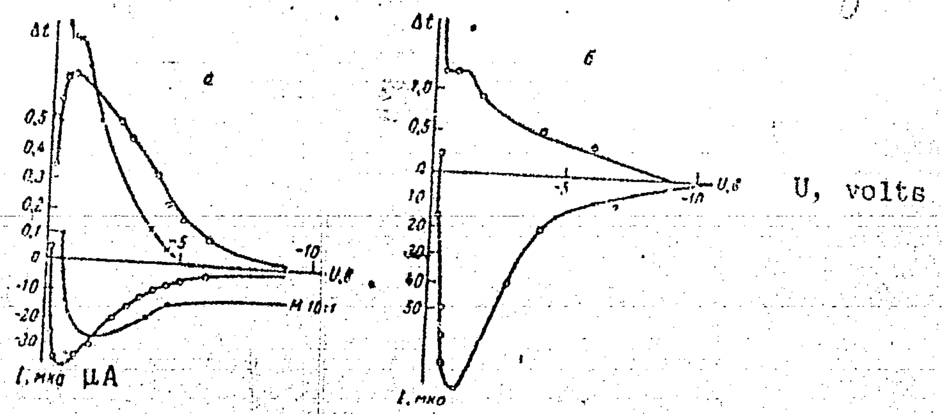
5 - excess radiation power in kT

Card 3/4

L 6642-65

ACCESSION NR: AP4038632

ENCLOSURE: 02



Examples of the dependence of excess noise temperature on bias voltage. Volt-ampere curves are included for interest.

L 24908-65 EWT(1)/EWA(h) Pm-4/Peb
ACCESSION NR: AP4045484 S/0109/64/009/009/1622/1627

B

**AUTHOR:** Karmanova, Ye. S.; Rozhkova, G. I.; Etkin, V. S.

**TITLE:** Some problems in the theory of a 4-frequency parametric amplifier 25

**SOURCE:** Radiotekhnika i elektronika, v. 9, no. 9, 1964, 1622-1627

**TOPIC TAGS:** parametric amplifier, 4 frequency amplifier

**ABSTRACT:** Synchronous conditions are considered in a 4-frequency amplifier operating at $\omega$, $p-\omega$, $p+\omega$, and $2p-\omega$ frequencies, where $\omega$ is the signal frequency and p is the pumping frequency, i.e., the parameter-modulation frequency in the amplifier. The effect of the parasitic circuit at $p+\omega$ on the operation of a parametric amplifier under degenerate and quasidegenerate conditions is evaluated. Distribution of the amplitude and phase of a random signal applied to the amplifier is clarified; a formula for the noise factor measured by a noise generator is derived. It is proven that, under the above conditions, the

L 24908-65

ACCESSION NR: AP4045484

4-frequency amplifier is similar to a 2-frequency amplifier operating under synchronous conditions and that the sum-frequency circuit in the former is conducive to higher equivalent noise temperatures without any benefit for statistical output-signal characteristics. Orig. art. has: 2 figures and 45 formulas.

ASSOCIATION: none

SUBMITTED: 13Jun63 ENCL: 00

SUB CODE: EC NO REF SOV: 005 OTHER: 003

Card 2/2

KARMANOVA, Yu.S.; ETKIN, V.S.

Some aspects of the theory of systems with modulated capacity and resistance. Izv. vys. ucheb. zav.; radiofiz. 8 no.2: 422-424 '65. (MIRA 18:6)

1. Moskovskiy gosudarstvennyy pedagogicheskiy institut imeni Lenina.

L 7815-66 EWT(1)/EWA(h)

ACCESSION NR: AP5027629

UR/0109/65/010/011/2067/2069
621.375.421.018.756.001.5

AUTHOR: Lobarev, A. S.; Kanevskiy, B. Z.; Etkin, V. S.

TITLE: Investigation of superbroadband modem video amplifiers 25

38
B

SOURCE: Radiotekhnika i elektronika, v. 10, no. 11, 1965, 2067-2069

TOPIC TAGS: video amplifier, waveguide, broadband transmission

ABSTRACT: The gain of a modem video amplifier, within 0—650 Mc, has been investigated; a gain formula is derived by the directed-graph method, and a gain vs. frequency curve is plotted. An experimental verification included a modulator and a demodulator connected via a superbroadband circulator. The modulator of a reflex-balance-converter type featured a waveguide section with two connected-in-opposition parametric diodes; the section could be tuned by means of a plunger and a three-probe impedance transformer. The signal was applied to both diodes simultaneously through the side wall of the waveguide. A superbroadband detector section with a D405B diode and a reduced output capacitance was used as a demodulator. The pumping power was 50—70 mw; the modulator and the demodulator

Card 1/2

2

L 7815-66

**ACCESSION NR:** AP5027629

0

were matched to the pumping waveguide within 1500 Mc. Orig. art. has: 2 figures and 3 formulas. [03]

**ASSOCIATION:** none

**SUBMITTED:** 27Jan65 **ENCL:** 00 **SUB CODE:** 09, 17

**NO REF SOV:** 007 **OTHER:** 000 ATD PRESS: 4147

Card 2/2

L 63712-65 EWT(1)/EWA(h)

ACCESSION NR: AP5014058 UR/0108/65/020/005/0070/0075
621.314

B

AUTHOR: Lyubimova, T. F. (Active member); Kanevskiy, B. Z. (Active member); Etkin, V. S. (Active member)

TITLE: Investigation of signal limiting in a regenerative frequency converter 25

SOURCE: Radiotekhnika, v. 20, no. 5, 1965, 70-75

TOPIC TAGS: frequency converter, regenerative frequency converter, limiter

ABSTRACT: As F. Olson's et al. (Trans. IRE, MTT, v. 9, no. 2, 1961) and other American investigations have shown, the regenerative frequency converter can be used as a limiter. The characteristics of such a limiter are theoretically examined: difference-frequency current and power, heterodyne-frequency current, output power, and other quantities. The experimental verification of formulas included these steps: determination of the effect of the diode bias on the limiting threshold (on a l-f model); the effect of the gain on the limiting threshold (at Gcps frequencies); the effect of the input power on the output power (under super-regenerative conditions). Orig. art. has: 8 figures and 22 formulas.

Card 1/2

L 63712-65

ACCESSION NR: AP5014058

ASSOCIATION: Nauchno-tekhnicheskoye obshchestvo radiotekhniki i elektrosvyazi (Scientific and Technical Society of Radio Engineering and Electrocommunication)

SUBMITTED: 23Dec63 ENCL: 00 SUB CODE: EC

NO REF SOV: 002 OTHER: 004

mlb

Card 2/2

LOBAREV, A.S.; KANEVSKIY, B.Z.; ETKIN, V.S.

Study of super-wideband modulator-demodulator type video amplifiers. Radiotekh. i elektron. 10 no.11:2067-2069 N '65.
(MIRA 18:11)

ACC NR: AP6027246

SOURCE CODE: UR/0109/66/011/008/1528/1530

AUTHOR: Pashin, Yu. N.; Khilov, Yu. K.; Etkin, V. S.

ORG: none

TITLE: Noise in semiconductor diodes under pulsed conditions

SOURCE: Radiotekhnika i elektronika, v. 11, no. 8, 1528-1530

TOPIC TAGS: semiconductor diode, diode noise, SHF

ABSTRACT: An excess (over thermal) noise radiation was discovered during an experimental investigation of the intrinsic noise of diodes operating under pulsed conditions in the SHF band. A negative square pulse (10--20-nsec rise time) was applied to a forward-biased diode. It was found that the excess noise radiation depend on the switching-pulse amplitude, pulse-rise time, diode-base thickness, and frequency. The cause of this excess noise is seen in a short-time avalanche occurring in the diode, a sort of "dynamic breakdown". This explanation of the excess-noise nature is detailed. Orig. art. has: 1 figure and 1 table.

SUB CODE: 09 / SUBM DATE: 10Nov65 / ORIG REF: 006 / OTH REF: 002

Card 1/1

UDC: 621.382.2.018.756

ACC NR: AM5005925 BOOK EXPLOITATION UR

Etkin, Valentin Semenovich; Gershenzon, Yevgeniy Mikhaylovich

Parametric superhigh frequency systems 12 based on semiconductor diodes (Parametricheskiye sistemy SVCh na poluprovodnikovykh diodakh). Moscow, Izd-vo "Sovetskoye radio," 1964. 351 p. illus., biblio. 15,600 copies printed.

TOPIC TAGS: parametric amplifier, semiconductor diode, circuit theory, superhigh frequency, low noise amplifier, band pass amplifier, parametric converter, frequency stability, radio engineering

PURPOSE AND COVERAGE: This book is intended for radio engineers, radio physicists, and senior university students concerned with the development and application of superhigh frequency parametric amplifiers and systems based on semiconductor diodes. It includes principles of theory and calculation, methods of experimental study and development and discussions on the application of such amplifiers and systems in radio engineering. The text includes material published in the periodical literature, as well as unpublished original data gathered by the authors in recent years. The authors are greatly indebted to I.K. Morozov, L.B. Litvak-Gorskaya, L.A. Plokhova, Ye.S. Karmanova, Ye.A. Bespalova, S.P. Babenko, T.S. Dombrovskaya, and L.A. Smirnova for their great help in preparing the book for publication. They are also greatly indebted to A.N. Vystavkin and V.L. Aronov, the reviewers of the book.

TABLE OF CONTENTS [abridged]:

Card 1/6 UDC: 621.375.931; 621.375.1.029.64

ACC NR: AM5005925

## Part 1. Problems in the theory of circuits with variable parameters and general properties of regenerative superhigh frequency amplifiers

ACC NR: AM5005925

Part 2. Semiconductor diodes for parametric systems

Part 3. Parametric amplifiers with one idle frequency

Card 3/6

ACC NR: AM5005925

Part 4. Development of parametric superhigh frequency amplifiers with one idel frequency, experimental study and application

Card 4/6

ACC NR: AM5005925

Part 5. Parametric systems

Card 5/6

ACC NR: AM5005925

Ch. XXII. Retunable parametric filters -- 327 [V.S. Etkin]

Ch. XXIII. Parametric limiters -- 331 [V.S. Etkin]

Ch. XXIV. Application of parametric systems in radiowave spectroscopy -- 338 [Ye.M. Gershenzon]

SUB CODE: 09/ SUBM DATE: 11Aug64/ ORIG REF: 155/ OTH REF: 312

Card 6/6

ETKIN, Ya.

Improve the quality of hides and skins. Kozh.-obuv. prom. 7 no. 10:34 0 '65 (MIRA 19:1)

GORLOVOY, D.V.; RYKIN, Ya.S.

Improve the utilization of hides and skins and the quality of leather. Kozh.-obuv. prom. 7 no. 11:11-14 N '65
(MIRA 19:1)

ETKIN, Ye.A.

Diathermic coagulation treatment of erosion of the cervix uteri.
Vop.okh.mat. i det. 8 no.2:91 F'63. (MIRA 16:7)

1. Iz Zavolzhskoy bol'nitsy Ul'yanovska.
(NO SUBJECT HEADINGS)

TYMINSKAYA, S. Yu.; LIKHTER, A.D.; Prinimali uchastiye: ETKIN, Ye.I., starshiy inzh.; SHELKOVNIKOV, Yu.V.

Automated machine for cutting slots in screen sieves. Bumagodel. mash. no.8:140-157 '60. (MIRA 14:3)

1. Nauchno-issledovatel'skiy institut po proyektirovaniyu bumagodelatel'nikh mashin (for Etkin). 2. Nachal'nik byuro instrumentov i prisposobleniy zavoda im. 2-y Pyatiletki (for Shelkovnikov).
(Papermaking machinery)

LEVINSON, A.M.; Prinimali uchastiye: REVIS, I.A.; TYMINSKAYA, S.Yu.; ETKIN, Ye.I.

Knotter drums made of acid-resistant steel. Bumagodel. mash. no.8:135-139 '60. (MIRA 14:3)

(Papermaking machinery)

LEVINSON, A.M.; Prinimali uchastiye: ZIGBERMAN, D.I.; TYMINSKAYA, S.Yu.; ETKIN, Ye.I.; BARGER, I.B.; SLAVSKIY, G.N.

Dynamic balancing of flexible tubular rolls. Bumagodel. mash. no.8:158-163 '60. (MIRA 14:3)

1. Nauchno-issledovatel'skiy institut po proyektirovaniyu bumagodelatel'nykh mashin (for Zigberman, Tyminskaya, Etkin). 2. Leningradskiy politekhnicheskiy institut im. Kalinina (for Barger, Slavskiy). (Papermaking machinery) (Balancing of machinery)

ETKIN, Ye.I.

Prospects of the development and the geographical distribution of papermaking machinery plants. Bumagodel. mash. no.11:6-9 '63.
(MIRA 17:6)

ETKIN, Ye.I.

System of consolidated norms for the expenditure of materials in the manufacture of papermaking machinery. Bumagodel. mash. no.12: 7-19 '64. (MIRA 17:11)

LIST, F.D.; FOMINA, V.A.; ETKIN, Z.A.

Automatic crossing signals with electronic audio frequency track circuits. Avtom., telem. i sviaz' 9 no.11:4-7 N '65.
(MIRA 18:12)

1. Vedushchiye konstruktory konstruktorskogo byuro Glavnogo upravleniya signalizatsii i svyazi Ministerstva putey soobshcheniya.

LIST, F.D.; FOMINA, V.A.; ETKIN, Z.A.

Automatic signaling system with electronic track circuits for railroad crossings. Avtom., telem. i sviaz' 9 no.12: 8-12 D '65. (MIRA 19:1)

1. Vedushchiye konstruktory konstruktorskogo byuro Glavnogo upravleniya signalizatsii i svyazi Ministerstva putey soobshcheniya.

ETKINA, I.

In the plant health room. Zdorov'e 9 no.3:12-13 Mr '63. (MIRA 16:5)

(MEDICINE, INDUSTRIAL)

SERGOVANTSEV, B.V.; ETKINA, V.S., red.; KUKOLEVA, T.V., red.; SVESHNIKOV, A.A., tekhn. red.

[Ultra-high frequency parametric amplifiers; a brief review of works published in the foreign press from 1957 to August 1960] Parametricheskie usliliteli SVCh; kratkii obzor rabot, opublikovannykh v zarubezhnoi pechati za period s 1957 po avgust 1960 g. Pod red. V.S.Etkina, Moskva, Izd-vo "Sovetskoe radio," 1961. 151 p. (MIRA 14:11)

(Parametric amplifiers) (Microwaves)

**ETKINA-YEFIMOVA**, kandidat meditsinskikh nauk (Moskva)

Diabetic coma and its therapy. Klin.med.33 no.8:11-18 Ag '55.
(MLRA 8:11)

1. Is 2-y Gorodskoy bol'nitsy (glavnyy vrach A.I.Khromova) i propedevticheskoy terapevticheskoy kliniki (zav.--prof. A.A. Shelagurov) lechebnogo fakul'teta II Moskovskogo meditsinskogo instituta imeni I.V.Stalina.
(DIABETES MELLITUS,
coma, ther.)

SEMENNIKOVA, Nina Vladimirovna; OKUN', Yakov Mikhaylovich;
ETKIND, M.G., red.

[Leningrad in three days; a short story for those who come to our city and want to get acquainted with its artistic landmarks] Leningrad za tri dnia; eto kratkii rasskaz dlia tekh, kto, priekhav v nash gorod, zakhochet poznakomit'sia s ego khudozhestvennymi pamiatnikami. Leningrad, Iskusstvo, 1965. 161 p. (MIRA 18:12)

ETLIN, A. E.

Neyshtadt, I. F. and Etlin, A. E.

Machine Tools

Spravochnik molodogo tokarya-skorostnika, Moscow, Vsesoyuznoe Uchebno-Pedagogicheskoe Izdatel'stvo Trudrezervisdat, 1951. pp. 171, diags., tables, bibliog.; 15 x 12.

LXIII-2

L 7645-66

ACC NR: AP5024978 SOURCE CODE: UR/0286/65/000/016/0043/0043

AUTHOR: Etlin, M. A.

27

B

ORG: none

TITLE: AC voltage regulator of ferromagnetic elements. Class 21, No. 173801

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 16, 1965, 43

TOPIC TAGS: voltage regulator, magnetic amplifier, electronic measurement

ABSTRACT: This Author Certificate presents an ac voltage regulator of ferromagnetic elements. The regulator consists of an operating unit, two measuring units (one responding to the average value of the voltage and the other to the effective value) and amplifiers in the feedback circuit (see Fig. 1). To obtain simultaneous regulation of the average and effective values, a double magnetic amplifier consisting of a pair of internal feedback diodes and two saturation choke coils connected in series is used as the operating unit. The control winding of one is connected in the feedback circuit from the average value measuring unit, and the central winding of the other is connected in the feedback circuit from the effective value measuring unit.

Card 1/2 UDC: 621.316.722.1

Z

L 7645-66

ACC NR: AP5024978

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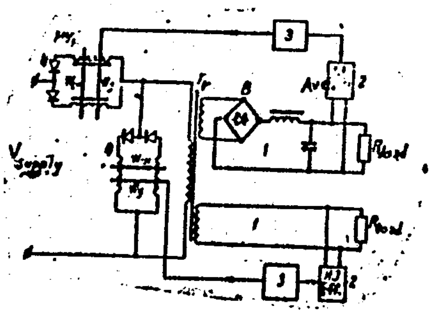

Fig. 1. 1- operating unit; 2- measuring unit; 3- amplifier;
4- magnetic amplifier

Orig. art. has: 1 diagram.

SUB CODE: 09/ SUBM DATE: 17Jun63

Card 2/2

TLIS,

NEVSKIY, V.A.; ETLIS, M.M.

"Aid for rural medical workers"; brief bibliographic index. E.V. Litvina, N.V.Belozovskaia. Reviewed by V.A.Nevskii, M.M.Etlis. Zdrav. Ros. Feder. 2 no.1:39 Ja '58. (MIRA 11:2)
(PUBLIC HEALTH, RURAL)
(LITVINA, E.V.) (BELOZOVSKAIA, N.V.)

BURLACHENKO, M.A., kand. med. nauk; SIGAL, L.D.; KAUSHANSKIY, M.Z.; PEL'TIN, K.K.; KRAVETS, I.G.; ZDANOVICH, O.A.; ERMAN, I.D. (Kishinev); MIL'SHTEYN, P.V. (Bel'tsy); ETLIS, S.S. (Bendery); MISHCHENKO, S.A.; ROYTIKH, R.M. (Tiraspol'); VASSERMAN, Z.S. (Soroki)

Role of artificial pneumothorax in the compound treatment of pulmonary tuberculosis. Probl. tub. no 7:24-29 '63. (MIRA 18:1)

1. Iz Moldavskogo instituta tuberkuleza (direktor - kand. med. nauk M.A. Burlachenko).

ETLIS, V.S.

USSR.

Moisture determination in ethylene oxide. V. S. Etlis and A. I. Kirillov. *Zavodskaya Lab.* 21, 511-2(19[illegible]—The very accurate method, requiring not over 10 min., is based on the use of Fischer's reagent (the directions for prepn. are given). W. M. Sternberg

(1)

ETLIS, V.S.

3

✓Determination of trichloroethane in dichloroethane. V. S. Etlis and L. M. Artyukhina. *Zavodskaya Lab.* 21, ~~[illegible](1955)~~.—Detn. of trichloroethane in $(CH_2Cl)_2$ with accuracy of 2.5% is made on the basis of different stability of the compds. to bases. The sample (5 g.) is treated with 15 ml. 0.2*N* $Ba(OH)_2$ and 35 ml. pure MeOH, heated under a reflux condenser protected with soda lime 2–2.5 hrs. at 30–40° then titrated for residual $Ba(OH)_2$ with standard HCl with methyl orange indicator. A blank run correction is suitably made, best by using a calibration curve which allows for the slight reaction of $(CH_2Cl)_2$. More concd. $Ba(OH)_2$ or 0.1*N* KOH cause too much cleavage of $(CH_2Cl)_2$ to be useful in this method. The soln. indicated above gives but 0.4–0.7% cleavage of the dichloride. G. M. K.

(1)

ETLIS, V.S

~~ETLIS, V.S.~~

✓Condensation of benzene with some symmetrical chloroethers. G. A. Razuvaev and V. S. Etlis. *J. Gen. Chem. U.S.S.R.* 25, 1665-8(1955)(Engl. translation).—See *C.A.* 50, 5595*f*. B. M. R.

2

RAZUVAYEV, G.A.; ETLIS, V.S.

Condensation of benzene with certain symmetric chloroethers. Zhur.ob.khim. 25 no.9:1711-1713 S '55. (MIRA 9:2)

1.Molotovskiy gosudarstvennyy universitet.
(Benzene) (Ethers)

Etlis, V.S.

Chem

**Sulfonation of diphenylmethane.** V. H. Etlis and O. A. Razuvaev. *Doklady Akad. Nauk S.S.S.R.* 111, 842-4 (1956).—Sulfonation of $Ph_2CH_2$ with 60% oleum in the cold yields the 4,4'-disulfonic acid and a small amt. of a colored product; a fresh portion of oleum at 150-60° converts the disulfonic acid to a colored substance whose $PhNH_2$ salt forms needles; the colored material is benzhydrol-*o*-sulfone-4,4'-disulfonic acid (I), also formed by heating diphenylmethane-*o*-sulfone with concd. $H_2SO_4$ until $SO_3$ fumes form. Oxidation of diphenylmethane-*o*-sulfone with $Pb(OAc)_4$ gives the *unsulfonated analog* of I (absorption spectra of both shown). When the oxidation is run with $CrO_3$, the product is not a dye. Mixed isomers of *o*- and *p*-dichloro substituted diphenylmethanes, from PhCl reaction with $O(CH_2Cl)_2$ and $AlCl_3$, were treated with 20% oleum yielding an insoluble substance, m. 166-7°, which is I with two Cl atoms in *m*-positions with respect to $SO_2$; this is yellow in alk. EtOH and colorless in acidic soln. The lack of sulfonation in this case is caused by the location of the Cl groups. All the above analogs of I are indicators with color change at pH 11.5-12.5. The *$PhNH_2$ salt* of I forms a *tetrahydrate*, which, in basic soln. in contact with air, changes its yellow color to green and passes to yellow; its HO group cannot be alkylated or benzoylated, and it does not react with $CH_2N_2$. The material readily couples with diazonium salts, yielding a dye with indicator properties, yellow in neutral or acid soln., red in alk. Thus I is regarded as a new form of a chromophoric group. G. M. Kosolapoff

ET'lis, V.S

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4E4j

Removal of mercury from vinyl chloride. A. S. Shevlakov, V. S. Illis, and N. M. Chernyshova. U.S.S.R. 105,265, Apr. 25, 1957. In the purification of Hg-contaminated vinyl chloride obtained in hydrochlorination of $C_2H_2$ at a Hg cathode, the gases leaving the app. are passed through a column filled with activated C at 120°. M. Hosch

2 may

ETKIN, V.S

AUTHOR: Etkin, V.S. 109-4-17/20

TITLE: Modulation of the Carrier by Changing the Permeability of Ferromagnetic Conductors. (Modulyatsiya nesushchey putem izmeneniya magnitnoy pronitsayemosti ferromagnitnykh provodnikov.)

PERIODICAL: Radiotekhnika i Elektronika, 1957, Vol.2, No.4, pp. 506 - 507 (USSR).

ABSTRACT: A tuned circuit consisting of a permalloy-wire coil (3 turns of 0.25 mm wire) and a parallel capacitor was supplied from a 198 Mc/s signal generator. Modulation was achieved by supplying the permalloy wire with 50 c/s currents up to 2.0 A. The output signal was observed by coupling a crystal detector to the tuned circuit by means of a single loop. It was found that for currents up to 1.0 A the output signal is amplitude-modulated; at 1.5 A, the modulation disappeared, but could be restored by cooling the wire. The tuned circuit was then incorporated in an oscillator operating at 195 Mc/s and, again, similar effects were observed. The results are shown in eight oscillograms. Almost identical effects were observed in a line which consisted of two parallel 0.5 mm permalloy wires and was operated at 700 Mc/s. There are 3 figures (10 oscillograms) and 7 reference, of which 2 are Slavic.

SUBMITTED: July 2, 1956.

AVAILABLE: Library of Congress.

Card 1/1

ETLIS V.S.

AUTHORS: Etlis, V. S., Razuvayev, G. A. 79-11-39/56

TITLE: Synthesis and Properties of Some Derivatives of Thioxanthene-5-Dioxide With Indicator Character (Polucheniye i svoystva nekotorykh proizvodnykh tioksanten - 5-dioksida, obladayushchikh indikatornymi svoystvami).

PERIODICAL: Zhurnal Obshchey Khimii, 1957, Nr 11, pp. 3092-3097 (USSR)

ABSTRACT: It was of interest to realize the synthesis of the otherwise little investigated derivatives of thioxanthene-5-dioxide with a good yield, by means of sulfonation of some aromatic compounds. At first diphenylamine was treated with 66% fuming sulfuric acid. After neutralization of the excess acid the alkaline solution took on an intensive orange yellow color. This fact incited the authors to investigate the nature of the coloring matter with indicator character produced in sulfonation. By the action of fuming sulfuric acid upon diphenylamine and its derivatives during strong cooling the oxidation of the methylene group and simultaneously the sulfonation in the position 4,4' takes place. A coloring product in a small quantity already forms on this occasion. When the resulting 4,4'-disulfonic acid

Card 1/2

Synthesis and Properties of Some Derivatives of Thioxanthene-5-Dioxide, With Indicator Character 79-11-39/56

of benzhydrol is treated with further quantities of fuming sulfuric acid at 150-160°C a coloring matter with high yield is obtained. 1,1-diphenylethane, triphenylmethane and 2,2 diphenylpropane were treated in the same manner. Coloring matters were also found in the first two compounds. On the basis of these tests it must be assumed that at least one hydrogen atom at the methylene group, where the oxidation takes place on sulfonation, is necessary for the formation of coloring matter (see formula). The following compounds were synthesized and their properties investigated: 3,7-dichlorothioxanthenol-5-dioxide and 3,7-dichloro-10-methylthioxanthenol-5-dioxide. The indicator properties of the derivatives of thioxanthenol-5-dioxide were determined and the structure of the coloring matter of these compounds was suggested. There are 2 figures, and 17 references, 2 of which are Slavic.

SUBMITTED: October 20, 1956

AVAILABLE: Library of Congress

Card 2/2 1. Thioxanthene-5-dioxide-Derivatives-Synthesis.

ELLIS, V.S.

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7

**3000. Determination of propylene derivatives present as impurities in ethylene oxide and its refining products.** V. S. Ellis and S. L. Helm'kaya. *Zavod. Lab.*, 1957, 23 (2), 163-165.—The oxides are transformed into chlorohydrins and then hydrolysed to glycols. Oxidation of the glycols with $HIO_4$ yields aldehydes which can be determined polarographically or colorimetrically. The sample (2·5 to 4 g) is mixed with 40 ml of 4 *N* HCl cooled in ice, the soln. is made up to 250 ml and 25 ml is transferred to an ampoule together with 4 g of $NaHCO_3$. The sealed ampoule is kept for 2 hr. at 100°, and the contents are then transferred to a 100-ml flask, neutralised with conc. HCl to a pH of 5 to 7 and diluted with water to 100 ml. An aliquot portion containing ≯ 0·05 g of the glycol is aerated in a current of N or $CO_2$ for 15 min. with 15 ml of 0·1 *M* $HIO_4$ [prepared by dissolving 10·7 g of $Na_3H_2IO_6$ in 200 ml of water and adding *N* $H_2SO_4$ (amount not stated) and water to 500 ml], after which 4 g of $NaHCO_3$ is added and the passage of gas is continued for 1·5 hr. at a rate of 120 to 150 ml per min. The formaldehyde is absorbed in 2% glycine soln. and the acetaldehyde from propylene oxide in 5% $NaHSO_3$ soln., which is treated with 0·1 *N* iodine to destroy the excess of $NaHSO_3$. Saturated $NaHCO_3$ soln. (10 ml) is then added and the soln. is titrated with 0·02 *N* iodine with the addition before the end of the titration of 10 ml of a buffer soln. containing 4 g of borax and 5 g of $Na_2CO_3$ in 100 ml. Any aldehydes in the original sample must be allowed for.

G. S. Smith

4E4j

AUTHORS: Etlis, V.S., Spasskaya, I.F. 32-12-58/71

TITLE: Short Reports (2) (Korotkiye soobshcheniya).

PERIODICAL: Zavodskaya Laboratoriya, 1957, Vol. 23, Nr 12, pp. 1518-1519 (USSR)

ABSTRACT: In this paper the improved construction of an apparatus for the fractioning of small quantities of mixtures of liquids in a vacuum is recommended. The fractionation properties of the apparatus were tested with ethylene-glycol, ethylene-glycol and triethylene-glycol as well as with mixtures of these components with water. The device is intended for fractionation of 5 g of a mixture within 30 to 35 minutes. The illustration of the apparatus, which is attached to this report, has no description, only its dimensions are given. There is 1 figure.

AVAILABLE: Library of Congress

Card 1/1 1. Fractionation-Instrumentation

LIKHTEROV, V.R.; ETLIS, V.S.

Condensation of propylene oxide with some aromatic hydrocarbons.
Zhur.ob.khim. 27 no.10:2867-2871 O '57. (MIRA 11:4)
(Propylene oxide) (Hydrocarbons)
(Condensation (Chemistry))

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A006/A001

Translation from: Referativnyy zhurnal, Khimiya, 1960, No. 17, p. 63, # 68688

AUTHORS: Razuvayev, G.A., Bobinova, L.M., Etlis, V.S.

TITLE: Titanium Compounds as Catalysts of Olefin Polymerization. Information II

PERIODICAL: Tr. po khimii i khim. tekhnol. 1958, No. 3, pp. 659-663

TEXT: It is shown that the $TiCl_4$ + $Ti(iso\text{-}OC_3H_7)_4$ system is an effective catalyst for propylene polymerization, the molar ratio of $TiCl_4$ to $Ti(iso\text{-}OC_3H_7)_4$ being 3 - 6, and a liquid polymer is formed consisting of unsaturated hydrocarbons with a branched chain. The following titano-organic compounds are synthesized: iso-$C_3H_7OTiCl_3$; sec-$C_4H_9OTiCl_3$; cyclo-$C_6H_{11}OTiCl_3$. It is established that these compounds decompose rapidly during storage resulting in the formation of titanium oxychloride which is an active catalyst in the polymerization of olefins (propylene, isobutylene, styrene).

The authors' summary

Translator's note: This is the full translation of the original Russian abstract.

Card 1/1

AUTHORS: Etlis, V. S., Razuvayev, G. A. 79-28-5-20/69

TITLE: Synthesis and Properties of Some Aryl Derivatives of Thioxanthenol-5-Dioxide Having Indicator Properties (Polucheniye i svoystva nekotorykh aril'nykh proizvodnykh tioksantenol-5-dioksida, obladayushchikh indikatornymi svoystvami)

PERIODICAL: Zhurnal Obshchey Khimii, 1958, Vol. 28, Nr 5, pp. 1225 - 1227 (USSR)

ABSTRACT: As was already reported by the authors (Reference 1) they obtained in the sulfonation of some aromatic compounds of the $Ar_2CH - R'$ -type (where R' = H, alkyl or aryl), on certain conditions, derivatives of thioxanthenol-5-dioxide, which have indicator properties. It was of interest to investigate the influence of various aryl substituents on the color of the compounds obtained in sulfonation as well as to investigate their applicability as indicators in acidimetric determinations. For this purpose the sulfonation process of 4-benzyl diphenyl, α-benzyl naphthalene and α,α' dinaphthyl methane was investigated. This process was carried out with 25 - 40% oleum at high

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79-28-5-20/69

Synthesis and Properties of Some Aryl Derivatives of Thioxanthenol-5-Dioxide Having Indicator Properties

temperature. The final products were sulfoacids which have indicator properties similar to those described earlier (Reference 1). In neutral and acidous media these compounds remained colorless and only colored intensely on the addition of alkali. Also the color of the one or the other compound depends on the nature of the substituent, which can be seen from the absorption curves in the visible spectrum of alkaline solutions of the mentioned compounds in the picture. The synthetized compounds are easely oxidized by potassium permanganate and on this occasion lose their capability of changing the color in alkaline media. They can be used in the filtration as indicators. The absolute error in the titration of various organic compounds on the average amounts to ± 0,3%. Starting from their properties and from the analysis their structure can be given by the formulae (I - III). A simple synthesis of $\alpha,\alpha'$-dinaphthyl methane of naphthalene, and of the $\alpha,\alpha''$-dichlorodimethyl ether

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79-28-5-20/69

Synthesis and Properties of Some Aryl Derivatives of Thioxanthenol-5-Dioxide Having Indicator Properties

nitrobenzene in the presence of $AlCl_3$ were elaborated. There are 1 figure and 5 references, 3 of which are Soviet.

SUBMITTED: June 8, 1957

Card 3/3

AUTHORS: Razuvayev, G. A., Bobinova, L. M., Etlis, V. S. SOV/ 79-28-6-43/63

TITLE: Organozinc Compounds, Catalysts for the Polymerization of Propylene (Tsinkorganicheskiye soyedineniya-katalizatory polimerizatsii propilena)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol. 28, Nr 6, pp. 1623 - 1626 (USSR)

ABSTRACT: The authors regarded it necessary to investigate the catalytic activity of organozinc compounds (diethyl-, dipropyl- and diphenyl zinc) for the polymerization of propylene. Diethylzinc with an addition of titanium chloride proved to be an active catalyst. In the presence of diethylzinc and tin tetrachloride (or sodium isopropylate) propylene does not polymerize. The influence of the reaction temperature on the polymerization of propylene, of the reaction duration, the composition of the catalyst (molar ratio between $Zn(C_2H_5)_2$ and $TiCl_4$ (furtheron denoted by C) and of the solvent were investigated. It was found that the best yield of polypropylene was obtained at 110-120° (Tab 1). After a longer duration of the polymerization (from 3 to 5 hours)

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Organozinc Compounds, Catalysts for the Polymerization SOV/79-28-6-43/63
of Propylene

the yield increased only little (Tab 1). The composition of the catalyst has a strong effect on the yield and the quality of the polymer. The best yield was obtained at the equimolecular ratio between $Zn(C_2H_5)_2$ and $TiCl_4$, however, in this case the polymer was obtained as an oil of varying viscosity. At C=3 a solid propylene was obtained (yield = 30%, melting point= 150-158°, molecular weight = 10000-18000). On a further increase of C its yield decreased considerably (Tab 2). Heptane and isooctane were used as solvents for the polymerization, the first mentioned supplying somewhat smaller yields (Tab 3). The substitution of zincdiethyl by zinc dipropyl and zincdiphenyl changed only little the activity of the catalyst in the polymerization of propylene. Thus the character of the radial exerts only little influence on the catalytic activity of the organozinc compound. The authors investigated the influence of the component molecular ratio on the yield and quality of the polymer in the case of the catalysts $Zn(C_3H_7)_2$ + $TiCl_4$ and $Zn(C_6H_5)_2$ + $TiCl_4$. There are 5 tables and

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Organozinc Compounds;Catalysts for the Polymerization SOV/79-28-6-43/63
of Propylene

7 references, 4 of which are Soviet.

SUBMITTED: May 23, 1957

1. Propenes--Polymerization

Card 3/3

SOV/79-28-7-21/64

AUTHORS: Spasskaya, I. F., Etlis, V. S., Razuvayev, G. A.

TITLE: The Chlorination of Ethylene Glycol (Khlorirovaniye etilenglikolya)

PERIODICAL: Zhurnal obshchey khimii, Vol 28, Nr 7, pp 1827 - 1831 (USSR)

ABSTRACT: Contrary to the chlorination of monovalent alcohols only few publications are known on that of bivalent and especially of ethylene glycols. The authors were interested in a detailed investigation of this reaction. The chlorination of ethylene glycol takes place sufficiently rapid only in ultraviolet light at room temperature, with a great amount of heat being developed (maximum up to 127°) with a pronounced absorption of chlorine, and the initial weight increasing by 70 - 80%. The final product consists of 27% β-chloro-ethyldichloro acetate, of 15% of a cyclic acetal not described in papers (A), 12% $H_2O$, 11% of dichloro acetaldehyde, 11 % chloroethylene hydrine, 6% dichloromethyl-1,3-dioxolane and of an admixture of oxalic and dichloroacetic acids. The cyclic acetal corresponds to the formula

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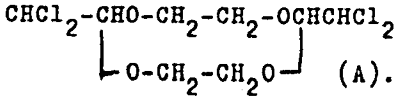
The Chlorination of Ethylene Glycol SOV/79-28-7-21/64



$$\underbrace{CHCl_2\text{-}CHO\text{-}CH_2\text{-}CH_2\text{-}OCHCHCl_2}_{O\text{-}CH_2\text{-}CH_2O}$$

(A).

This structure was proved by cleavage with concentrated hydrochloric acid under the formation of dichloro acetaldehyde and chloroethylene hydrine. The chlorination only with a previous addition of $SbCl_3$ yielded about the same composition of the mixture, however, without the acetal of the ethylene glycol and without the $CHCl_2CHO$. Prior to the separation of the mixture it had to be liberated from the disturbing hydrogen chloride. In order to explain the nature of the high-boiling products it was of interest to subject the main product of the ultraviolet treatment, the β-chloro-ethyl dichloro acetate, to the conversion with chlorine: The chlorination experiments in the ultraviolet range yielded α, β, β', β"-tetrachloro-ethyl ester of trichloro acetic acid. Thus, in the case of the above mentioned chlorination reaction in the ultraviolet range, or with a catalyst, the oxidation and chlorination processes, i. e., the formation of ester and acetal, take place at the same time.

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The Chlorination of Ethylene Glycol SOV/79-28-7-21/64

There are 1 table and 10 references, 1 of which is Soviet.

SUBMITTED: May 31, 1957

1. Ethylene glycol--Chlorination 2. Ultraviolet waves--Chemical effects

Card 3/3

AUTHORS: Spasskaya, I. F., Etlis, V. S., Razuvayev, G. A. SOV/79-28-11-22/55

TITLE: Chlorination of Olefin Chlorohydrins (Khlorirovaniye khlorgidrinov olefinov)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 11, pp 3004 - 3008 (USSR)

ABSTRACT: The reaction of chlorine with olefin chlorohydrins is little investigated. There are no reports on the chlorination of the propylene chlorohydrin. The aim of this paper was the chlorination of the ethylene and propylene chlorohydrin. The chlorination of ethylene chlorohydrin was carried out under ultraviolet irradiation at 30-40°, 60-70°, 90-100°: At 30-40° in the presence of 1% water, at 50-60° in the presence of marble, and at 70-80° in the presence of 0.5% acetyl cyclohexane sulfonyl peroxide. The compounds (I), (II), (III), (IV), and (V) were separated from the products of the chlorination. The data on the composition of the formed mixtures are mentioned in table 1. As the β-chloro-ethyl dichloro

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Chlorination of Olefin Chlorohydrins SOV/79-28-11-22/55

acetate was found in all experiments in the company of dichloro acetaldehyde of dichloro acetyl chloride, it must be assumed that on the action of chlorine on (I)an oxidation and chlorination take place easily, accompanied by secondary formations of the acetal and ether. The free chloro acetaldehyde could not be separated, its formation is, however, beyond any doubt, due to the acetal (V) separated in most experiments. Thus, the reaction of chlorine with ethylene hydrin could be explained by means of the reactions mentioned in the scheme. In the chlorination of propylene chlorohydrin under ultraviolet irradiation at 30-100° a mixture of chlorine ketones is formed, from which the 1,1,3-trichloro acetone is separated - and was also identified as such. There are 2 tables and 12 references, 4 of which are Soviet.

SUBMITTED: September 30, 1957

Card 2/2

.5(4), 15(9)

SOV/76-32-10-5/39

AUTHORS: Tkachenko, G. V., Stupen', L. V.~~, Etlis,~~ V. S., Kofman, L. P.

TITLE: Polymerization of the Chlorine Derivatives of Styrene and Their Copolymerization With Vinyl Chloride (Polimerizatsiya khlorproizvodnykh stirola i ikh sovmestnaya polimerizatsiya s khloristym vinilom)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol 32, Nr 10, pp 2251-2255 (USSR)

ABSTRACT: In the present paper the single polymerization of β,β-dichloro-styrene and α,β,β-trichloro-styrene is investigated as well as their copolymerization with vinyl chloride. In some experiments L. A. Kracheva participated as well. The polymerizations took place in glass ampoules and in a steel autoclave. The technique of filling the ampoules was described in reference 9, whereas the polymerization velocity was measured dilatometrically according to reference 10. To determine the relative viscosity the balance according to V. A. Kargin was used (Ref 11). It was found that the substitution of the hydrogen atoms in the vinyl group of styrene leads to the fact that the monomer also in the presence of peroxides, azo compounds and some redox systems, as

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SOV/76-32-10-5/39

Polymerization of the Chlorine Derivatives of Styrene and Their Copolymerization With Vinyl Chloride

well as the Friedel-(Fridel) Krafts catalyst does not polymerize. This low reactivity is explained by steric hinderances. The higher reactivity of the radical of α,β,β-trichloro-styrene, as well as the polarity of the molecule, leads to a more rapid copolymerization of this monomer with vinyl chloride than with styrene. β,β-dichloro-styrene polymerizes slowly according to the ionic mechanism with catalysts of the cation type to a small degree of transformation. It is assumed that in the copolymerization of vinyl chloride with β,β-dichloro- and α,β,β-trichloro-styrene radicals with a low reactivity are formed, due to which fact the reaction velocity is decreased and the polymers obtained have a reduced molecular weight. An introduction of α,β,β-trichloro-styrene into the chain of the polychloro-vinyl leads to a decrease of the transition temperature into the vitreous and viscous state, i. e. an internal plastification takes place. The authors thank V. A. Kargin, Member, Academy of Sciences, USSR; K. A. Kocheshkov, Corresponding Member, Academy of Sciences, USSR; A. D. Abkin; and P. M. Khomikovskiy. There are 2 figures and 13 references, 9 of which are Soviet.

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SOV/76-32-10-5/39

Polymerization of the Chlorine Derivatives of Styrene and Their Copolymerization With Vinyl Chloride

SUBMITTED: April 11, 1957

Card 3/3

AUTHORS: Razuvayev, G. A., Corresponding Member, Academy of Sciences, USSR, Bobinova, L. M., Etlis, V. S. SOV/20-122-4-22/57

TITLE: Production and Properties of Several Trichloro-Titane-Alkoxy Compounds With Secondary and Tertiary Alkyl Groups (Polucheniye i svoystva nekotorykh trikhlortitanalkoksisoyedineniy s vtorichnymi i tretichnymi alkil'nymi gruppami)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 4, pp 618 - 620 (USSR)

ABSTRACT: Some authors believe the titane organic compounds to be the initiators of the polymerization of the olefines; therefore, they have been carefully considered recently as possible intermediate products of the reaction of trialkylaluminum with titane tetrachloride (Refs 1 - 3). In the present paper some titane compounds of the type $TiCl_3OR$ were synthetized and investigated. In this connection R denotes the secondary or tertiary group. Since in the synthesis, according to reference 6 an insufficient pure compound was obtained, the authors used isopropyl alcohol and an excess of $TiCl_4$ in a petroleum ether solution (boiling point 60 -

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70°) for the synthesis of i-$C_3H_7OTiCl_3$ at approximately 0°. Crystals of the pure titane-trichloro-isopropylate were precipitated from the filtrate after a part of the solvent had been distilled off and cooled down. Secondary $C_4H_9OTiCl_3$ and $C_6H_{11}OTiCl_3$ (hitherto not described) were produced in a similar way, but by distilling off under vacuum in order to reduce the decomposition of the said compounds (Table 1). The latter are, however, unstable in contrast to similar compounds with primary groups. In the case of decomposition, gaseous products escape and titane oxychloride is produced. The following compounds were furthermore identified in the case of isolation of liquid products under vacuum: hydrogen chloride, alkylchloride, i-$C_3H_7Cl$ from the secondary $C_4H_9OTiCl_3$ and $C_6H_{11}OTiCl_3$. Furthermore, polymerization products of the olefines were closely adsorbed on the surface of the oxychloride. Table 2 shows a balance of this decomposition. Table 3 gives the physical-chemical properties of the decomposition products. From the isolated products it may be assumed that the primary decomposition process of the mentioned compounds is the formation of the titane oxychloride and of the radicals. The latter might then yield one olefine and HCl or an alkylchloride. Finally the authors were able to prove that the titane oxychloride effectively catalyzes the reaction of the hydrochlorination of propylene, isobutylene, and cyclohexene. Alkylchlorides with good yields are formed in this case. No inverse reaction (dehydrochlorination of alkylchlorides) takes place in the case of decomposition of the titane organic initial compounds. On the strength of the above-mentioned results a decomposition scheme is suggested. Further ranges of application are finally given along with exemplifications. There are 3 tables, and 7 references, 2 of which are Soviet.

SUBMITTED: June 17, 1958

Production and Properties of Several Trichloro-Titane-Alkoxy Compounds With Secondary and Tertiary Alkyl Groups

SOV/20-122-4-22/57

Card 4/4

5(1)

AUTHORS: Shevlyakov, A. S., Etlis, V. S., Minsker, K. S., Degtyareva, L. M., Fedoseyeva, G. T., Kucherenko, M. M. SOV/20-122-6-34/49

TITLE: **Preparation of Isotactic Polystyrene** (Polucheniye izotakticheskogo polistirola)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 6, pp 1076-1078 (USSR)

ABSTRACT: Inspite of several papers (Refs 1-3) the **preparation method** and the parameter of isotactic polystyrene are not described in publications. The present paper tries to determine the conditions of stereospecific styrene polymerization which are suited for technological development. The styrene polymerization was produced with a catalytic system of triethyl aluminium titanium trichloride in the medium of saturated hydrocarbons at 30-120° in a nitrogen atmosphere. A dependence of the polymerization velocity and the yield of isotactic fraction of the polymer on the concentration of $Al(C_2H_5)_3$ in the solvent (benzine) was found (Table 1). Figure 1 shows the dependence of the yield of the isotactic fraction (fraction III.), of the per cent content of the

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amorphous fraction in the polymer (1st fraction), of the characteristic viscosity (in cyclohexanone at 20°) and of the density ($\rho$) on the quantity K. Figure 2 shows the yield of the isotactic and amorphous fraction in the polymer in dependence on temperature. An increase in the entire yield of polystyrene takes place only in consequence of an increase in the yield of the amorphous fraction. When the relation $C_8H_8 : TiCl_3$ was raised from 10 to 15, the content of the amorphous fraction in the polymer increased by 1.5-2.0 times. The yield of the isotactic fraction per $TiCl_3$-unit practically did not change. The results of typical tests are collected in table 2. Obviously the formation of the amorphous product is not connected with surface effects and takes place in a homogeneous solution according to the ion mechanism. The constant yield of an isotactic product, however, must be explained by the constant size of the active surface of the catalyst. Polystyrene can be prepared according to the system described, depending on the conditions of the procedure and the polymerization method either as a completely crystalline substance (98.5-100 %) or with a considerable content of the amorphous fraction. Figure 3 shows typical thermodynamic curves (plotted with Kargin's scales) of an industrial sample, of the polymer **prepared** according to the catalytic system mentioned above, and of its individual fractions. Figure 4 gives the radiographs of both fractions. Table 3 shows some physico-mechanic and electric properties of the polystyrene under consideration. V. A. Kargin, Member, Academy of Sciences, USSR assisted the author in his work. There are 3 figures, 3 tables, and 3 references.

| | |
|---|---|
| PRESENTED: | June 27, 1958, by V. A. Kargin, Academician |
| SUBMITTED: | June 26, 1958 |

5(3)

AUTHORS: Minsker, K. S., Etlis, V. S. SOV/20-123-6-23/50

TITLE: Chlorinated Polypropylenes (Khlorirovannyye polipropileny)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 6, pp 1041 - 1043 (USSR)

ABSTRACT: The conditions of synthesis and the properties of the products according to the chlorine content in the polymer were not indicated in reference 1 for the substance resulting from the interaction of chlorine and crystalline polypropylene. Therefore, the authors have thoroughly studied the process of chlorination of polypropylene on the catalytic system $Al(C_2H_5)_3$ and $TiCl_4$ (I) as well as on $Al(C_2H_5)_3|TiCl_3$ contact (II). The chlorination was carried out in a chloro benzene medium either in the presence of initiators (radical-producers) or without them. In the first case every hour 0.28 g each of azoisobutyric acid-dinitrile (or of some other radical-producer) were added. Figure 1 shows the chlorination kinetics of the polypropylene (I) and (II) with initiators (Curves 2 and 1, respectively) and of (I) without initiator (Curve 3). The

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initiator especially accelerates the process, if polypropylene contains much of the isotactic fraction. The author failed to obtain an elementary composition $(C_3H_3Cl_3)_n$ even in the case of a long-lasting chlorination. The chlorine introduction into the polymer causes considerable variations in the latter. After the formation of a polymer $(C_3H_5Cl)_n$ a non-combustible powder finally results. With an increasing chlorine content the solubility of the polypropylene increases, the viscosity decreases, whereas the density increases as well (Figs 3,2). All of the samples formed were amorphous which was proved electronographically. The decrease in viscosity suggests a bursting (destruction) of the polymer chain on the C-C bond. From the increase in density it can be assumed that after the introduction of 30 - 35% of chlorine both polymers show structures resembling each other whereas the common structure of the initial polymers considerably differed by the content of the amorphous and isotactic fraction. Figure 3 shows the variation of the softening temperature of the chlorinated polypropylenes according to the chlorine content. If this content is low, Chlorinated Polypropylenes SOV/20-123-6-23/50

the temperature falls. On a further chlorine introduction into the molecule of the polymer it increases and reaches up to 200° and even more at 65-66% (Figs 3,1). The authors tried to interpret this phenomenon by structural peculiarities as well as by the chlorine position. There are 4 figures and 1 reference.

PRESENTED: May 16, 1958, by V. A. Kargin, Academician

SUBMITTED: May 9, 1958

Card 3/3

ETLIS, V.S.; MINSKER, K.S.; RYLOV, Ye.Ye.; BORT, D.N.

Crystalline poly(vinyl chloride). Vysokom. soed. 1 no.9:1403-1406
S '59. (MIRA 13:3)
(Ethylene)

SOV/79-29-9-37/76

5(3)

AUTHORS: Razuvayev, G. A., Spasskaya, I. F., Etlis, V. S.

TITLE: Chlorination of the α-Chloro Aldehydes

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 9, pp 2978-2980 (USSR)

ABSTRACT: The chlorination of aliphatic aldehydes has hitherto been little investigated (Refs 1-4) in contrast to the well-known chlorination of aromatic aldehydes into the corresponding acid chlorides. Only individual cases are described in which the carbonyl hydrogen of the aliphatic aldehydes is replaced by chlorine. As in the chlorination of the carbonyl compounds halogen is substituted for hydrogen on carbon in α-position to the carbonyl, the chlorination of several α-chlorine-substituted aldehydes was of practical interest. The acid chlorides of dichloroacetic and α,α-dichloropropionic acid were obtained in good yields and with small impurities of free acid from chlorination in ultraviolet light as well as in the presence of acetylcyclohexane sulphonyl peroxide at 50-60°. These acid chlorides were obtained from dichloro acetic and α,α-dichloropropionaldehyde. The chlorination of α,α-dichloropropionaldehyde is accompanied by a marked decarbonylization under the formation of 1,1,1-tri-

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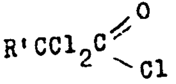
chloro ethane and phosgene. The formation of the products found may take place according to the scheme $R'CCl_2CHO + R^\cdot \rightarrow R'CCl_2\dot{C}O + RH$ (Ref 4), where R' = H, $CH_3$; $R^\cdot$ = a chlorine atom or a free radical formed by cleavage of the peroxide or by photolysis of the aldehyde. The α,α-acyl dichloride radicals react with chlorine and form acid chlorides of α,α-dichlorine-substituted acids: $R'CCl_2\dot{C}O + Cl_2 \rightarrow$  $R'CCl_2C\genfrac{}{}{0pt}{}{\diagup\!\!\diagup O}{\diagdown Cl}$ + Cl. The cleavage of a considerable part of the radicals $CH_3CCl_2\dot{C}O$ takes place at 50-60° according to the scheme $CH_3CCl_2\dot{C}O \rightarrow CH_3\dot{C}Cl_2 + CO$. The cleavage products react with chlorine and form 1,1,1-trichloro ethane and phosgene (last scheme). Thus, the chlorination of the anhydrous α,α-dichlorine-substituted aldehydes leads, under the above conditions, to the formation of the acid chlorides of α,α-dichlorine-substituted acids in good yields and may be preparatively applied to those cases in which other chlorinating agents are not desired. As far as the

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chlorination of the α-monochlorine-substituted aldehydes is concerned, an experiment was only possible with the acetaldehyde available (with 5-6% water); in the chlorination dichloroacetic acid formed predominantly besides a small quantity of dichloroacetyl chloride. There are 1 table and 14 references, 2 of which are Soviet.

SUBMITTED: August 11, 1958

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SOV/80-32-2-33/56

AUTHORS: Etlis, V.S., Minsker, K.S., Kirillov, A.I., Kucherenko, M.M.

TITLE: On the Production and the Properties of Polypropylene (O poluchenii i svoystvakh polipropilena)

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol XXXII, Nr 2, pp 418-423 (USSR)

ABSTRACT: Polypropylene was prepared on catalysts containing a mixture of triethylaluminum (AlEt$_3$) and the chlorides of titanium (TiCl$_4$ and TiCl$_3$). The polymer was obtained in the quantity of 0.5 - 1.0 kg from 1 liter of the reaction mass in the presence of TiCl$_4$ as a catalyst. The average molecular weight was 23,000 - 24,000. The content of the amorphous polymer in the final product was 25 - 35%. If AlEt$_3$ with TiCl$_3$ was used as catalyst the polymer was in crystalline form. The Staudinger equation [Ref 7] is valid for all propylene solutions.

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On the Production and the Properties of Polypropylene SOV/80-32-2-33/56

There are 3 tables, 2 graphs, 1 diagram, and 8 references, 4 of which are Soviet, 3 English, and 1 German.

SUBMITTED: June 17, 1957

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SOV/80-32-4-30/47

5(3)

**AUTHORS:** Etlis, V.S. and Grebov, L.N.

**TITLE:** Hypochlorination of Propylene (Gipokhlorirovaniye propilena)

**PERIODICAL:** Zhurnal prikladnoy khimii, 1959, Vol 32, Nr 4, pp 874-877 (USSR)

**ABSTRACT**

A number of important products can be obtained with the use of propylene oxide which, in turn, can be produced by the dehydrochlorination of propylene chlorohydrin. The latter can be obtained by hypochlorination of propylene, the process of which is the subject of the present article. The authors studied this process on a bubble-type column of continuous operation, 2 m high and 40 mm in diameter, shown in Figure 1. The run of this reaction was investigated under different conditions, and the yield of propylene chlorohydrin was measured in dependence on various factors, such as the molar ratio of the agents, speed of chlorine inlet, etc., and the results are shown in tables. The authors noted that the production of propylene chlorohydrin in concentrated form is rather easy by using the process of hypochlorination of propylene. As a

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by-product of this process, the formation of chloroacetone was discovered, which resulted from the oxidation of propylene chlorohydrin.

There are: 1 diagram, 1 table and 4 references, 2 of which are Soviet, 1 English and 1 French.

SUBMITTED: September 7, 1957

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5.3600

75684
SOV/80-32-10-33/51

AUTHORS: Smetankina, N. P., Etlis, V. S.

TITLE: Preparation of Alkene Chlorohydrine Ethers

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol 32, Nr 10, pp 2320-2324 (USSR)

ABSTRACT: Preparation of alkene chlorohydrine ethers was studied, as exemplified by the synthesis of propylene chlorohydrine ether. The reaction between propylene, alcohol, and chlorine, takes place as follows:

$$C_3H_6 + Cl_2 + CH_3OH \longrightarrow CH_2ClCH(OCH_3)CH_3 + HCL; \qquad (A)$$

$$C_3H_6 + Cl_2 \longrightarrow CH_2ClCHClCH_3. \qquad (B)$$

On prolonged synthesis the chloroether content in the reaction mixture decreases, but that of dichloropropane and the high boiling residue increases. Raising the temperature decreases the solubility of gases in the reaction medium. Lowering the temperature to 0° increases

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the yield of chloroether. Increasing the molar ratio of propylene to chorine increases the yield of the product. For the preparation of propylene chlorhydrine methyl ether, the following optimal conditions were found: temperature range -5 to +5, duration 10 hr, ratio (propylene to chlorine) 1:4, feed rate 0.5 g mole/hr and 0.1 to 1% of catalytical water, based on the weight of introduced alcohol. There is 1 table; 4 figures; and 11 references, 10 Soviet, 1 German.

SUBMITTED: August 12, 1958.

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SOV/76-33-1-5/45

5(4), 15(8)

AUTHORS: Tkachenko, G. V., Etlis, V. S., Stupen', L. V., Kofman, L. P.

TITLE: The Copolymerization of Vinyl Chloride With Styrene and Pentachloro Styrene (Sovmestnaya polimerizatsiya khloristogo vinila so stirolom i pentakhlorstirolom)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 1, pp 25-31 (USSR)

ABSTRACT: According to various publications (Refs 1-4) there is a considerable difference between the reactivity of styrene (I) and that of pentachloro styrene (II). It is assumed that a copolymerization of styrene with vinyl chloride (III) and styrene derivatives (due to the influence of the less reactive styrene derivatives) results in more homogeneous copolymers. The polymerization took place in the substance itself and in the emulsion (glass ampoules and 4 liter steel autoclave), as well as in dichloro-ethane solutions (in the dilatometer) (Refs 9,10). The velocities of the polymerizations of (III), (I), and (II) in dichloro-ethane solutions at 60° and monomer concentrations of 1.6 mol/l besides an initiating amount (dinitrile of the azoiso fatty acid) of 0.06 mol/l were: 0.0060, 0.0001 and 0.0036 mol/l.minute. In the case of a copolymerization of (III)

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with (II), the function curve of the yield of polymers in dependence on the composition of the initial mixture with a content of 0.08-0.1 mole-parts of (II) passes through a minimum. Calculations based upon the results of the investigations (Table 3) resulted in the values α = 0.045 and β = 12.4 for the constants of a copolymerization of (III) with (I), which agrees with Dook's (Dok) statements (Ref 3). The copolymerization of (III) with (II) takes place at a measurable velocity, i. e. slower than the copolymerization of (III) with (I). The reaction constants calculated from the equations (1) and (2) corresponding to a diagram (Fig 5) are given as follows: α = 0.43 and β = 5.3. The thermomechanical curves of copolymers obtained by the copolymerization of (III) with (II) containing more than 20% of (II) do not possess a range of high elasticity. Copolymers containing up to 10% of (II) do not differ from polyvinyl chloride as regards the temperature of transformation from highly elastic to viscous-liquid state. L. A. Karacheva participated in some of these experiments. The cooperation of A. D. Abkin and P. M. Khomikovskiy is appreciated. There are 5 figures, 3 tables, and 15 references, 8 of which are Soviet.

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The Copolymerization of Vinyl Chloride With Styreno and Pentachloro Styrene

SUBMITTED: May 17, 1957

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5(2,3)

SOV/20-127-3-28/71

AUTHORS: Razuvayev, G. A., Corresponding Member, AS USSR, Bobinova, L. M., Etlis, V. S.

TITLE: Some Chemical Properties of Phenyltitantriisopropylate and Its Catalytic Power in the Polymerization of Olefines

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 3, pp 581 - 583 (USSR)

ABSTRACT: It was proved that diphenyltitancyclopentadienyl alone (Refs 1,2) cannot initiate a polymerization of ethylene. If titantetrachloride is added to trialkylaluminum, catalysts develop in both cases which transform ethylene into a solid polymer. $(C_6H_5)_2Ti(C_5H_5)_2$ differs considerably from the usual metal-organic compounds with co-valent Me-C-linkages as far as its structure is concerned. Phenyltitantriisopropylate is a purely co-valent titan-organic compound (Refs 3,4) and is an initiator of the polymerization of styrene into a solid polymer. Some investigators explain this by the readiness to decompose with the development of a phenyl radical. Since the chemical reaction characteristic of true metal-

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Some Chemical Properties of Phenyltitantriisopropylate SOV/20-127-3-28/71
and Its Catalytic Power in the Polymerization of Olefines

organic compounds have been little investigated as far as phenyltitantriisopropylate is concerned, the authors carried out the present work. They investigated its catalytic power for unsaturated compounds, alone and with an addition of $AlR_3$ or $TiCl_4$, and also its chemical properties. The mentioned product, synthesized by the authors, actually initiated the polymerization of styrene, but during the reaction with propylene, only traces of a liquid polymer could be found. This catalyst also polymerized several tested monomers. It was proved that the system $Al(C_2H_5)_3$ - $C_6H_5Ti(i\text{-}OC_3H_7)_3$ initiated the polymerization of propylene at 90-100° with the development of not more than 30-35% of a liquid polymer. The addition of titantetrachloride to phenyltitantriisopropylate developed a catalyst which caused a more intensive polymerization of propylene at 90-100°. The liquid polymer had a molecular weight of 144-545. Its output largely depended upon the molecular proportion of the components of the catalyst (Fig 1).

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Figure 2 shows the influence of the catalyst content on the

Some Chemical Properties of Phenyltitantriisopropylate SOV/20-127-3-28/71
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output of the polymer. Based upon the above investigation, the experts arrived at the following conclusion: titanoxychloride is the actual catalyst in the polymerization of the catalytic system $C_6H_5Ti(i\text{-}OC_3H_7)_3$. It is produced by several reactions which precede polymerization. Phenyl radicals do not take part in the mentioned process. This is confirmed by the i.-r. spectrum (Fig 3). There are 3 figures and 7 references, 1 of which is Soviet.

SUBMITTED: May 12, 1959

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ETLIS, V.S.

PHASE I BOOK EXPLOITATION SOV/4983

International symposium on macromolecular chemistry. Moscow, 1960.

Mezhdunarodnyy simpozium po makromolekulyarnoy khimii, SSSR, Moskva, 14-18 iyunya 1960 g.: doklady i avtoreferaty. Sektsiya II. (International Symposium on Macromolecular Chemistry Held in Moscow, June 14-18; Papers and Summaries) Section II. [Moscow, Izd-vo AN SSSR, 1960] 559 p. 5,500 copies printed.

Sponsoring Agency: The International Union of Pure and Applied Chemistry, Commission on Macromolecular Chemistry

Tech. Ed.: T.A. Prusakova.

PURPOSE: This book is intended for chemists interested in polymerization reactions and the synthesis of high-molecular compounds.

COVERAGE: This is Section II of a multivolume work containing papers on macromolecular chemistry. The papers in this volume treat mainly the kinetics of various polymerization reactions initiated by different catalysts or induced by radiation. Among the research techniques discussed are electron paramagnetic resonance spectroscopy and light-scattering interpolation. There are summaries in English, French and Russian. No personalities are mentioned. References follow each article.

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S/629/60/000/003/002/011
D202/D305

AUTHORS: Minsker, K. S., and Etlis, V. S.

TITLE: The mechanism of stereospecific polymerization

SOURCE: Vsesoyuznoye khimicheskoye obshchestvo imeni D. I. Mendeleyeva. Uspekhi khimii i tekhnologii polimerov, sb. 3, Moscow, Goskhimizdat, 1960, 14-38

TEXT: A critical review of theories concerning the formation of stereoregular polymers, based largely on Western work. Many examples of stereospecific polymerization reactions with different catalysts are given and discussed. It is concluded that the question of the polymerization mechanism cannot be regarded as settled, although a number of fundamental conditions for its realization have been determined: a) The presence of a solid surface, capable of forming complexes with the components of the reacting system; b) formation of intermediate complexes on the surface of the catalyst which increase the probability of the formation of molecular configurations desirable and necessary for stereospecific

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polymerization; c) the location of polymerizing molecules between the metal-carbon bond and the initially bound atoms of the carbon chain. It is also pointed out that during this type of polymerization the formation of both crystalline and amorphous polymers always occurs. It is, therefore, possible that the mechanism of formation is different for both processes. Despite the present lack of an unanimous opinion concerning the mechanism of stereospecific polymerization, the authors believe that owing to the great number of published experimental data and theoretical consideration this question would be fully elucidated in the nearest future. There are 71 references: 16 Soviet-bloc and 55 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: G. Natta, J. Inorg. and Nuclear Chem., 8, 589, (1958); K. Fukui, T. Kagiya, T. Yagi, T. Shimidsu and S. Ykasa, J. Polymer. Sci., 37, 353, (1959); J. Furukawa and T. Tsuruta, J. Polymer. Sci., 36, 275, (1959); T. Fox, B. Garret, W. Goode, S. Oratch, J. Kincaid, A. Spell and T. Stroupe, J. Am. Chem. Soc., 80, 1780, (1958).

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