ZIMAKOV, A. M. and G. S. BOBROVSKII

Parovye kotly promyshlennykh predpriiatii. Moskva, Gosenergoizdat, 1949. 335 p.
diagrs.

Steam boilers in industrial enterprises.

SO: Manufacturing and Mechanical Engineering in the Soviet Union, Library of Congress, 1953

Zimakov A.M.

AUTHORS: Vorobey, V.V. and Zimakov, A.M. 133-11-13/19

TITLE: Automation of Thermal and Technological Processes in Iron and Steel Works (Avtomatizatsiya teplovykh i tekhnologicheskikh protsessov na predpriyatiyakh chernoy metallurgii)

PERIODICAL: Stal', 1957, No.11, pp. 1024 - 1027 (USSR).

ABSTRACT: Automatic controlling used in blast furnaces, open-hearth and electric furnaces and rolling mills is outlined. It is pointed out that the progress achieved is to a large extent due to the existence of special organisations grouped in the "Energochermet" Trust: instrument-making factories ("KIP" in Kharkov and "Teplopribor" in Chelyabinsk), the Central Laboratory of Automatics, Central Design Office, etc.

AVAILABLE: Library of Congress

Card 1/1

ZIMAKOV, A.M. and BOROVSKIY, G.S.

"Stream Boilers in Industrial Enterprises". Gosenergoizdat, Moscow/ Leningrad, 1949, 331 pp, 11 rubles 40 kopeks.

SO: W-14151 11 Oct. 1950.

ZIMAKOV, B.M.; STEPANOV, Yu.V.

Oil manifestation in the Vorkuta coal-bearing region of the Pechora Basin. Sov. geol. 8 no.3:125-127 '65.

(MIRA 18:5)

1. Vorkutskaya kompleksnaya geologorazvedochnaya ekspeditsiya UTGU i Moskovskiy geologorazvedochnyy institut im. S. Ordzhonikidze.

ETTINGER, I. L.; YEREMIN, I. V.; ZIMAKOV, B. M.; BAKALDINA, A. P.

Sorption properties of various petrographic components of fossil coals. Dokl. AN SSSR 155 no. 2:364-367 Mr '64. (MIRA 17:5)

1. Institut gornogo dela im. A. A. Skochinskogo, Moskovskiy geologorazvedochnyy institut im. S. Ordzhonikidze i Institut geologii i razrabotki goryuchikh iskopayemykh. Predstavleno akademikom N. V. Mel'nikovym.

ZIMAKOV, B.M.

Effect of geological conditions on the accumulation and distribution of gases in coal deposits of the Pechora Basin. Izv.vys.ucheb.zav.;geol.i razv. 4 no.7:78-92 Jl '61.
(MIRA 14:8)

1. Moskovskiy geologorazvedochnyy institut imeni S. Ordzhonikidze.

(Pechora Basin--Mine gases)

USSR/Chemistry - Allyl   Nov 48
Chemistry - Acrolein

"Mechanism for Oxidizing Allyl Alcohol in Acrolein," I. V. Zimakov, V. A. Pokrovskiy, 2 3/4 pp

"Dok Ak Nauk SSSR" Vol LXIII, No 2

PA 55/49T5

Established uniformity of this mechanism both at low temperatures for the fluid phase and at higher temperatures for the vapor phase with solid catalysts. Oxidation occurred first at the side of double connection with formation of an intermediate product, glycide, which is either kept as a final reaction product hydrolyzed in glycerin or converted into

USSR/Chemistry - Allyl (Contd)   Nov 48

acrolein. This mechanism is an interesting example of oxidizing compounds with an ethyl bond. Submitted by Acad A. N. Nesmeyanov 25 Jun 48.

FDD   55/49T5

SPITSYN, VIKT, I., akademik; ZEMLYANOVA, L.I.; MIKHAYLENKO, I.Ye.; GROMOV, V.V.; ZIMAKOV, I.Ye.

Electron microscope study of the effect of radioactive waves from solids on the structure of their surface. Dokl. AN SSSR 139 no.5:1163-1165 Ag. '61. (MIRA 14:8)

1. Institut fizicheskoy khimii AN SSSR.
(Solids, Effect of radiation of)

ZIMAKOV, I.Ye.; DOBROSEL'SKAYA, N.P.; SPITSYN, Vikt.I., akademik

Effect of the radioactivity of molybdic andydride on the variation of its specific surface area. Dokl.AN SSSR 148 no.4:884-885 F '63. (MIRA 16:4)

1. Institut fizicheskoy khimii AN SSSR.
(Molybdenum oxides) (Radioactivity) (Sutface measurement)

ACCESSION NR: AP4020063 S/0186/64/006/001/0130/0132

AUTHOR: Spitsy*n, Vikt. I.; Zimakov, I. Ye.; Dobrosel'skaya, N. P.

TITLE: Effect of radioactive emission S^{35} and Mo^{99} on the magnitude of the specific surface of molybdenum disulfide

SOURCE: Radiokhimiya, v. 6, no. 1, 1964, 130-132

TOPIC TAGS: molybdenum disulfide, specific surface, BET method, radioactive radiation, tagged molybdenum disulfide, crystal lattice irregularity, crystallization center formation, specific surface change, sulfur 35, molybdenum 99

ABSTRACT: The effect of radioactive radiation imparted by incorporating S^{35} and Mo^{99} isotopes, on the specific surface of MoS_2 obtained from a melt was investigated. The specific surface was determined by the BET method by low temperature adsorption of krypton. The specific surface of the radioactive materials differs from that of the non-tagged MoS_2 in that it increases with an

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ACCESSION NR: AP4020063

increase in specific radioactivity. With S^{35} the increase is fairly regular and the specific surface is tripled with 30 millicurie/gm. radioactivity from about 8 to 24 m^2/gm. With Mo^{99} the increase is sharper, i.e., almost tripled with 15 millicurie/gm. radiation. (fig. 1). The specific surface of the materials does not change on standing. The difference in specific surface associated with radioactive radiation is apparently caused by the formation of irregularities in the crystal lattice and the creation of additional crystallization centers. Orig. art. has: 2 figures and 1 table

ASSOCIATION: None

SUBMITTED: 05Aug63 DATE ACQ: 31Mar64 ENCL: 01

SUB CODE: GP, NP NO REF SOV: 007 OTHER: 003

Card 2/3

ZIMAKOV, I. Ye.

The Second All-Union Conference on the Preparation and Analysis of High-Purity Elements, held on 24-28 December 1963 at Gorky State University im. N. I. Lobachevskiy, was sponsored by the Institute of Chemistry of the Gorky State University, the Physicochemical and Technological Department for Inorganic Materials of the Academy of Sciences USSR, and the Gorky Section of the All-Union Chemical Society im. D. I. Mendeleyev. The opening address was made by Academician N. M. Zhavoronkov. Some 90 papers were presented, among them the following:

A. A. Popel' and Z. A. Saprykovo. Quantitative determination of paramagnetic ions in solution by NMR methods.

I. Ye. Zimakov. Determination of microimpurities (10^{-7} to 10^{-3}%) by repeated radioactive dilution.

A. A. Tumanov and V. S. Yefimychev. Determination of microconcentrations with salicylan-2-aminophenol.

(Zhur Anal Khim, 19 No. 6, 1964, p. 777-79)

S/137/62/000/012/082/085
A006/A101

AUTHOR: Zimakov, I. Ye.

TITLE: The use of radioactive tracers to check some analytical methods of separating rhenium and molybdenum

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 12, 1962, 15, abstract 12K92 ("Sb. nauchn. tr. Gos. n.-i. in-t tsvetn. met.", 1961, no. 18, 56 - 59)

TEXT: Using radioactive Mo^{99} and Re^{186} isotopes, the author compares 2 methods of separating low Re amounts from high Mo amounts with the aid of 8-axyquinoline and α-benzoin oxime. The oxyquinoline method was found to be suitable for Re separation from Mo even if Mo : Re = 685,000 : 1. Most complete Mo separation from Re by chloroform extraction is obtained at pH 4.5. Using Re^{186}, it was established that during extraction Re is not transferred completely into the chloroform layer. The α-benzoin oxime method can not be used to separate low Re from high Mo amounts, due to considerable sorption of Re by a precipitate of Mo α-benzoin oxime. There are 6 references.

[Abstracter's note: Complete translation] L. Vorob'yeva

Card 1/1

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ZEMLYANOVA, L.I.; ZIMAKOV, I.Ye.; LYAPINA, A.M.; SPITSYN, Vikt. I.;
DOBROSEL'SKAYA, N.P.

Electron microscope study of the effect of radioactivity of elementary sulfur on the structure of its surface.
Radiokhimiia 5 no.3:392-394 '63. (MIRA 16:10)

(Sulfur isotopes) (Electron microscopy)

SOV/136-59-5-15/21

AUTHORS: Gulyayeva, Ye.I., Zimakov, I.Ye., and Rudenko, B.I.

TITLE: Extraction of Rhenium from Industrial Solutions using Activated Coal (Izvlecheniye reniya iz proizvodstvennykh rastvorov pri pomoshchi aktivirovannykh ugley)

PERIODICAL: Tsvetnyye metally, 1959, Nr 5, pp 73-77 (USSR)

ABSTRACT: The difficulty in extracting Re from solution is the separation from W and Mo which have similar properties. An ordinary chromatographic method was tried using activated coals types KAD, SK-T, SU-KhU, and MSK-1. The coals were washed with 0.01N H_2SO_4 until they showed acid reaction to methyl orange and then the test solutions were poured through the coal. Afterwards the coal was washed with water and then 1% soda solution to remove the Re, W and Mo. The solutions used are given in Table 1. Radioactive isotopes Re^{106}, Mo^{99}, and W^{185} were added to the solutions and used to indicate the degree of separation. The best coal was found by testing with the first solution. 0.3, 0.6 and 1.0 g of coal and 4.5 and 7.0 mm diameter columns were tried. Table 2 shows the dynamic exchange capacity under various conditions. It increases with increase in the ratio

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SOV/136-59-5-15/21

Extraction of Rhenium from Industrial Solutions using Activated Coal

height/diameter of column. Fig 2 shows that MSK coal has the greatest absorption. The washing results in Fig 3 show that Re is completely extracted from all the coals so MSK coal was used for further work with the other three solutions. Table 3 shows that the exchange capacity was highest for solution 2 which differed from the other solutions in Mo content and acidity. Fig 4 shows that Re is selectively absorbed by the coal but Mo and W are weakly absorbed. Tests on acidity showed that absorption of W and Mo were practically independent of pH value, but Re absorption increases with inverse pH. Therefore washing was carried out with alkaline solution. Fig 8 shows that Mo and W are washed out before Re. The final solution containing Re has small amounts Mo and W present. Hot soda gave better results than cold soda.

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SOV/136-59-5-15/21

Extraction of Rhenium from Industrial Solutions using Activated Coal

Further research to obtain more concentrated and purer Re is being carried out.

There are 8 figures, 4 tables and 1 Soviet reference.

Card 3/3

ZIMAKOV, I. Ye.

5(2); 21(5) PHASE I BOOK EXPLOITATION SOV/1900

Akademiya nauk SSSR. Komissiya po analiticheskoy khimii

Primeneniye radioaktivnykh izotopov v analiticheskoy khimii (Use of Radioactive Isotopes in Analytical Chemistry) Moscow Izd-vo AN SSSR, 1958. 366 p. [Series: Its: Trudy, t. 9 (12)] Errata slip inserted. 3,000 copies printed.

Resp. Ed.: I.P. Alimarin, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: A.N. Yermakov; Tech. Ed.: T.V. Polyakova.

PURPOSE: The book is intended for chemists and chemical engineers concerned with work in analytical chemistry.

COVERAGE: The book is a collection of the principal papers presented in Moscow at the Second Conference on the Use of Radioactive Isotopes. The problems discussed at the Conference included coprecipitation, aging, and solubility of precipitates, determination of the instability constants

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of complex compounds, separation of rare earth metals, and ion-exchange chromatography. No personalities are mentioned. There are 351 references, 175 of which are Soviet, 33 German, 19 French, 8 Swedish, 2 Hungarian, and 2 Czech.

TABLE OF CONTENTS:

Use of Radioactive Isotopes (Cont.) SOV/1900

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ZIMAKOV, I.Ye.; SPITSYN, Vikt.I., akademik

Effect of radioactive radiation energy on the rate of evaporation of a solid. Dokl. AN SSSR 141 no.6:1400-1402 D '61. (MIRA 14:12)

1. Institut fizicheskoy khimii AN SSSR.
(Radioactivity) (Evaporation)

SPITSYN, Vikt.I., akademik; ZIMAKOV, I.Ye.

Effect of the radioactivity of molybdenum trioxide on the rate of its vaporization. Dokl. AN SSSR 139 no.3:654-657 Jl '61. (MIRA 14:7)

1. Institut fizicheskoy khimii AN SSSR.
(Molybdenum oxide) (Solids, Effect of radiaton on)
(Vaporization)

32432

S/020/61/141/006/018/021
B105/B147

54600

AUTHORS: Zimakov, I. Ye., and Spitsyn, Vikt. I., Academician

TITLE: Effect of radioactive energy on the evaporation rate of a solid

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 141, no. 6, 1961, 1400-1402

TEXT: This is a supplement to a previous paper by the authors on the effect of the radioactive level upon the evaporation rate of MoO_3 (Ref. 1: Vikt. I. Spitsyn, I. Ye. Zimakov, DAN, 139, No. 3 (1961)), where also the production methods of MoO_3 with different Mo^{99} contents were described. The effect of β-radiator additions such as a) Y^{90} (E_{max} = 2.18 Mev), b) Mo^{99} (E_{max} = 1.23 Mev), and c) W^{185} (E_{max} = 0.43 Mev) as well as the value of their radiant energy were studied. In case a), MoO_3 powder was soaked with a certain quantity of dissolved radioactive yttrium nitrate (or of not radioactive yttrium nitrate as control), dried, and therefrom

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fractions of 0.5 - 0.25 mm were obtained by screening. The specific radioactivity was related to MoO_3. c) As admixture, radioactive ammonium tungstate was added to the ammonium molybdate solution. After evaporation of the solution, the residue was moistened with some drops of HNO_3, calcined, and fractions obtained like in case a). The evaporation rate was determined in an electric oven from the change in the length of the quartz spring to which the specimen was fixed. A stream of dry air or nitrogen (flow rate 10 ml/min) was passed through at 700 ± 1°C. The changes in the weight of the weighed portions were noted and used for plotting evaporation curves. The evaporation rate (ER) of the preparations containing non-radioactive Y and of those with an initial specific radioactivity of 1.0 and 2.0 millicuries/g is practically constant. From 3 millicuries/g onward, the ER of the non-radioactive specimens differs considerably. The ER of each specimen increases steadily, since the radioactivity of the residual preparation increases owing to MoO_3 evaporation. In the case of c) this difference sets in at 5 millicuries/g. No radioactive products were found in the sublimate. The dependence of the ER of MoO_3 on its specific radioactivity does not differ from that

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Effect of radioactive energy... S/020/61/141/006/018/021
B103/B147

described in Ref. 1. Thus, it has been found that the ER of MoO_3 depends not only on the radioactivity level of the preparation, but also on the radiant energy of the radioactive addition. The ER of MoO_3 is affected not only by the radiation of a) but also by the radiation of the foreign radioactive inclusions in the solid phase. There are 4 figures and 1 Soviet reference.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences USSR)

SUBMITTED: July 22, 1961

X

Card 3/3

ZIMAKOV, I.Ye.; ROZHAVSKIY, G.S.

Method of multiple radioactive dilution for the determination of small quantities of admixtures. Trudy kom.anal.khim. 9:231-239 '58.
(MIRA 11:11)

(Radiochemistry)

5(2)

AUTHOR: Zimakov, I. Ye. SOV/32-25-2-2/78

TITLE: The Determination of the Solubility of Barium-tungstate by Means of the Radioactive Tungsten Isotope - 185 (Opredeleniye rastvorimosti vol'framata bariya s pomoshch'yu radioaktivnogo izotopa vol'frama - 185)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 2, pp 133-134 (USSR)

ABSTRACT: Slightly soluble barium tungstate (I) is used in separating tungsten from rhenium in the determination of the rhenium content in tungsten concentrates. In the present case the solubility of (I) was determined in water. The indicator used (W^{185}) possesses a β-radiation with an energy of 0.430 Mev and a half-life of 73.2 days. Tests were carried out in a vessel with a spiral agitator. The activity of the dry residue was measured by means of the counter MST-17 and the solubility calculated on the basis of an equation (Table). The curve representing the solubility as a function of the temperature (Fig 1) shows that (I) is the least soluble at 10° C and that the solubility increases moderately at temperatures below 10° C. The dependence of the solubility

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The Determination of the Solubility of Barium-tungstate by Means of the Radioactive Tungsten Isotope - 185 SOV/32-25-2-2/78

on the pH value was studied with a pH meter of the LP-5 type with a glass electrode at 20° in hydrochloric acid and soda lye. The investigation results show (Fig 2) that the precipitation of (I) is most complete at a pH value of 6-7. There are 2 figures and 1 table.

ASSOCIATION: Gosudarstvennyy nauchno-issledovatel'skiy institut tsvetnykh metallov (State Scientific Research Institute for Non-ferrous Metals)

Card 2/2

SPITSYN, Vikt.I., akademik; ZIMAKOV, I.Ye.

Effect of radioactive radiation from Y^{90} and Y^{91} on the solubility of yttrium hydroxide. Dokl.AN SSSR 138 no.1:130-132 My-Je '61.
(MIRA 14:4)

1. Institut fizicheskoy khimii AN SSSR.
(Yttrium--Isotopes) (Yttrium hydroxide) (Solubility)

ZIMAKOV, I.Ye.

Use of radioactive tracers to check certain analytical methods of separating rhenium and molybdenum. Sbor. nauch. trud. Gintsvetmeta no.18:56-59 '61. (MIRA 16:7)

(Rhenium—Metallurgy)
(Molybdemum—Metallurgy)
(Radioactive tracers)

5.4600
15.2141

25725
S/020/61/139/003/024/025
B127/B206

AUTHORS: Spitsyn, Vikt. I., Academician, and Zimakov, I. Ye.

TITLE: Effect of radioactivity of molybdenum anhydride on the rate of its evaporation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 3, 1961, 654-657

TEXT: For their studies the authors used preparations of molybdenum anhydride containing Mo^{99} (half-life period 68.3 hr) which emits β-particles of high energy (E_{max} % 1.23 Mev, 85 %). The specimens had a specific activity of 1.0-28.0 millicuries/g. A mixture of calculated amounts of highly active and inactive MoO_3 was converted with ammonia into ammonium molybdate; the solution was evaporated and annealed with small amounts of nitric acid to prevent the reduction of hexavalent Mo through ammonia. The MoO_3 obtained was mixed with small amounts of Nb_2O_5 and ZrO_2, and sublimated at 350°C in a weak air current for purification from radiochemical admixtures. The particle size was 0.25-0.5 mm.

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25725

Effect of radioactivity of molybdenum... S/020/61/139/003/024/025
B127/B206

Working method: A dry current of air was conducted through the layer of molybdenum powder at a rate of 8 ml/min and 700°C temperature. Every 15 min, the quartz crucible was removed, cooled, weighed, and again suspended in the tube. Table 1 shows the experimental results. The following dependence between rate of evaporation and radioactivity was established: At a specific activity of MoO_3 of 2.5-3 millicuries/g, the rate of evaporation equals the inactive specimen. At a specific activity of 2.5-4 millicuries/g, a drop of the rate of evaporation was established. At 4-9 millicuries/g, a fast increase of the rate of evaporation was observed, which was retarded at a further increase of the specific activity. An increase of the electric charge on the surface was observed on the basis of β-particle emission. It probably also had an effect on the rate of evaporation, which becomes obvious in an interaction between the surface of the hard substances and the gaseous molecules. In the MoO_3 molecule, the Mo is surrounded by three negatively charged oxygen atoms. The positive charge of the solid MoO_3 prevents, therefore, transition into the vapor phase. The following experiment was made for explanation: In a crucible with radioactive MoO_3, an earthed platinum

Card 2/5

wire was brought directly to the specimen. The results in Figs. 3 and 4 confirm the assumption that the electric charge causes the retardation of the rate of evaporation at 2.5-4 millicuries/g. The increase of the rate of evaporation of $M\overset{*}{o}O_3$ above 4-5 millicuries/g depends on the radiation effects in the gaseous phase. A strong flow of β-particles ionizes the evaporated molecules to MoO_3^+ which repel themselves from the surface. The surface of the crystals is changed through radioactive radiation. The electron-microscopic pictures showed a surface for MoO_3 entirely different from that for $M\overset{*}{o}O_3$ which is full of irregularities, elevations, and depressions, the size of which depends on the strength of the specific radioactivity. It is also pointed out that the rate of evaporation begins to increase only at doses $> 10^{16}$ ev/g·sec in the case of an external irradiation of MoO_3 by an electron current of 800 kev. There are 4 figures, 1 table, and 14 Soviet-bloc references.

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S/020/61/139/003/024/025
B127/B206

Effect of radioactivity of molybdenum...

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, Academy of Sciences USSR)

SUBMITTED: April 12, 1961

Table 1. Rate of evaporation of MoO_3 as a function of the specific radioactivity of preparations. Legend: (1) Number of the preparation; (2) specific radioactivity, millicuries/g; (3) amount of MoO_3 (mean value) evaporated in 2 hr, grams; (4) observed deviation from the mean value, %.

1 па-ата	2 Удельн. радиоактивн., мCu/г	3 Колич. испаривш. за 2 часа MoO_3 (средн.), г	4 Наблюдавш. отклон. от средн., %	1 № препарата	2 Удельн. радиоактивн., мCu/г	3 Колич. испаривш. за 2 часа MoO_3 (средн.), г	4 Наблю- давш. клон. средн.,
1	Неактивный	0,1240	5,0	7	5,0	0,1148	3,5
				8	7,0	0,1458	5,0
2	1,0	0,1240	6,0	9	8,4	0,1514	7,0
3	2,0	0,1240	5,1	10	10,0	0,1556	4,5
4	2,5	0,1217	6,0	11	14,0	0,1600	5,0
5	3,0	0,1184	5,0	12	20,0	0,1623	6,0
6	4,0	0,1125	5,0	13	28,0	0,1009	6,0

Card 4/5

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S/020/61/139/005/020/021
B103/B208

5.4600

AUTHORS: Spitsyn, Vikt. I., Academician, Zemlyanova, L. I., Mikhaylenko, I. Ye., Gromov, V. V., and Zimakov, I. Ye.

TITLE: Electron-microscopic examination of the effect of radioactive radiation of solids on the structure of their surface

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 139, no. 5, 1961, 1163-1165

TEXT: The crystal lattice of solids is disturbed by the ionizing action of their own radioactive radiation and the appearing recoil atoms, which also changes their surface structure. According to the authors, all this may be one of the causes of the effect exerted on physicochemical properties of solids by their own radiation (sorptive power, solubility in water, kinetics of heterogeneous processes of isotopic exchange, catalysis, etc.). The authors made electron-microscopic studies of the surface structure of radioactive samples of K_2SO_4, $MgSO_4$, $BaSO_4$, and MoO_3 which had been used previously to study adsorption, catalysis, and isotopic exchange. Except for $BaSO_4$, the pictures were obtained by

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Electron-microscopic examination... S/020/61/139/005/020/021
B103/B208

replication, and for $BaSO_4$ the method of double replicas (silver-quartz replicas) was used. K_2SO_4, $MgSO_4$, and MoO_3 were applied to a collodion film in the form of a fine powder. A 200 - 300 Å thick quartz layer was sputtered onto it in vacuo. After dissolution of collodion in amyl acetate, the quartz replica were rinsed in distilled water in the case of K_2SO_4 and $MgSO_4$, and in dilute alcohol in the case of MoO_3. Radioactive samples of K and Mg were obtained by adding small amounts of Na_2SO_4 containing S^{35}. $Ba\overset{*}{S}O_4$ precipitates were isolated by a method previously described by Vikt. I. Spitsyn, V. V. Gromov (DAN, 123, 722 (1958); Radiokhimiya, 1, 181 (1959)). Radioactive $M\overset{*}{o}O_3$ was obtained by adding an Mo^{99} containing sample to ordinary MoO_3 in order to attain the necessary specific radioactivity. The mixture was converted to ammonium molybdate by treating it with aqueous ammonia; it decomposed when heated. The resultant $M\overset{*}{o}O_3$ was sublimed at 850°C. When comparing the pictures (magnification: 12,000 times) [Abstracter's note: Not reproducible] the

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Electron-microscopic examination... S/020/61/139/005/020/021
B103/B208

authors found the following differences in the crystal surface of a) radioactive and b) non-radioactive samples: 1) The surface of b) is comparatively smooth, that of a) highly pitted. The crystal surface of $BaSO_4$ is changed to a high extent by incorporation of small radium amounts. K_2SO_4, $BaSO_4$, and MoO_3 also show some changes in their surface structure after an external irradiation with 800-kev electrons. Although the dose was much higher in this case, the changes were less pronounced than those caused by radioactive radiation. The above surface defects appear rather regularly over the whole length of the crystal of the radioactive substance. The deep cavities observed in samples irradiated with neutrons were absent. The surface changes resemble those observed in metal etched by an ion beam. The authors further conclude from the comparison of the photographs that the surface defects of the radioactive samples develop already during the separation of the solid phase from the solution or from the gas. They assume that the radiation of electrons or other charged particles during the crystallization of solid substances gives rise to a great number of new active centers (seed crystals). The particle-size distribution on separation of radioactive salts from

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Electron-microscopic examination... S/020/61/139/005/020/021
B103/B208

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences USSR)

SUBMITTED: April 15, 1961

Card 5/5

ZIMAKOV, I.Ye.; ROZHAVSKIY, G.S.

Multiple radioactive dilution method for determining small amounts of impurities. Zav. lab. 24 no.8:922-925 '58. (MIRA 11:8)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut tsvetnykh metallov.
(Tracers (Chemistry)) (Antimony--Analysis)
(Lead--Analysis)

ZIMAKOV, I. Ye., and ROZHAVSKIY, G. S.

"Method of repeated radioactive dilution for the determination of small admixtures (of the order of 10^{-4} to 10^{-7}%)."

report presented at The Use of Radioactive Isotopes in Analytical Chemistry, Conference in Moscow, 2-4 Dec 1957
Vestnik Ak Nauk SSSR, 1958, No. 2, (author Rodin, S. S.)

ZIMAKOV, I.Ye.

Determining the solubility of barium tungstate with radioactive tungsten-185. Zav.lab. 25 no.2:133-134 '59. (MIRA 12:3)

1. Gosudarstvennyy nauchno-issledovatel'skiy institut tsvetnykh metallov.

(Barium tungstates) (Solubility) (Tungsten--Isotopes)

AUTHORS: Zimakov, I. Ye., Rozhavskiy, G. S. SOV/32-24-8-2/43

TITLE: The Method of Multiple Radioactive Dilution for Determining Trace Amounts in Mixtures (Metod mnogokratnogo radioaktivnogo razbavleniya dlya opredeleniya malykh primesey)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol.24, Nr 8, pp. 922-925 (USSR)

ABSTRACT: Previous methods of using radioactive dilution for determining trace amounts in mixtures have had a certain disadvantage. The specific activity and the amount of the isolated substance have had to be determined by an analytical method. In this paper a method is described which eliminates this disadvantage. This determination involves adding two different amounts m_1 and m_2 of the radioactive isotope of the substance x being determined to two similar solutions of this substance. By withdrawing equal amounts of substance y the concentration of the substance x to be analysed can be calculated according to the activity. The paper gives the formula for calculating the concentration, and gives several other equations as well. If the weighed amount of the sample to be analysed and the specific activity of the preparation are increased the ad-

Card 1/2

The Method of Multiple Radioactive Dilution for Determining Trace Amounts in Mixtures

SOV/32-24-8-2/43

mixture can be determined in the order of magnitude of 10^{-5} to 10^{-7} % with an accuracy of about 10 %. A method of determining trace amounts of antimony in lead was worked out. The main problem here was to find a way by which small and equal amounts of the substance to be analysed could be separated from solutions of different concentrations. The most suitable method found for this purpose was extraction of the antimony-methylviolet complex compound with toluene. The optimal acidity of the antimony solution was found to be 1:9 in HCl. A procedure as well as tables of results obtained are given.
There are 2 tables.

ASSOCIATION: Gosudarstvennyy nauchno-issledovatel'skiy institut tsvetnykh metallov (State Scientific Research Institute for Non-ferrous Metals)

Card 2/2

S/020/63/148/004/022/025
B144/B101

AUTHORS: Zimakov, I. Ye., Dobrosel'skaya, N. P., Spitsyn, Vikt. I., Academician

TITLE: Effect of the radioactivity of molybdenum trioxide on the change of its specific surface

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 4, 1963, 884-885

TEXT: The specific surface was studied in MoO_3 samples containing different quantities of Mo^{99} ($T_{1/2}$ = 68.3 hr, $E(\beta)_{max}$ = 1.23 Mev). A mixture of radioactive and non-radioactive MoO_3 was converted by NH_4OH to ammonium molybdate. The solution was evaporated and the residue calcined with addition of HNO_3 to prevent reduction of sexivalent Mo by NH_3. The MoO_3 recovered was mixed with small quantities of Nb_2O_5 and ZrO_2 and sublimated at 850°C. The surfaces were measured in samples of

Card 1/2

Effect of the radioactivity of ...

S/020/63/148/004/022/025
B144/B101

0.5 - 0.25 mm granulation. The external specific surface (without blind pores) was measured by filtering rarefied air through the sample and determining the resistance. At radioactivities up to ≃ 10 mcu/g, these surfaces decreased slightly, whereas with higher mcu values they increased. The total surface was determined by the BET method with adsorption of krypton (area occupied by the Kr molecule: 19.5 Å^2). Additions of radioactive MoO_3 up to 10 mcu reduced the total specific surface (maximum 30%), while higher additions increased it. The absolute values obtained by the two methods were rather similar, which indicates only a small number of blind pores. Based on a previous study (DAN, 139, 654 (1961)), the reduction of the specific surface with low radioactivities is attributed to the reduction of the evaporation rate. Higher radioactivity entails higher evaporation rates and formation of dendrites owing to the effect of β-particles. There are 2 figures.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry of the Academy of Sciences USSR)

SUBMITTED: November 16, 1962

Card 2/2

L 00622-67 EWT(1)/EWT(m)/T/EWP(t)/ETI IJP(c) GG/JD

ACC NR: AT6020037 (A) SOURCE CODE: UR/2564/65/005/000/0212/0218

AUTHOR: Spitsyn, V. I.; Zimakov, I. Ye.; Dobrosel'skaya, N. P.

52
B+1

ORG: none

TITLE: The influence of radiation on the formation and uniformity of crystals 12

SOURCE: AN SSSR. Institut kristallografii. Rost kristallov, v. 5, 1965, 212-218

TOPIC TAGS: crystal growth, crystal deformation, radiation damage, radiation effect

ABSTRACT: In the last 5 years the Institute of Physical Chemistry, Academy of Sciences SSSR (Institut fizicheskoy khimii Akademii nauk SSSR) gathered numerous data concerning the influence of radioactive radiations of solids on their physico-chemical properties, in particular the production of nonuniform crystals. The present article contains further data collected during the study of radioactive crystalline powders of barium tungstate, elementary sulfur, molybdenum tri- and disulfide, all synthesized by crystallization from solutions and gaseous vapors, and precipitation from alloys. The nonradioactive and radioactive samples with differing specific activity were prepared under strictly identical conditions. The samples were studied by measuring their size and their specific surface, and by taking electron-miscroscopic pictures. The paper describes in considerable detail the

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L 00622-67

ACC NR: AT6020037

0

preparation and analysis of the samples. The results are given in the form of graphs showing the specific surface of crystals as a function of activity and a table summarizing the results of the particle size analysis. Radiation was due to W^{185}, S^{35}, and Mo^{99} isotopes. The paper concludes with a discussion of the microphotographs. Orig. art. has: 7 figures and 2 tables.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 007/ OTH REF: 000

Card 2/2 pb

L 26745-66 EWT(m) DIAAP JD/JG

ACC NR: AP6011474 SOURCE CODE: UR/0070/66/011/002/0316/0320

30

B

AUTHOR: Spitsyn, V. I.; Zimakov, I. Ye.; Zemlyanova, L. I.

ORG: Institute of Physical Chemistry, Academy of Sciences, SSSR (Institut fizicheskoy khimii Akademii nauk SSSR)

TITLE: Investigation of the influence of radioactive emission from Mo^{99} on the surface structure of molybdenum anhydride

79

SOURCE: Kristallografiya, v. 27 11, no. 2, 1966, 316-320

TOPIC TAGS: molybdenum compound, radioactivity effect, surface property, crystallization

ABSTRACT: The authors investigated under an electron microscope the surface structure of samples of molybdenum trioxide containing different amounts of radioactive Mo^{99}, which emits high-energy β particles (1.23 Mev) of relatively short half life

centers during the course of crystallization. The radioactivity also in-

Card 1/2 UDC: 548.4: 539.16

L 26745-66

ACC NR: AP6011474

creased appreciably the effective external surface of the crystal. Other changes induced by the radioactivity are the decomposition of the crystal into smaller blocks and a certain degree of asterism. Orig. art. has: 5 figures.

SUB CODE: 20/ SUBM DATE: 30Apr65/ ORIG REF: 014/ OTH REF: 001

ZIMAKOV, N. V.

"Prospects of Using Fission Product Source Radiation in Radiation Chemistry",

by N. V. Zimakov, E. V. Volkova, A. V. Fokin, V. V. Kulichenko, V. G. Vereskunov,

A. G. Bykov, and N. I. Bogdanov

Report presented at 2nd UN Atoms-for-Peace Conference, Geneva, 9-13 Sept 1958

ZIMAKOV, P. P. (Assist. Prof.)

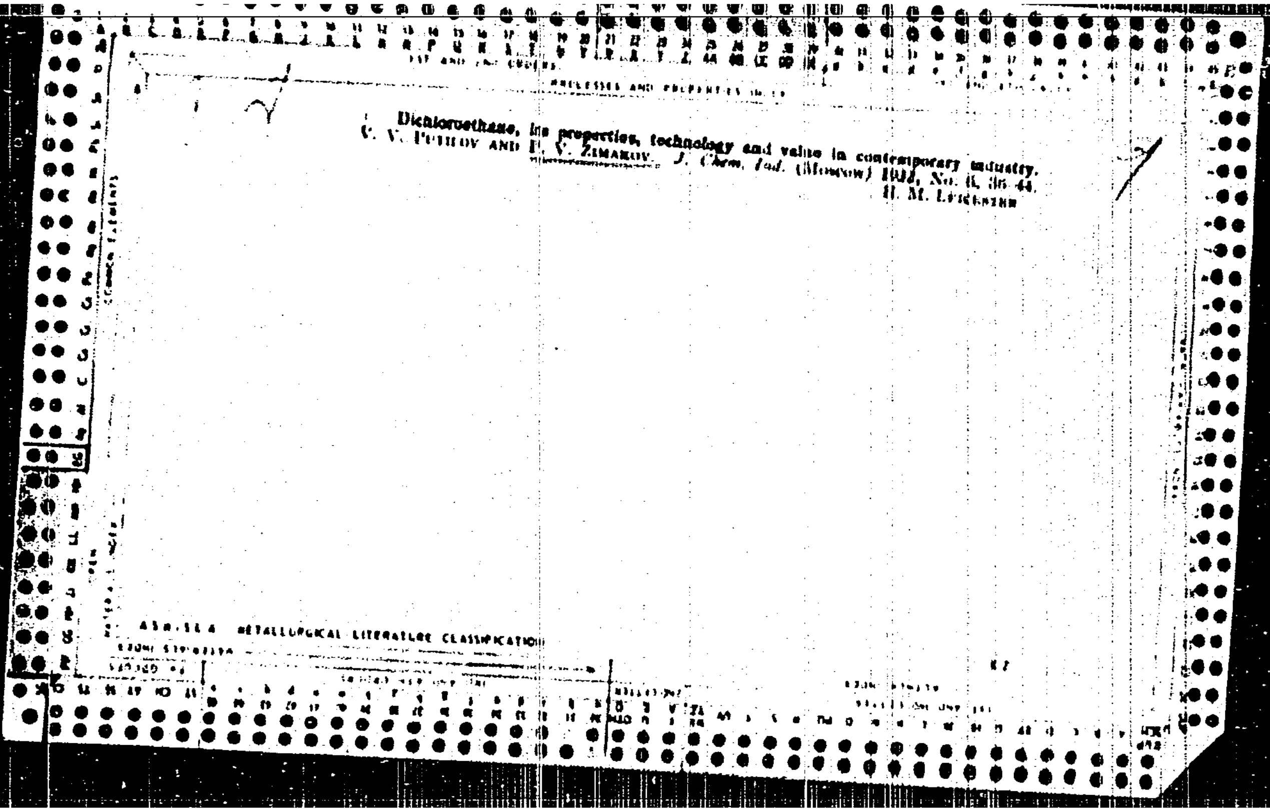
"Trainer for Fighter Pilots."

report presented at the 13th Scientific Technical Conference of the Kuybyshev Aviation Institute, March 1959.

CA

Catalytic formation of hydrocyanic acid from ammonia and carbon monoxide. P. V. Zimakov. *J. Russ. Phys.-Chem. Soc.* **61**, 997-1000(1929). The kinetics of the Maille and de Godon reaction (*C. A.* **15**, 370) were studied. The expts. were carried out in a glass tube 10 mm. in diam. and 750 mm. long, placed in an elec.-heated furnace and contg. a layer of catalyzer over which NH_3 and CO were passed. The HCN formed was absorbed in U-tubes contg. H_2O. ThO_2, ZrO_2, Al_2O_3, Cr_2O_3, V_2O_5 and UO_2 as well as mixts. of these oxides and their ppts. on pumice, brick, and asbestos were tried as catalysts. At the outset, ThO_2 and UO_2 show the greatest catalyzing activity, but they also show the quickest drop in activity, namely a 77.3 and a 60.0% decrease after the first 20 min. ZrO_2 has an insignificant activity at 400°, the temp. at which the other catalyzers were used, and 550° was necessary. After 20 min. it lost only 14-15% of its activity. The drop in catalyzer activity is not due to impurities contained in the original gases, but is due to CO_2 formed from an unavoidable side reaction. The activity of poisoned ZrO_2, ThO_2 and V_2O_5 can be restored by merely leaving them alone for 2 days, and still better by passing an air current over the heated catalyzer. UO_2 never recovers its former activity, and Cr_2O_3 only recovers it to a slight extent. Dependence of the reaction velocity on concn. of the gases over the catalyzer was tested by changing the CO/NH_3 ratio by varying the speeds of these gases over the catalyzer, as well as by diln. with an inert gas, such as H_2. Only an insignificant variation of velocity of HCN formation was found. The main reaction, $NH_3 + CO = HCN + H_2O$, is usually accompanied by 3 side reactions, one of which is $2NH_3 = N_2 + 3H_2$. This dissocn. is particularly large when the catalyzers are used in the form of ppts. on porous substances, apparently owing to a peculiarity of SiO_2. Dissocn. is very small with chemically pure catalyzers, and with pure ThO_2 there is none up to 600°. The side reaction $2CO = C + CO_2$ is practically absent with ThO_2, ZrO_2 and particularly a mixt. of ZrO_2 and V_2O_5, but with UO_2 it is considerable, the catalyzer becoming covered with C and permanently weakened. Schuftan's results (*C. A.* **20**, 1576) with Ni as catalyzer, that CO decompn. can only be prevented when the CO content is less than 10% and the temp. not over 400°, are extended to all the catalyzers tried. The reaction $CO + H_2O = H_2 + CO_2$ cannot be avoided. It takes place no matter what catalyzer is used and at the expense of either the adventitious moisture or of H_2O formed in the main reaction. CO_2 thus produced is very harmful. It retards HCN formation and causes the rapid loss of activity of the catalyzer, which adsorbs it until the CO_2 equil. is reached on the surface of the catalyzer.

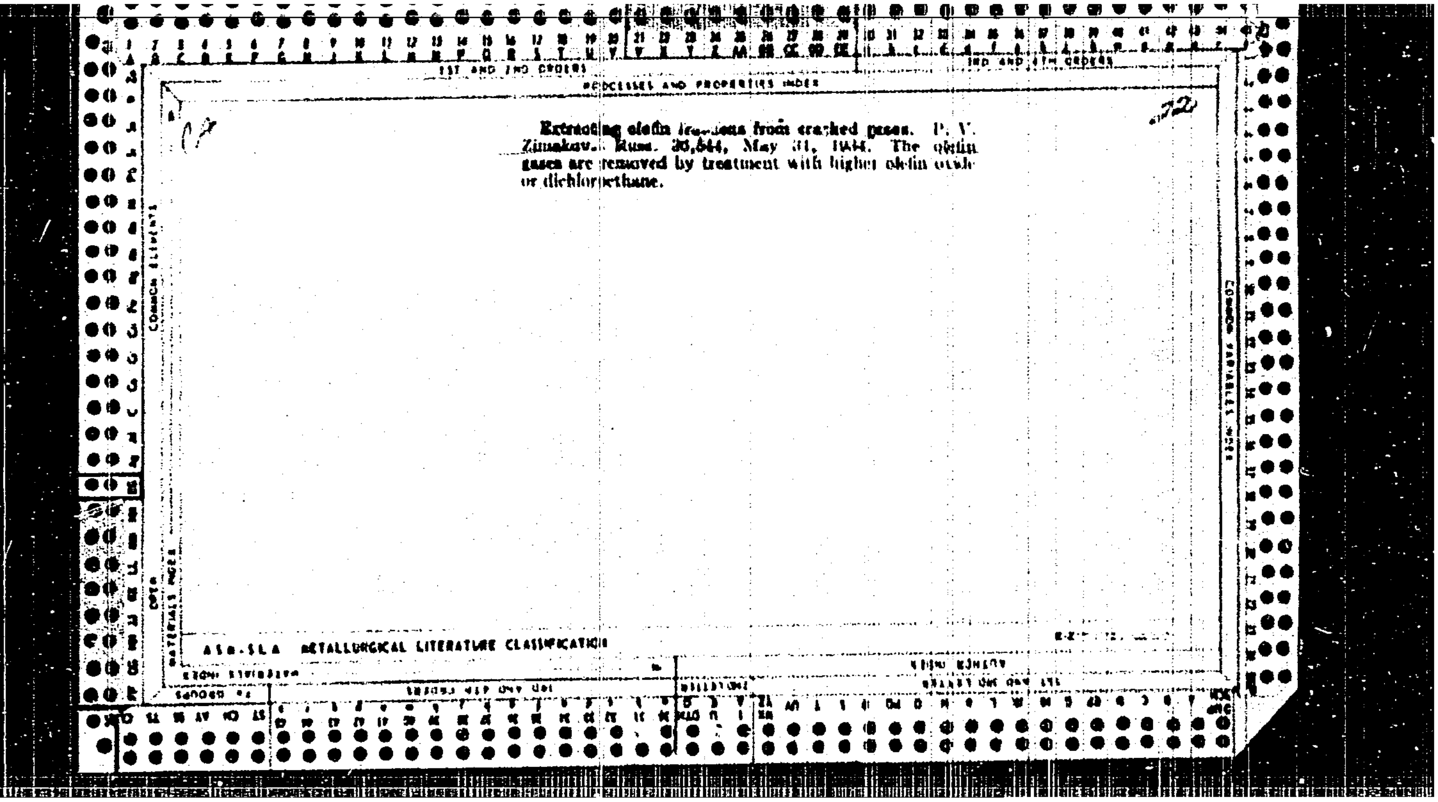
Bernhard Nelson



PROCESSES AND PROPERTIES INDEX

Dichloroethane, its properties, technology and value in contemporary industry. V. V. Putilov and P. V. Zimakov. J. Chem. Ind. (Moscow) 1932, No. 6, 36-44.
H. M. Leicester

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



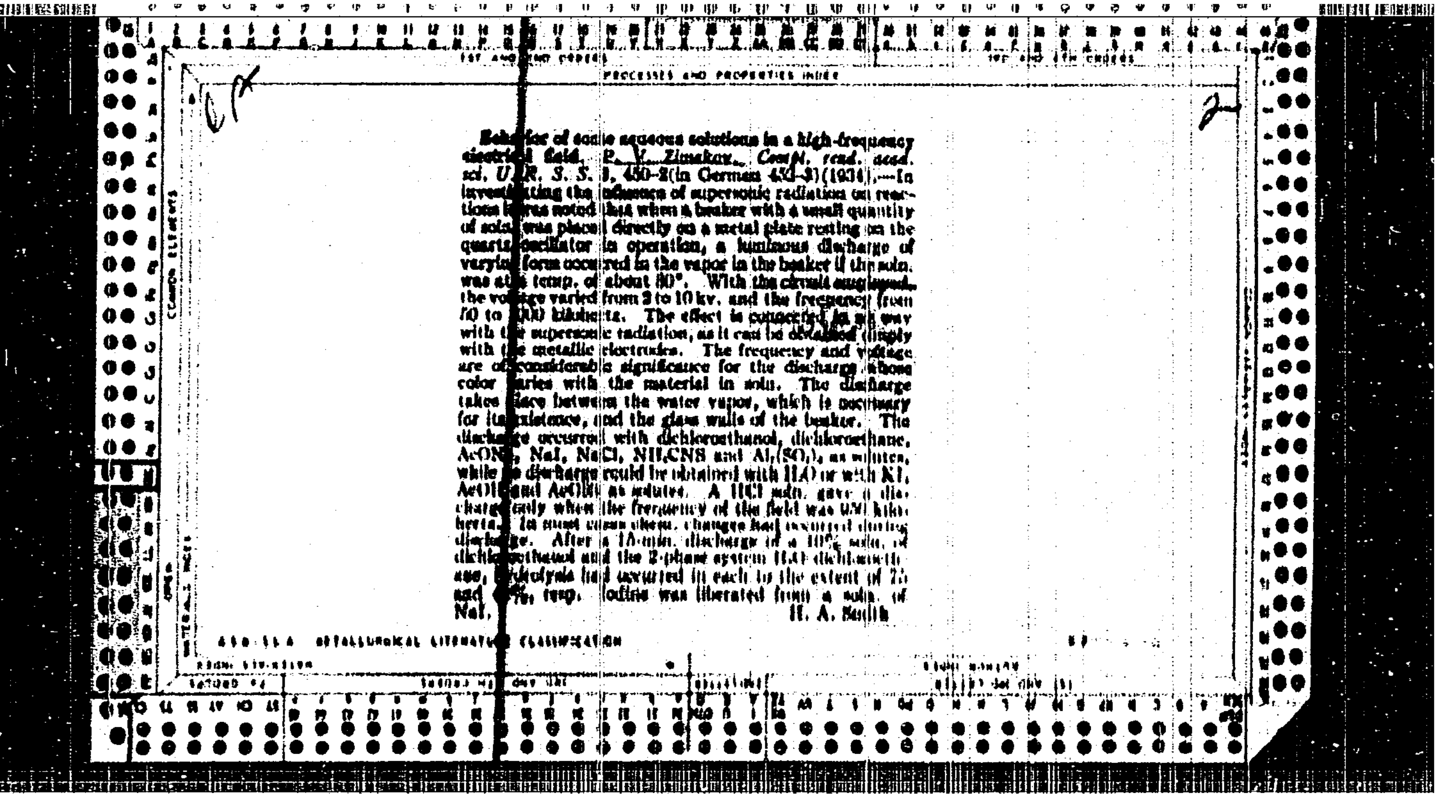
1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Extracting olefin fractions from cracked gases. P. V. Zimakov. Russ. 30,544, May 31, 1933. The olefin gases are removed by treatment with higher olefin oxide or dichloroethane.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

CP

2

Behavior of some aqueous solutions in a high-frequency electrical field. P. V. Zimakov. *Compt. rend. acad. sci. U.R.S.S.* 1, 450-2 (in German 452-3) (1934).—In investigating the influence of supersonic radiation on reactions it was noted that when a beaker with a small quantity of soln. was placed directly on a metal plate resting on the quartz oscillator in operation, a luminous discharge of varying form occurred in the vapor in the beaker if the soln. was at a temp. of about 80°. With the circuit employed, the voltage varied from 2 to 10 kv. and the frequency from 50 to 300 kilohertz. The effect is connected in no way with the supersonic radiation, as it can be obtained directly with the metallic electrodes. The frequency and voltage are of considerable significance for the discharge whose color varies with the material in soln. The discharge takes place between the water vapor, which is necessary for its existence, and the glass walls of the beaker. The discharge occurred with dichloroethanol, dichloroethane, AcONa, NaI, NaCl, NH_4CNS and $Al_2(SO_4)_3$ as solutes, while no discharge could be obtained with H_2O or with KI, AcOH and AcOEt as solutes. A HCl soln. gave a discharge only when the frequency of the field was 300 kilohertz. In most cases chem. changes had occurred during discharge. After a 15-min. discharge in a 10% soln. of dichloroethanol and the 2-phase system H_2O-dichloroethane, hydrolysis had occurred in each to the extent of 75 and [illegible]%, resp. Iodine was liberated from a soln. of NaI.

H. A. Smith

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

3.

CA

Primary molecular interactions in chemical kinetics. P. [illegible] Zimakov. J. Phys. Chem. (U. S. S. R.) 6, 824-31 (19[illegible]).—Theoretical review. Mol. formation must result at the cost of polarized electrostatic forces. Intermediate compds., adsorption and activated adsorption are discussed. F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

ca

10

Production of the monoethyl ether of ethylene glycol. P. Zimakov and A. Chaurakov. Org. Chem. Ind. (U. S. S. R.) 1, 329-32(1936).—$HOCH_2CH_2OEt$ (I) was obtained in 95-6% yield, with practically no formation of ethylene glycol (II) and ethers of polyglycols (chiefly diethylene glycol Et ether (III)), by autoclaving a mixt. of 1 part of ethylene oxide (IV) and 8 parts of abs. alc. with 1% H_2SO_4 or $NaHSO_4$ for 7-8 hrs. at 100°, 4-5 hrs. at 150° or 3 hrs. at 200° (cf. Brit. pat. 271,160, C. A. 22, 1406). Since II and III are valuable com. products, the use of a large excess of abs. alc. was eliminated in the comm. production of I. A mixt. of 1 part by wt. of IV, 5 parts of 90% alc. and 0.5% of H_2SO_4 or $NaHSO_4$ was autoclaved at 100° for 5 hrs., giving 35-40% I, 55-60% II and 0-0.5% III. As a result of the dehydrating action of IV 66% of the alc. was recovered as anhyd. EtOH, which was used in the production of I. C. Blanc

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

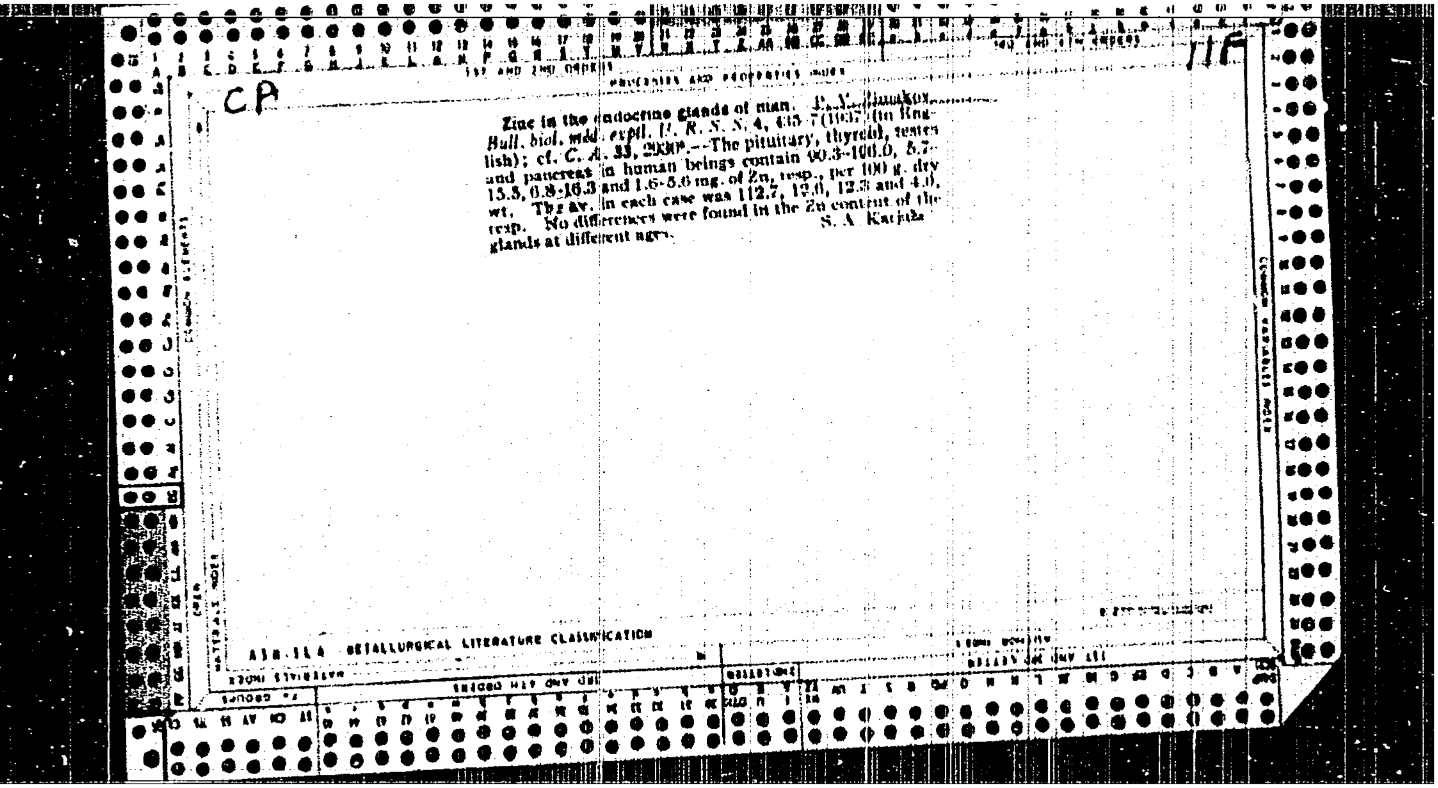
PROCESSES AND PROPERTIES INDEX

ca

10

Preparation of ethylene chlorohydrin by the Gomberg process. P. Zinakov and O. Gritich. *Org. Chem. Ind.* (U. S. S. R.) 1, 396-404(1936).—Expts. in the prepn. of CH_2ClCH_2OH (I) by the Gomberg process (*C. A.* 13, 2368) are described. Dil. and 90-6% C_2H_4 and naphtha cracking gas contg. 15% C_2H_4 were treated in H_2O or dil. I with about 10% excess Cl in the Bozza app. (Bozza, *et al.*, *C. A.* 24, 5021; 25, 2962). At temps. below 25° a yield of 91-3% I was obtained from concd. C_2H_4. Above 25° the rate of formation of I decreases and that of $(CH_2Cl)_2$ increases. The reaction rate is retarded at the concn. of 15-16% I, and not at 7-8% as claimed by Gomberg and Tropsch and Kassler (*C. A.* 20, 1242). Cracking gas gave 70-80% I (based on Cl). The addn. of 0.1-0.2% $CuSO_4$ failed to catalyze the formation of I. C. Blanc

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CP

11A

Zinc in the endocrine glands of man. P. V. Bunakov. *Bull. biol. méd. exptl. U. R. S. S.* 4, 435-7(1937)(in English); cf. *C. A.* 33, 2930^8.—The pituitary, thyroid, testes and pancreas in human beings contain 90.3-100.0, 8.7-15.5, 0.8-16.3 and 1.6-5.6 mg. of Zn, resp., per 100 g. dry wt. The av. in each case was 112.7, 12.0, 12.3 and 4.0, resp. No differences were found in the Zn content of the glands at different ages.

S. A. Karjala

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1A

PROCESSES AND PROPERTIES INDEX

The determination of zinc in biological materials. P. V. Zimakov. *J. Physiol.* (U. S. S. R.) 24, 992-5 (in French, 995)(1938).—The material to be analyzed is thoroughly ashed at temps. below 600°, treated with dil. HCl, allowed to stand several hrs., filtered and the filtrate evapd. to dryness. To the residue is added 1.2 cc. of 1:1 HCl and distd. H_2O to 15 cc., and H_2S is passed through the soln. for 15-20 min. After standing 8 hrs. the sulfides are filtered and washed thoroughly and the filtrate is evapd. to dryness. To the residue is added 0.6 cc. of glacial HOAc and 14.4 cc. of H_2O, and H_2S is passed through the soln. for 20 min. Under these conditions ZnS ppts. and leaves the sulfides of Fe, Ni and Co in soln. After 12-24 hrs. 0.25 g. of $Al(OH)_3$ or talc is added to the soln. with stirring and the soln. is filtered. The ppt. is washed with HOAc, H_2S soln. and H_2O until free of Fe, Co and Ni. A final moistening with 2% NH_4CNS indicates the presence or absence of Fe. The ppt. is treated with 2.4 cc. of 3 *N* HCl, the soln. is dild. to 10 cc. and 1 cc. of 2% $K_4Fe(CN)_6$ is added. The turbidity of the soln. is compared with that of standard solns. contg. 0.02-0.2 mg. of Zn. The results are 10% in error at 0.02 mg. and 2.5-7.5% at 0.04-0.2 mg. of Zn. S. A. Karjala

1B

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PROCESSES AND PROPERTIES INDEX

Ca

11F

The zinc content of exercised muscles of rabbits. P. V. Zimakov. *Bull. biol. méd. exptl. U. R. S. S.* 9, 79-80 (1940) (in French).—The exercised muscles of rabbits contain 2.0-4.4 mg. of Zn/100 g. dry residue, as compared with 0.89-1.43 mg. in control muscles. The metal accumulates in the muscle during training and appreciable amts. are present in the muscle even after 6 days of rest following training. After this period it slowly falls to normal over a long period of time. S. A. Karjala

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

Ce

10

Catalytic oxidation of allyl alcohol to acrolein. P. V. Zimakov and V. A. Pokrovskii. *Compt. rend. acad. sci. U.R.S.S.* 48, 641-3(1945)(in French).—Allyl alc. (I) was oxidized to acrolein (II) over a Ag catalyst (III) under the same conditions that ethylene is oxidized to ethylene oxide. When 8 vol. % of I in air was passed at 15 l./hr. through a bed of III 100 mm. deep and 20 mm. diam., at a temp. of 200-40°, the conversion of I to II was 76.0% of the theoretical. Under other conditions lower conversions were obtained. W. J. Kirkpatrick

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Ca

10

Formation of ethylene oxide from dichloroethane. P. V. Zimakov. *Doklady Akad. Nauk S.S.S.R.* **50**, 219-23(1945).—Passage of $(CH_2Cl)_2$ vapor over Pb oxide deposited on pumice at 120° results only in traces of ethylene oxide (I). Addn. of steam to the vapor phase (even in small amts.) increases the yield considerably especially if alternate passes are made. The catalyst, however, is very rapidly inactivated. The highest yield (0.25%) was attained with fresh catalyst at 180°. Addn. of 1-10% fresh CuO to the catalyst results in the best yield (0.4%) in the range 120-200°. Above 200° some AcH is formed with the max. yield obtained at 250° (1.5-2%); at 250-80° some $ClCH_2CH_2OH$ may be detected. Use of Pb carbonate deposited on pumice results in zero reaction up to 250° (with or without steam); above 250° (max. at 320°) the yields of I compare with those obtained from the PbO catalyst used as such. The use of granulated soda lime as the catalyst results in the formation of I above 120° (with steam), with a max. yield at 180° (1%); above 200°, AcH and $ClCH_2CH_2OH$ begin to form (max. 8% and 0.5%). This catalyst was best for durability, as 6-10 hrs.' operation resulted in but a small decrease in conversion. Thus, I formation is conditioned by the presence of water. It is believed that the PbO catalyst operates at 120-200° by formation of $ClCH_2CH_2OPbCl$, which splits with H_2O into Pb(OH)Cl and $ClCH_2CH_2OH$, and the latter yields I on reaction with PbO; AcH formation above 200° is an isomerization of I. The soda-lime reaction is analogous. The usual hydrolysis of $(CH_2Cl)_2$ into glycol in the presence of weak bases must be a 2-step hydrolysis going through $(CH_2Cl)_2$ as intermediate.

G. M. K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

ZIMAKOV, P.V.

[Ethylene oxide] Okis' etilena. Moskva, Gos. nauchno-tekhn. izd-vo khim. lit-ry, 1946. 237 p. (MIRA 7:12)
(Ethylene oxide)

CA

PROCESSES AND PROPERTIES INDEX

2

The peculiarities of the structure and properties of ethylene oxide. P. V. Zimakov. *J. Phys. Chem.* (U.S.S.R.) 20, 133-7(1946).—The heat of formation and chem. properties of ethylene oxide are accounted for by assuming the resonance forms $^+CH_2.CH_2.O^-$ and $^-O.CH_2.CH_2^+$. Also in *Acta Physicochim. U.R.S.S.* 21, 401-8(1946)(in English). J. J. Bikerman

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDER

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDER

CA

10

Peculiarities of the molecular refraction of ethylene oxide. P. V. Zimakov. *J. Phys. Chem.* (U.S.S.R.) 21, 913-18 (1947)(in Russian).—The at. refraction of O in epoxy compds. (ethylene oxide, epichlorohydrin, etc.) and in furan is 1.074 for the D line. The increment due to the 3-membered cycle in epoxy compds. is equal to that for cyclopropane (0.7). These assumptions are preferred to those of Auwers (*C.A.* 13, 433). J. J Bikerman

COMMON ELEMENTS

MATERIALS INDEX

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

37

CA

Chemical properties of ethylene oxide polymer. P. V. Zimakov and E. V. Girshberg. *Doklady Akad. Nauk S.S.S.R.* **58**, 1001-3(1947).—A solid ethylene oxide polymer produced by contact with either dil. NaOH or $SnCl_4$, m. about 62°, was examd. Treatment with Br gave a sirup with much heat evolution and no solid deriv. could be obtained; treatment with $AgNO_3$ readily ppts. AgBr while KI liberates free I; treatment with Hg for 48 hrs. gave a liquid product, b. 100°, whose constants are close to those of dioxane. A spot test of the polymer with alc. I gave red crystals which are quite unstable; the product, m. 82°, appears to be $O(CH_2CH_2)_2OI_2$. Treating with $SnCl_4$ yields colorless crystals, m. 125°, which appear to be $2SnCl_4.3C_4H_8O_2$. Apparently all the reaction products can be formulated like adducts of dioxane at one of the O atoms. G. M. K.

CA

10

Oxidation of allyl alcohol to acrolein. P. V. Zimakov and V. A. Pokrovskii. *Doklady Akad. Nauk S.S.S.R.* **63**, 143-5(1948).—The previously proposed scheme (Z. and P., *C.A.* **40**, 1318⁹) of the oxidation on an Ag catalyst, $CH_2:CHCH_2OH$ (I) + ½ O_2 → $\underbrace{O.CH_2.CH}CH_2OH$ (II) $\xrightarrow{-H_2O}$ $CH_2:CHCHO$ (III), was tested by a qual. reaction for II (neutral urotropine + phenolphthalein) and by quant. detn. by the method of Lubatti (*C.A.* **27**, 245). With an Ag powder catalyst column 15 mm. in diam., 300 mm. long, characterized by oxidation of 3 vol. % C_2H_4 with air to 50% $(CH_2)_2O$ and 30% CO_2 and H_2O at 225°, oxidation of about 3% I with air passed at 10 l./hr., at 150, 170, and 200°, gave yields of 8.30, 47.14, and 83.0% III, no CO_2; at 5 l./hr., 200, 225, and 250°, 92.31, 100.00, and 21.05% III, 0, 0, and 11.4 vol. % CO_2 in the outgas. At 10 l./hr., 175 and 200°, 0.67 and 1.12% II were detected along with 47.11 and 83.00% III; with an azeotropic mixt., I 1.74 + H_2O 0.74 vol. %, at 200°, the yield of II reached 13.75%, along with 80.00% III. Evidently, H_2O vapor inhibits further conversion of II to III, in agreement with the proposed scheme. On the same catalyst, II alone with an excess of air is oxidized, at 250°, to the extent of 50%, but mainly to CO_2 and H_2O, with only small amts. of III. However, mixts. of I and II give high yields of III, e.g., 80% I + 20% II, at 250°, feed rate 1.85 and 5.40 g. mixt./hr., gave, resp., 0.2 and 41.41% II, 72.92 and 50.38% III, as against 0.0% II and 5.32% III with pure I (calcd. for 20% I for comparability). Thus, II appears to be the intermediate product in the oxidation of I; depending on the conditions, it can either be dehydrated to III or hydrated to $CH_2(OH)CH(OH)CH_2OH$ as in the expts. of Wagner (*Ber.* **21**, 1230, 3347(1888)).

N. Thon

CA

10

Some peculiarities of structure and formation of dioxane. P. V. Zimakov and G. F. Margolina. *Zhur. Fiz. Khim.* **23**, 689-94(1949); cf. *Doklady Akad. Nauk S.S.S.R.* **58**, 8(1947).—Dioxane is particularly stable because it has 9 resonance structures. Formation of dioxane proceeds via oxonium compds. because these have an even higher resonance energy.

J. J. Bikerman

CA

1A

Participation of polyphenols in peroxidase oxidation of substrate with an imine group. P. V. Zinakov (Acad. Med. Sci., Moscow). *Biokhimiya* 16, 37-41(1951).—Blood peroxidase oxidizes indigo carmine (C.A. 40, 1001^9). But the plant peroxidase in horse radish, while rapidly oxidizing pyrogallol and guaiacol, can not oxidize indigo carmine. On introducing into the reaction mixt. pyrogallol, guaiacol, or adrenaline, indigo carmine is rapidly oxidized by the horse radish peroxidase. Polyphenols act as intermediate catalysts in the peroxidase oxidation of substrates with imino groups. Apparently blood erythrocytes are capable of rapidly oxidizing substances with imino groups because of the participation of adrenaline as an intermediate catalyst.

H. Priestley

1951

ZIMAKOV, P. V.

USSR/Chemistry - Propylene Oxide Jul 53

"Some Physical-Chemical Properties of Propylene Oxide," P. V. Zimakov and V. A. Sokolova

Zhur Fiz Khim, Vol 27, No 7, pp 1079-1080

Remeasured density, refractive index, and viscosity of propylene oxide and detd its limits of miscibility in water with greater accuracy. Found that propylene oxide forms the cryst hydrate $C_3H_6O \cdot 16H_2O$, m p -3°, under proper conditions.

271T14

ZIMAKOV, P. V.

(2)

A peculiarity in the reaction of ethylene oxide vapor with wood. P. V. Zimakov and V. A. Pokrovskii. *Zhur. Priklad. Khim.* [illegible]-8(1954).—Ordinary wood chips or pieces of cellulose in contact with ethylene oxide vapor at times show development of a brown or black color without any notable change in vol. or without binding large amts. of the oxide. Cellulosic matter pretreated with NaOH reacts with the oxide which diffuses through the cellulosic mass leading to swelling and bursting of structure (in the sense of strength loss), with preservation, however, of all structural details of the original piece. Several photographs are shown, portraying the forms obtained after 2-3 weeks exposures. G. M. Kosolapoff

MF
9-20-54

ZIMAKOV, P.V.

"Behavior of ethylene oxide at elevated temperatures."
[illegible]

ZIMAKOV, P.V.

USSR/ Chemistry - Physical chemistry

Card 1/2 Pub. 147 - 10/26

Authors : Zimakov, P. V.

Title : Behavior of C_2H_4O at higher temperatures

Periodical : Zhur. fiz. khim. 29/1, 76-83, Jan 1955

Abstract : The pyrolysis of ethylene oxide in combination with nitrogen and the reaction of the C_2H_4O with ethylene, acetylene, benzene and toluene were investigated to determine the behavior of the C_2H_4O at higher temperatures (above 400° C). The data obtained indicate that at temperatures exceeding 400° the C_2H_4O is converted into a metastable biradical, Dimethylene oxide.

Institution : ....

Submitted : April 16, 1954

Periodical : Zhur. fiz. khim. 29/1, 76-83, Jan 1955

Card 2/2 Pub. 147 - 10-26

Abstract : The conversion of C_2H_4O molecules into the biradical, dimethylene oxide, and its consequent reactions explain the characteristics of [illegible] at [illegible] temperatures. Twenty one [illegible] English and German [illegible] (19[illegible]-19[illegible]). [illegible]

Tables; graph

ZIMAKOV,P.V.

[redacted]

Peculiarities in the structure and properties of ethylene oxide.
Zhur.fiz.khim. 29 no.3:496-501 Mr '55. (MIRA 8:7)
(Ethylene oxide)

ZIMAKOV, P.V.

Category: USSR / Physical Chemistry-Molecule. Chemical bond B-4

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29552

Author : Zimakov, P.V.
Inst : ~~not given~~
Title : Experimental Confirmation of the Presence of Oxonium Form of Ethylene Oxide in Aqueous Solutions

Orig Pub: Zh. fiz. khimii, 1956, 30, No 8, 1904-1905

Abstract: Distortion of valency angles in the molecule of ethylene oxide (I) must increase the affinity of oxygen to the proton and its tendency to conversion to the "oxonium" state. Comparison of blowing with air, at a rate of about 10 liters per hour, of 1.5-1.6% solutions of I, in neutral and in acidified water, at 15-20°, has revealed that from neutral solutions I is driven off completely within 15 minutes, while in acidified solutions up to 15% of the initial amount of I are always retained. In the opinion of the author this is due to a lowering of the vapor tension of I, caused by a solvation, catalyzed by H^+ ions, with formation of the oxonium form of I.

Card : 1/1

ZIMAKOV, P.V.

1

USSR/Chemical Technology - Chemical Products and Their Application. Industrial Organic Synthesis. I-1

Abs Jour : Ref Zhur - Khimiya, No 1, 1958, 2146

Author : Zimakov, P.V.
Inst : —
Title : Current Methods for the Preparation of Ethylene Oxide

Orig Pub : Khim. nauka i prom-st', 1957, 2, No 1, 24-33

Abstract : A review article. Considered in detail are the two principal current methods for the preparation of ethylene oxide (I), which are of significance in the industrial production of I: a) the method comprising the step of hypochlorination of ethylene (II) with subsequent decomposition of the resulting $HO(CH_2)_2Cl$, and b) the method of direct oxidation of II, with O_2 or air, to I, without catalyst (volumetric oxidation) or over an Ag catalyst. Views concerning the mechanism of both processes are considered and discussed. A comparison is made of the advantages and

Card 1/2

ZIMAKOV, P.V.

20-2-28/62

AUTHOR ZIMAKOV, P.V., and KOGAN, L.M.

TITLE On Two Reaction Trends in the Dehydrochlorination of Lower Alkylene Chlorohydrins
(O dvukh napravleniyakh reaktsii degidrokhlorirovaniya nizshikh alkilenkhlorgidrinov, Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 115, Nr 2, pp 297-300 (U.S.S.R.)

ABSTRACT In the year 1959 it will be hundred years since the description by A. Würz of the reaction mentioned in the title. At that time a new compound, ethylene chlorids, was for the first time produced in an alkaline medium. At present this reaction forms the basis of the commercial production of ethylene by means of chlorine. No note was hitherto taken of the fact that this substance is always obtained with an admixture of 1 - 2 % acetaldehyde, if the reaction is performed with application of milk of lime. These admixtures can develop due to a secondary isomerization reaction of ethylene oxide. In 1939 a French patent was published concerning the formation of considerable quantities of aldehydes (or ketones) beside the α-oxides on dehydrochlorination of aliphatic chlorohydrins in the environment of "milk of Magnesia". The subject of the patent did not draw the attention of chemists to the two-way reactivity of the simple compound (ethylene chlorohydrin). Some years ago the authors made thorough investigation of the dehydrochlo-

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rination of ethylenechlorohydrin (denoted EClH in the following) in various media and conditions. The method of the French patent yielded up to 35 $^0/_0$ of ethyleneoxide and up to 50 $^0/_0$ acetaldehyde. The authors proved that ethylene glycol develops only in the hydratation of the primarily-forming ethyleneoxide. Acetaldehyde, as the practically only reaction product (98$^0/_0$), with small admixtures of ethyleneoxide develops in a boiling water suspension of nickeloxide hydrate. This proves that even such a simple compound as EClH, according to the nature of reagents acting on it, distinctly shows two reaction trends. It was interesting to study the particularities of the dehydrochlorination of EClH. In order to make the experimental checking of the above-mentioned assumption (isomerization) easier, the authors used propylenechlorohydrin (=PClH), since this compound exists in 2 (α- and β-) isomeric forms. Its dehydrochlorination takes place just as easily as that of EClH, but it usually leads to a yield of propylene oxide higher than 85$^0/_0$. The causes of the small yield have not been determined. Conclusions: 1.) Propion-aldehyde in greater quantities develops on dehydrochlorination of PClH only in suitable media: aqueous suspensions of magnesium- and especially nickel-hydrooxide. This is in agreement with the rule governing in the case of EClH. 2.) Propion aldehyde de-

ZIMAKOV, P. V., BYKOV, A. G. and USACHEVA, I. A. (Ministry of the Chemical Industry)

"Radio Electrochromatographic Method of Analysis"

Isotopes and Radiation in Chemistry, Collection of papers of 2nd All-Union Sci. Tech. Conf. on Use of Radioactive and Stable Isotopes and Radiation in National Economy and Science, Moscow, Izd-vo AN SSSR, 1958, 380pp.

This volume published the reports of the Chemistry Section of the 2nd AU Sci Tech Conf on Use of Radioactive and Stable Isotopes and Radiation in Science and the National Economy, sponsored by Acad Sci USSR and Main Admin for Utilization of Atomic Energy under Council of Ministers USSR Moscow 4-12 Apr 1957.

ZIMAKOV, P.V.

5(2); 21(5) PHASE I BOOK EXPLOITATION SOV/1900

Akademiya nauk SSSR. Komissiya po analiticheskoy khimii

Primeneniye radioaktivnykh izotopov v analiticheskoy khimii (Use of Radioactive Isotopes in Analytical Chemistry) Moscow Izd-vo AN SSSR, 1958. 366 p. [Series: Its: Trudy, t. 9 (12)] Errata slip inserted. 3,000 copies printed.

Resp. Ed.: I.P. Alimarin, Corresponding Member, USSR Academy of Sciences; Ed. of Publishing House: A.N. Yermakov; Tech. Ed.: T.V. Polyakova.

PURPOSE: The book is intended for chemists and chemical engineers concerned with work in analytical chemistry.

COVERAGE: The book is a collection of the principal papers presented in Moscow at the Second Conference on the Use of Radioactive Isotopes. The problems discussed at the Conference included coprecipitation, aging, and solubility of precipitates, determination of the instability constants

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of complex compounds, separation of rare earth metals, and ion-exchange chromatography. No personalities are mentioned. There are 351 references, 175 of which are Soviet, 33 German, 19 French, 8 Swedish, 2 Hungarian, and 2 Czech.

TABLE OF CONTENTS:

Use of Radioactive Isotopes (Cont.) SOV/1900

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(11)

ZIMAKOV, P. V. and KRASNOUSOV, L. A.

"Use of Cl^{36}."

report presented at The Use of Radioactive Isotopes in Analytical Chemistry, Conference in Moscow, 2-4 Dec 1957
Vestnik Ak Nauk SSSR, 1958, No. 2, (author Rodin, S. S.)

SOV/ 64-58-4-5/2o

AUTHORS: ~~Zimakov, P. V.,~~ Doctor of Chemical Sciences, Kogan, L. M., Candidate of Technical Sciences

TITLE: On the Influence of Temperature on the Process of the Hypochlorination of Ethylene (O vliyanii temperatury na protsess gipokhlorirovaniya etilena)

PERIODICAL: Khimicheskaya promyshlennost', 1958, Nr 4, pp. 21o - 213 (USSR)

ABSTRACT: Already Carius (Ref 1) observed the reaction between ethylene and hypochlorous acid, however, a technological use of this reaction took place only according to the synthesis by Gomberg (Ref 2). Greatly differing data exist on the influence of the temperature on the course of reaction: Brooks (Ref 21) maintained that the hypochlorination is to be carried out at low temperatures; Zapadinskiy (Ref 3) worked at 0 - 2°, while Tropsch and Kassler (Ref 1o) showed that the reaction takes a better course at 4o - 6o° than at 0 - 30°. According to Domask and Kobe (Ref 15) a rise of temperature is to supply a better yield, while Murray (Ref 24) finds 30° to be the upper limit. These contradictions made the authors

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SOV/ 64-58-4-5/20

On the Influence of Temperature on the Process of the Hypochlorination of Ethylene

of this paper assume that the distribution of ethylene and with it its transformation velocity into the solution are dependent on temperature. For this purpose three experimental series were carried out at temperatures of from 0 - 70° and in the case of different acetylene distribution; in the first case a distribution of the gas was arranged by a Schott filter Nr 1, in the second case by openings in the supply tube, and in the third case by means of 1 mm openings. From the results obtained may be seen that in the first series of experiments a rise of temperature leads to an increase in the yield of ethylene chlorohydrin (at 70° up to 90 %). The second series showed that under these conditions a change of temperature within a wide range did not exert any influence on the yield and that on the average it amounts to 20 %. In the third series of experiments a rise of temperature caused a decrease of the ethylene chlorohydrin yield, so that it was 40 % at 90° and 55 % at 60°. In order to explain these contradicting results the process of hypochlorination is shown schematically and two basic reactions are assumed - the solution of ethylene and the chlorohydrolysis - which influence the yield. The hydrolysis was already investigated

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SOV/64-58-4-5/20

On the Influence of Temperature on the Process of the Hypochlorination of Ethylene

by Yakovkin (Ref 25) who observed an increase in the degree of hydrolysis with the rise of temperature; for the further classification an investigation of the solution kinetics is carried out. It is assumed that for the first experimental series a "kinetic" factor is decisive, while the third experimental results depend on a "diffuse" factor, and the second series has a balancing effect of the temperature on the two mentioned factors; such an independence of the temperature may be observed after all. Based on the results obtained the authors then conclude that a rise of temperature has a favorable effect in the case of a fine distribution of the gases, while in a coarse distribution the temperature factor exerts a negative effect. Thus for obtaining a maximum yield of ethylene chlorohydrin the corresponding conditions must be prepared; the effect of the optimum temperature will be the greater, the greater the velocity of the transition of ethylene from the gaseous phase into the solution - the medium of the reaction. There are 1 figure and 25 references, 10 of which are Soviet.

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SOV/64-58-4-5/20

On the Influence of Temperature on the Process of the Hypochlorination of Ethylene

1. Ethylenes--Halogenation 2. Chemical reactions--Temperature factors

Card 4/4

KRASNOUSOV, L.A.; VOLKOVA, Ye.V.; ZIMAKOV, P.V.

Chlorine isotope Cl^{36} used for quantitative determination of the isomeric composition of hexachlorocyclohexane in commercial hexachloran. Trudy kom.anal.khim. 9:356-360 '58. (MIRA 11:11)
(Cyclohexane) (Radioactive tracers) (Chlorine--Isotopes)

ZIMAKOV, P.V.

"Some questions of the fixation of radioactive isotopes in connection with the problem of their safe burial."

report presented at the Scidntific Conference on the Disposal of Radioactive Wastes, Monaco, November 1959.

ZIMAKOV, P.V.

PHASE I BOOK EXPLOITATION SOV/5084

International Conference on the Peaceful Uses of Atomic Energy. 2d, Geneva, 1958.

Doklady sovetskikh uchenykh. [t.4] Khimiya radioelementov i radiatsionnykh prevrashcheniy (Reports of Soviet Scientists. v. 4.: Chemistry of Radioelements and Radiation Transformations) Moscow, Atomizdat, 1959. 323 p. 8,000 copies printed. (Series: Its: Trudy)

Ed. (Title page): A. P. Vinogradov, Academician; Ed.: V. I. Labaznov; Tech. Ed.: Ye. I. Mazel'.

PURPOSE: This collection of articles is intended for scientists and engineers interested in the applications of radioactive materials in science and industry.

COVERAGE: The book contains 26 separate studies concerning various aspects of the chemistry of certain radioactive elements and the processes of radiation effect on matter. These reports discuss present-day methods of reprocessing irradiated nuclear fuel, research in the chemistry of mercury, thorium, uranium, plutonium, and americium, problems related to the sorption and burying of radioactive wastes, the radiolysis of aqueous solutions and of organic compounds, the mechanism of polymer chain grafting, and the effect of radiation on natural and synthetic rubbers. V. F. Prusakov edited the present volume. Most of the reports are accompanied by references. Contributors to individual investigations are mentioned in annotations to the Table of Contents.

TABLE OF CONTENTS:

L. V. Lipis, Yu. I. Fomin, and N. T.

Pravednikov, A. N., Ying Sheng K'ang, and S. S. Medvedev. Mechanism of Polymer Chain Grafting Under the Effect of γ-Radiation (Report No. 2294) 241

Zimakov, P. V., A. V. Fokin, Ye. V. Volkova, V. V. Kalichenko, N. I. Mel'nikov, V. G. Bereskinov, and A. G. Bykov. Prospects for the Utilization of Fragmentation Radiators in Radiation Chemistry Processes (Report No. 2209) 247

Polak, L. S., A. V. Topchiyev, and N. Ya. Chernyak. Radiolysis of the Alkanes (Report No. 2524) 254

Kuz'minskiy, A. S., T. S. Nikitina, Ye. V. Zhuravskaya, L. A. Oksent'yevich, L. L. Sunitsa, and N. I. Vitushkin. Effect of Ionizing Radiation on Natural and Synthetic Rubbers (Report No. [illegible]) 266
[The following are mentioned for their part in certain phases of the investigations: L. L. Lyubchanskaya, N. N. Leshkov, F. A. Galil-Ogly, T. N. Dyumayeva, and A. S. Novikov.]

Yakovlev, Yu. V., A. I. Kulak, V. A. Ryabukhin, and R. S. Rychkov. Determination by the Radioactive Analysis Method of Small Quantities of Impurities in Pure Substances (Report No. 2023) 280
[The following are mentioned as having participated in the development of analysis methods in connection with the present study: M. N. Shchelepnikov, I. P. Alimarin, V. I. Shamayev, and Professor D. I. Ryabchikov.]

Turovtseva, Z. M., and N. F. Litvinova. Determination of Gaseous Impurities in Structural and Other Materials (Report No. 2205) 297
[The following are mentioned as having developed experimental techniques and analysis methods relative to this investigation: Yu. A. Klyachko, L. L. Kunin, and Ye. M. Chistyakova (TsNIIChM - Tsentral'nyy nauchno-issledovatel'skiy institut chernoy metallurgii - Central Scientific Research Institute of Ferrous Metallurgy); N. M. Rostotskaya and K. G. Semenyuk (GEOKhI - Institut geokhimii i analiticheskoy khimii - Institute of Geochemistry and Analytical Chemistry); and V. I. Malyshev (FIAN - Fizicheskiy institut AN SSSR - Institute of Physics AS USSR)]. 16

Korovin, Yu. I., and L. V. Lipis. Determination by the Spectral Method of Impurities in Zirconium and Its Compounds (Report No. 2137) 316

as having made a study of
of dyes from leuco bases: V. D. Orekhov, A. A. Zansokhova, ...
Bolen'kiy, T. V. Bromberg, and M. Ya. Kazanskaya.]

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Bakh, N. A., V. I. Medvedovskiy, and V. V. Sarayeva. Radiolysis and Radiation Oxidation of Organic Compounds (Report No. 2295) 229
[The following are mentioned: N. S. Kolosova and Y. F. Tsurikov,

5 (3)

AUTHORS: Zimakov, P. V., Kogan, L. M. SOV/20-127-2-26/70

TITLE: The Mechanism of Aldehyde Formation in the Dehydrochlorination of Lower Alkylene Chlorohydrins

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 2, pp 329-332 (USSR)

ABSTRACT: The authors proved (Ref 1) that the transformation of the substances last mentioned in the title (ethylene-, propylene chlorohydrin) into a corresponding α-oxide or aldehyde with good yields depends on the character of the medium in which the reaction proceeds. However, only one isomer, i.e. the β-isomer, of propylene chlorohydrin is transformed into an aldehyde, the α-isomer is not capable of being transformed (see Scheme). The transformation of the mentioned substances into α-oxides proceeds in media with a high pH according to the Würtz-(Vyurts-) reaction (in "milk of lime"). They are transformed especially smoothly into aldehydes in a suspension of nickel hydroxide (Ref 1). The aldehyde yields in "milk of magnesia" are as well considerable (Ref 2). The authors give then considerations with respect to the probable mechanism of such a double-track reactivity of such simple compounds as those mentioned in the title. They have two easily polarisable Cl- and O-atoms which are in a

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The Mechanism of Aldehyde Formation in the Dehydrochlorination of Lower Alkylene Chlorohydrins SOV/20-127-2-26/70

β-position to each other. This favors a maximum reciprocal effect which is often accompanied by the change of the valence stages of both atoms or of one of them. The yperite molecule may serve as an example of such an "activity" of the mentioned β-position of the chlorine atoms and of an easily polarisable sulphur. Its very special toxicity is explained by the slight change in the valence of the mentioned atoms (Ref 3). The activity of the polarisable atoms is also very high in the two mentioned chlorohydrins in consequence of their structural peculiarities. The reactivity is due to this fact. Even an anhydrous ethylene chlorohydrin produces a certain quantity of diethylene-glycol-chlorohydrin in the case of a long storage. An equivalent HCl-quantity becomes liberated in this case (Ref 4). This transformation is caused by the transition of single chlorohydrin molecules into an "active" polar form with changed valence stages of oxygen and chlorine (Ref 5). The Wurtz reaction which leads to the formation of ethylene-oxide proceeds through such an active molecule form of chlorohydrin with oxonium oxygen and with ion chlorine (Ref 6). The propylene oxide is produced from propylene chlorohydrin in the same way. Its two isomers (α and β)

Card 2/4

react practically equally. The ethylene-oxide produced in the practical carrying-out of the Würtz reaction is always accompanied by a small admixture of acetaldehyde (Ref 7). The formation of the latter increases according to reference 8 with decreasing acidity of the medium. At present it must be assumed that the ethylene chlorohydrin molecule may assume a second active "chloronium" form under splitting off of a hydroxyl ion in media not containing an excess of hydroxyls. This must be assumed from the ethylene chlorohydrin formation in the ethylene chlorination in the aqueous medium (Ref 10). Analogous active forms exist for propylene chlorohydrin, however, with a different degree of stability (Ref 11). Nickelous hydroxide $N(OH)_2$ in suspension is an especially suitable medium, as was already mentioned (Ref 1). It may be assumed that the interaction of ethylene chlorohydrin in the aqueous medium passes in the case of boiling (100°) several stages explained in the scheme. Such alcoholate forms of the nickel compounds are described in reference 13. The considerable tendency of nickel to the formation of a basic chloride is essential, whereas the intermediate compound with alkylene chlorohydrin favors the reconstruction of the molecule of the latter under splitting off of an acetaldehyde. The α-isomer of propylene chlorohydrin which does not incline to the splitting off of hydroxyl and to the formation of chloronium does not react at all with the nickelous hydroxide (Ref 1). The two chains of the interactions are simultaneous and parallel in the "milk of magnesia" in which the yield of α-oxides and aldehydes is approximately equal (Ref 14). There are 14 references, 8 of which are Soviet.

PRESENTED: April 1, 1959, by B. A. Kazanskiy, Academician

SUBMITTED: March 30, 1959

ZIMAKOV, P. V., ZAKHAROVA, K. P., KULICHENKO, V. V., BOGDANOV, N. I. (USSR)

"A Thermic Method of Preparing Sr-90 Sources."

report presented at the Conference on Radioisotopes in Metallurgy and Solid State Physics, IAEA, Copenhagen, 6-17 Sept 1960.

S/089/60/009/005/012/020
B006/B070

AUTHORS: Krasnousov, L. A., Zimakov, P. V., Volkova, Ye. V.

TITLE: Radiochemical Chlorination of Benzene

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 5, pp. 412 - 414

TEXT: The radiative chlorination of benzene was studied under standard conditions in order to study the possibility of using nuclear radiations for the production of hexachlorane. As can be seen from the Table, the different radiations led to the formation of hexachlorocyclohexane (HCCH) characterized by a high content of alpha phase. In addition to data on thermal, chemical (benzene peroxide), and infrared chlorination, the Table gives the following data:

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Radiochemical Chlorination of Benzene S/089/60/009/005/012/020
B006/B070

Concentration g chlorine/100g C_6H_6	t°C	γ-Isomer %	α-Isomer %	Mean energy ev
Ultraviolet (3650A)14.0	40	11.3	73.8	3 - 5
β: (3.48 rad/sec, total: $2.4 \cdot 10^4$ rad)14.0	40	10.2	78.5	$0.4 \cdot 10^6$
γ: (6.75 rad/sec, total: $2.4 \cdot 10^4$ rad)14.0	40	11.8	83.5	$1.2 \cdot 10^6 - 1.3 \cdot 10^6$

On the contrary, the content of α-isomer on chemical chlorination is only 63.7%. The chlorination was done for pure substance and for solution in CCl_4. The β source was Sr^{90}, and the γ source, Co^{60}. The radiochemical yield of the reaction was 853,000 per 100 ev; it was, however, strongly dependent on the purity of the starting material. If industrially pure benzene is used, the yield is only 130,000. The ultraviolet yielded 9000 molecules per 100 ev. The radiative chlorination rate is proportional to the square of radiation intensity (benzene without solvent). In CCl_4 solution, the rate of reaction is essentially lower.

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Radiochemical Chlorination of Benzene

S/089/60/009/005/012/020
B006/B070

Radiative chlorination of benzene is possible also at low temperatures in solid phase; the total yield increases with decreasing temperature down to -80°C. Chlorination remains incomplete for temperatures still lower (at -120°C, the content of tetrachlorocyclohexane reaches 58%). The effect of temperature on the isomeric composition of HCCH was also studied. While the total yield of HCCH has its maximum at -80°C, the content of α-isomer decreases from 83.5 to 38% for the fall of temperature from 40 to -190°C. The yield of γ-isomer also depends on the concentration of chlorine. The formation probabilities of α-, β-, γ-, δ-, and ε-isomers were calculated to be 27.8, 4.63, 25.0, 26.0, and 16.7%, respectively. There are 4 figures, 1 table, and 3 references: 1 Soviet, 1 German, and 1 Polish.

SUBMITTED: March 31, 1960

39437

S/081/62/000/004/074/087
B138/B110

112214

AUTHORS: Zimakov, P. V., Volkova, Ye. V., Fokin, A. V., Sorokin, A. D., Belikov, V. M.

TITLE: Use of nuclear radiation energy in the process of the polymerization of fluoro-olefines

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 4, 1962, 557, abstract 4P24 (Sb. "Radioakt. izotopy i yadern. izlucheniya v nar. kh-ve SSSR, v. 1. M.", Gostoptekhizdat, 1961, 219-226)

TEXT: The processes of the separate and combined radiation polymerization of tetrafluorethylene and trifluorchlorethylene have been investigated with the aim of eliminating some of the deficiencies in existing methods of fluoro-olefine polymerization. It has been found that tetrafluorethylene and trifluorchlorethylene can easily be polymerized under various temperature conditions and mediums with comparatively low radiation intensities. The resulting polymers have a high degree of purity. The possibility of producing various fluoro-copolymers by radiation is demonstrated. Both radiation polymerization and radiation vulcanization might be carried out in the case of fluor-containing rubbers. [Abstracter's note: Complete translation.]

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S/089/61/010/001/008/020
B006/B063

81.1400 (2816, 1482, 1138)

AUTHORS: Zimakov, P. V., Kulichenko, V. V.

TITLE: Some Problems Concerning the Localization of Radioisotopes in Connection With the Problem of Their Safe Storage

PERIODICAL: Atomnaya energiya, 1961, Vol. 10, No. 1, pp. 58-63

TEXT: The authors have made a detailed study of the methods used today for the storage of radioactive waste matter, and they now discuss the hazards involved. It must be borne in mind that, in general, radioactive wastes will actually remain on the spot for several centuries, especially if it contains Sr^{90}, Cs^{137}, and similar isotopes. First, the authors reject the widespread opinion that fluid radioactive wastes can be safely stored in any container. Apart from corrosion, there may arise considerable overpressure in the gas container. This overpressure results from radiolytically evolving gases and might lead to the destruction of the container. Certain radioactive solutions are capable of evolving gas in quantities of up to 10 cm^3/curie per hour. In addition, the activity of the waste matter may heat the container and thus destroy it through evolution of

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Some Problems Concerning the Localization of Radioisotopes in Connection With the Problem of Their Safe Storage

S/089/60/010/001/008/020
B006/B063

vapor or pyrochemical processes. Storage at great depths does not prevent radioactive fluids from penetrating into the ground water. The most promising method is to solidify all fluid radioactive matter, a possibility that is discussed in detail. Of special interest is the conversion of radioactive wastes into difficultly soluble precipitates, such as hydroxides, phosphates, etc. The best way to keep radioactive wastes on the spot is to deposit isotopes in the form of vitreous preparations of the smallest possible size. An analysis of the physicochemical fundamentals of producing such preparations is presented, and some specific features of the state and behavior of sealed-in radioactive fission fragments are discussed. The melting processes and also the formation of radioactive aerosols (which increases rapidly with temperature, especially above 1200°C) in the heat treatment of radioactive slimes are described. Fractional and X-ray structural analyses have shown that the melts obtained are inhomogeneous, i.e., the vitreous, amorphous preparation contains crystalline inclusions, particularly iron compounds, which are the principal carriers of radioactive fragments. Problems of leaching out and elution of radioactive matter by ground water, as well as self-heating

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Card 2/3