SOV/79-28-6-36/63

The Diphenylamide of Trichlorophosphazocarbonic Acid and Its Derivatives

phenylurea at 7o - 8o^0 in carbontetrachloride solution almost quantitatively under the formation of the diphenylamide of trichlorophosphazocarbonic acid according to the scheme $(C_6H_5)_2NCONH_2 + PCl_5 \longrightarrow 2HCl + (C_6H_5)_2NCON{=}PCl_3$ (I). This diphenylamide is on the one hand an analogue of the recently synthesized trichlorophosphazoacyl (Ref 3) and on the other hand it is an analogue of the dialkylamides of trichlorophosphazo sulfuric acid (Ref 4). The compound (I) is a low-melting product which only in high vacuum remains undecomposable in distillation; it hydrolyzes easily with water and violently enters reaction with alcohols, phenols and amines. On the action of unhydrous formic acid (I) consequently yields all theoretically possible phosphorus-containing products of hydrolysis, depending on the conditions of the reaction : the dichloroanhydride of the N,N-diphenylcarbamide-N'-phosphoric acid $(C_6H_5)_2NCONHPOCl_2$(II), the monochloroanhydride of the N,N-diphenylcarbamide-N'-phosphoric acid $(C_6H_5)_2NCONHPO(OH)Cl$ (III) and the free N,N-diphenylcarbamide-N'-phosphoric acid $(C_6H_5)_2NCONHPO(OH)_2$ (IV). There are 11 references, 11 of which are Soviet.

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SOV/79-28-6-36/63

The Diphenylamide of Trichlorophosphazocarbonic Acid and Its Derivatives

ASSOCIATION: Dnepropetrovskiy metallurgicheskiy institut
(Dnepropetrovsk Metallurgical Institute)

SUBMITTED: March 5, 1957

1. Phosphoric acids--Synthesis 2. Urea--Chemical reactions

Card 3/3

SOV/79-28-7-36/64

AUTHORS: Kirsanov, A. V., Derkach, G. I.

TITLE: Trichlorisophosphazoacyls of the Aromatic Series (Trikhlorizofosfazoatsily aromaticheskogo ryada)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol. 28, Nr 7, pp. 1887-189
(USSR)

ABSTRACT: Recently trichlorophosphazoacyls were obtained according to the reactions (1), (2) and (3). It was of importance to the authors to find out whether the reaction (3)

$$RCONHPOCl_2 + PCl_5 \longrightarrow POCl_3 + RCCl{=}NPOCl_2$$

was of general character or whether it holds only for carboxylic acids with a clearly electronegative character. It turned out that this reaction (3) is of general character for acids of the aromatic series. The authors obtained trichlorophosphazoacyls of the type $RCCl{=}NPOCl_2$ in almost quantitative yields, in which R is of the electronegative character just mentioned (Table 1). This reaction takes place considerably more slowly and at higher temperature than (1), and it reminded the authors of the reaction of phosphorus-pentachloride with the N,N-dialkyl-

Card 1/2

Trichlorisophosphazoacyls of the Aromatic Series SOV/79-28-7-36/64

amides of carboxylic acids (Ref 5). The trichloroisophosphazoacyls of the aromatic series are liquid and low melting crystalline products and cleave-off $POCl_3$ on heating under the formation of nitriles according to the scheme:

$RCCl{=\!=}NPOCl_2 \longrightarrow POCl_3 + RCN$ (4). They are stable in the absence of humidity and can be well stored in closed containers at room temperature. Some trichlorophosphazoacyls and dichloranhydrides of acylamidophosphoric acids as well as the corresponding acylamidophosphoric acids, which were synthesized by the authors and had been unknown before, served as initial products. There are 2 tables and 7 references, 6 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry, AS UkrSSR)

SUBMITTED: May 10, 1957

1. Cyclic compounds--Synthesis 2. Cyclic compounds--Properties
3. Acids--Chemical reactions

Card 2/2

AUTHORS: Kirsanov, A. V., Matveyenko, L. L. SOV/79-28-7-37/64

TITLE: Bistriaroxyphosphazo Sulfones and Tetraaryl Esters of the Sulfamidebisphosphoric Acid (Bistriaroksifosfazosul'fony i tetraarilovyye efiry sul'famidbisfosfornoy kisloty)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 28, Nr 7, pp 1898-1901 (USSR)

ABSTRACT: Only the bistrichlorophosphazo sulfone (Ref 1) has hitherto been known of all the derivatives of sulfamidebisphosphoric acid. Neither the bistriaroxyphosphazo sulfones nor the esters of the sulfamidebisphosphoric acids have been described in literature. Bistrichlorophosphazo sulfone reacts turbulently with phenolates, in dry state even to carbonization. In dissolved state the reaction takes place much more quietly under the formation of the corresponding bistriaroxyphosphazo sulfones (I) according to the scheme

$$SO_2(N{=}PCl_3)_2 + 6NaOAr \longrightarrow SO_2\left[N{=}P(OAr)_3\right]_2 + 6NaCl \text{ (II).}$$

The formation of (I) takes place similar to the scheme (IV), i.e., according to the formation of the triaroxy- or trialk-

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SOV/79-28-7-37/64

Bistriaroxyphosphazo Sulfones and Tetraaryl Esters of the Sulfamidebis-
phosphoric Acid

oxyphosphazo sulfone alkyls (Ref 7), however, the reaction (II)
was much more difficult than that of (IV) as with (I) already
small impurities of the initial products exerted a strong in-
fluence on the purity of the final products, so that for each
sulfone (I) special conditions of synthesis and purification
were required. Sulfones of the type $SO_2[N{=}P(OAr)_3]_2$, where
Ar = C_6H_5(V); o-, m- and p-$CH_3C_6H_4$ (VI, VII, VIII), α- and
β-$C_{10}H_7$(IX and X), p-ClC_6H_4(XI) and p-$NO_2C_6H_4$(XII) were syn-
thesized according to scheme (II). The structure of these
neutral compounds were determined by means of analytical
data and conversions; they were obtained in pure state in-
spite of their high moleculer weight (712-1012 !). On their
boiling with alcohol of diluted alkali liquor the saponifi-
cation according to the mentioned scheme takes place within
20-40 minutes; then the tetraarylesters of the sulfamidebis-
phosphoric acid (XIV) of the type $SO_2[NHPO(OAr)_2]_2$ were
obtained, where Ar=C_6H_5(XV); o-, m- and p-$CH_3C_6H_4$(XVI, XVII
and XVIII), α- and β-$C_{10}H_7$(XIX and XX), p-ClC_6H_4(XXI) and
p-$NO_2C_6H_4$(XXII). They are fine-crystalline products, they

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SOV/79-28-7-47/64

Bistriaroxyphosphazo Sulfones and Tetraaryl Esters of the Sulfamidebisphosphoric Acid

melt under decomposition, they are not soluble in water, but are soluble in acetone, alcohol and dioxane. There are 4 references, 3 of which are Soviet.

ASSOCIATION: Dnepropetrovskiy metallurgicheskiy institut
(Dnepropetrovsk Metallurgical Institute)

SUBMITTED: March 5, 1957

1. Bistriaroxyphosphazo sulfones--Chemical properties
2. Sulfamidebisphosphoric acid esters--Chemical reactions

Card 3/3

AUTHORS: Kirsanov, A. V., Derkach, G. I. SOV/79-28-8-51/66

TITLE: Triaroxyisophosphoazoacyls of the Aromatic Series (Triaroksiizofosfazoatsily aromaticheskogo ryada)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol. 28, Nr 8, pp. 2247 - 2252 (USSR)

ABSTRACT: Until now only five triaroxyisophosphoazoacyls of the type $RC(OR')=NPO(OR')_2$ have been synthesized according to the reaction $RCCl=NPOCl_2+3NaOR' \longrightarrow 3NaCl+RC(OR')=NPO(OR')_2$.

Reaction I, with the notation R and R'). Only one of these compounds is crystalline. On the basis of the few facts known the reaction (I) may be considered a general reaction, or a conception of the general properties of the triaroxyisophosphoazo compounds may be formed. In the previous paper the authorsworked out a general method for synthesizing the trichloroisophosphoazoacyls of the aromatic series (Ref 3), which offered the possibility to determine the limits within which the reaction might be used in regard to the triaroxyisophosphoazoacyls. It was found that this reaction can be used in all cases for the aromatic series. 22 triaroxyisophospho-

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Triaroxyisophosphoazoacyls of the Aromatic Series SOV/79-28-8-51/66

azoacyls and 1-trimethoxyisophosphoazoacyl were obtained in good yield (see the experimental section and table 1). The properties of these compounds differed sharply from those of their isomeric triaroxyphosphoazoacyls (Ref 4), as did those of the triaroxyisophosphoazoacyls from the properties of the trichloroacetic acid series (Refs 1,2). The triaroxyisophosphoazoacyls of the aromatic series are crystals of low melting point and which can be distilled in a high vacuum without decomposition. With heating under atmospheric pressure or at reduced vacuum they carbonize gradually, and the formation of triarylphosphates does not occur (this is a difference from the isomeric triaroxyphosphoazoacyls). This shows that the reaction

$ArC(OR)=NHPO(OR)_2 \xrightarrow{heat} OP(OR)_3$ does not occur. The triaroxyisophosphoazoacyls of the aromatic series do not hydrolyse in boiling water and they saponify easily and quantitatively only by boiling aqueous alkali alcohol solutions according to diagram (II)(see table 2). There are 2 tables and 7 references, which are Soviet.

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Triaroxyisophosphoazoacyls of the Aromatic Series SOV/79-28-8-51/66

ASSOCIATION: Institut organicheskoy khimii Akademii nauk USSR (Institute of Organic Chemistry AS UkrSSR)

SUBMITTED: June 5, 1957

Card 3/3

KIRSANOV, A.V.; ZHMUROVA, I.N.

Reaction of phosphorus pentichloride with phosphoric acid amides.
Zhur.ob.khim. 28 no.9:2478-2484 S '58. (MIRA 11:11)

1. Institut organicheskoy khimii AN USSR.
(Phosphorus chlorides) (Amides)

SOV/79-29-2-52/71

AUTHORS: Kirsanov, A. V., Derkach, G. I.

TITLE: C-Aroxy-P,P-dimethoxyisophosphazoacyls and Mixed Triaroxyisophosphazoacyls (C-Aroksi-P,P-dimetoksiizofosfazoatsily i smeshannyye triaroksiizofosfazoatsily)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 2, pp 600-605 (USSR)

ABSTRACT: In the preceding paper (Ref 1) the authors synthesized C-chloro-P, P-dimethoxyisophosphazoacyls and C-chloro-P,P-diaroxyisophosphazoacyls (I) according to the scheme

$$RCONHPO(OR')_2 + PCl_5 \longrightarrow POCl_3 + HCl + RCCl{=}NPO(OR')_2. \qquad (I)$$

The problem was whether the C-aroxy-P,P-dimethoxyisophosphazoacyls and the mixed triaroxyisophosphazoacyls of the type (II), which have hitherto been unknown, may be obtained by aroxylation of these compounds (I) according to the scheme

$$RCCl{=}NPO(OR')_2 + R''ONa \longrightarrow NaCl + RC(OR''){=}NPO(OR')_2. \qquad (II)$$

Other syntheses are connected with great difficulties. Synthesis (II) takes place without difficulties. In mixing equivalent amounts of

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SOV/79-29-2-52/71

C-Aroxy-P,P-dimethoxyisophosphazoacyls and Mixed Triaroxyisophosphazoacyls

n-chlorophenolate and C-chloro-P,P-dimethoxyisophosphazoacyls in benzene solution the synthesis takes place under a strong development of heat within 5-10 minutes, in the case of other derivatives only within 2-3 hours. All mixed triaroxyisophosphazoacyls are obtained in crystalline form after the distillation of the solvent. The C-aroxy-P,P-dimethoxyisophosphazoacyls form first as oils, which soon adopt a crystalline shape. Compounds (II) do not hydrolyze with water if they are boiled, they hydrolyze difficultly in boiling alkali lye and easily in aqueous alcoholic solutions of alkali (Scheme 3). Some of the initial compounds were synthesized anew according to scheme 1 described above. The mixed triaroxyisophosphazoacyls are no insecticides. In this respect C-n-nitrophenoxy-P,P-dimethoxyisophosphazobenzoyl is very active. - There are 3 Soviet references.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, UkrSSR)

SUBMITTED: December 16, 1957

Card 2/2

5 (3)

AUTHORS: Kirsanov, A. V., Molosnova, V. P. SOV/79-29-3-53/61

TITLE: Dimethyl Amides of the Alkoxy-dichloro Acetic Acids (Dimetilamidy alkoksidikhloruksusnykh kislot)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 3, pp 1000-1005 (USSR)

ABSTRACT:

Phosphorus pentachloride acts upon the aliphatic esters of the oxamic acid under formation of the amides of the alkoxy-dichloro acetic acids (Ref 1): $NH_2COCOOR + PCl_5 \longrightarrow POCl_3 + NH_2COCCl_2OR$ (I), the reaction is always accompanied by the formation of the trichloro-phosphazo-alkoxy-dichloro acetyls according to scheme (II) (Ref 2). In the case of the dimethyl oxaminates the reaction cannot be carried out according to scheme (II) so that only the formation of the dimethyl amides of the alkoxy-dichloro acetic acids according to the scheme $(CH_3)_2NCOCOOR + PCl_5 \rightarrow POCl_3 + (CH_3)_2NCOCCl_2OR$ (III) is bound to occur. It was found that the reaction (III) proceeds easily and with an almost quantitative yield in the case of the application of the methyl-, ethyl-, n-butyl, and isobutyl ester of the dimethyloxamic acid. The phenyl-ester of the dimethyloxamic acid cannot react according to scheme (II)

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SOV/79-29-3-53/61

Dimethyl Amides of the Alkoxy-dichloro Acetic Acids

so that it is impossible to obtain the dimethyl amide of the phenoxy-dichloro acetic acid according to scheme (III). The dimethyl amides of the alkoxy-dichloro acetic acid and the dimethyl amide of the phenoxy-dichloro acetic acid are liquids of pleasant smell, soluble in acetone, CCl_4, benzene, scarcely soluble in ether and petroleum ether. They hydrolyze at room temperature slowly with water, more quickly in the case of heating. The chlorine atoms in this compound are very mobile and easily to be substituted. The acid chloride of the dimethyloxamic acid was obtained by the thermal dissociation of the dimethyl amides of the alkoxy-dichloro acetic acids. The aromatic esters of the dimethyloxamic acid were obtained by the reaction of the sodium arylates with the acid chloride of the dimethyloxamic acid or by the action of the phenols upon the dimethyl amides of the alkoxy-dichloro acetic acids. There are 1 table and 5 references, 3 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, Ukrainskaya SSR)

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SOV/79-29-3-53/61

Dimethyl Amides of the Alkoxy-dichloro Acetic Acids

SUBMITTED: January 23, 1958

Card 3/3

5(3)

AUTHORS: Levchenko, Ye. S., Sheynkman, I. E., Kirsanov, A. V.

SOV/79-29-5-14/75

TITLE: Preparation of Phosphorus-Diiodide and -Triiodide (Polucheniye dvukhyodistogo i trekhyodistogo fosfora)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 5, pp 1474-1477 (USSR)

ABSTRACT:

In the work under review the authors devised a harmless and - as to preparation - convenient method for the production of phosphorus diiodide and at the same time a method for the production and purification of phosphorus triiodide without use of white phosphorus and carbon disulfide. After numerous experiments it was found that phosphorus diiodide and phosphorus triiodide can be obtained in absolutely pure form directly from iodine and red phosphorus with subsequent crystallization from suitable solvents. The reaction may be carried out by fusing iodine and phosphorus or by boiling of iodine and phosphorus in solvents applicable to crystallization. Butyl iodide and bromide, dichloro ethane, ethyl iodide and other alkyl- and alkene halogens can be used for the crystallization of phosphorus diiodide. Chloro benzene is the most suitable one. The phosphorus iodide obtained represents rather large, orange, longish lamina with a melting point of 126-127°. Higher quantities of this preparation

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Preparation of Phosphorus-Diiodide and -Triiodide SOV/79-29-5-14/75

can be prepared without difficulties. Carbon tetrachloride, chloroform, butyl iodide can be used for the recrystallization of phosphorus triiodide, but most suitable is dichloro-ethane. Phosphorus triiodide is obtained in the form of rather large brilliant, dark-red crystals with a melting point of 60-61°. There are 5 references, 2 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, Ukrainian SSR)

SUBMITTED: May 6, 1958

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SOV/79-29-5-59/75

5(3)

AUTHORS: Kirsanov, A. V., Molosnova, V. P.

TITLE: Orthoesters of Oxaminic Acids (Ortoefiry oksaminovykh kislot)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 5, pp 1684-1687(USSR)

ABSTRACT: Amides and dimethyl amides of alkoxydiaroxy acetic acid (orthoesters of oxaminic and dimethyl oxaminic acid) $NH_2COC(OR)(OAr)_2$ and $(CH_3)_2NCOC(OR)(OAr)_2$ were represented by the reaction of sodium arylates with amides and dimethyl amides of alkoxy dichloro-acetic acid. Amides with the following alkyl residue R and aryl radical Ar were synthesized:

R	Ar
CH_3	CH_3
CH_3	C_6H_5
C_2H_5	C_6H_5
C_2H_5	$p\text{-}NO_2C_6H_4$
$n\text{-}C_4H_9$	C_6H_5
$iso\text{-}C_4H_9$	C_6H_5

Card 1/2 and the following diamides:

Orthoesters of Oxaminic Acids SOV/79-29-5-59/75

R	Ar
CH_3	C_6H_5
CH_3	$p-NO_2C_6H_4$
C_2H_5	C_6H_5
$n-C_4H_9$	C_6H_5
$iso-C_4H_9$	C_6H_5

Reaction temperature, reaction duration, yield , melting temperature, formula, nitrogen content found and solubility in different organic solvents are given in a table. There are 1 table and 3 references, 2 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: March 31, 1958

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SOV/79-29-5-60/75

5(3)

AUTHORS: Zhmurova, I. N., Kirsanov, A. V.

TITLE: Extension of the Range of Applicability of the Phosphazo Reaction (Rasshireniye granits primeneniya fosfazoreaktsii)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 5, pp 1687-1694 (USSR)

ABSTRACT: By the action of phosphorus pentachloride on triaryl phosphite one obtains triaroxy phosphorus dichlorides. Not only phosphorus pentachloride but also pentaphenoxy phosphorus and triphenoxy phosphorus dichloride may be utilized as phosphorus containing components for phosphazo reactions. Triphenoxy phosphazo aryls are obtained by the reaction of the above-mentioned compounds with aromatic amines. Production and properties of the following compounds are given. Triphenoxy phosphorus dichloride, pentaphenoxy phosphorus, triphenoxy phosphazo phenyl, triphenoxy phosphazo nitrophenyls $ArN=P(OC_6H_5)_3$ with the aryl radicals: $4-NO_2C_6H_4$, $2,4-(NO_2)_2C_6H_3$, $3,4-(NO_2)_2C_6H_3$, NO_2 , $2,4,6-(NO_2)_3C_6H_2$ (Table 1), triphenoxy phosphazoacyls $AcN=P(OC_6H_5)_3$ with the acyl radicals: $C_6H_5SO_2$, $SO_2[N=P(OC_6H_5)_3]_2$, $(C_6H_5O)_2PO$,

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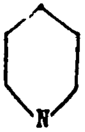
SOV/79-29-5-60/75

Extension of the Range of Applicability of the Phosphazo Reaction

$(C_6H_5O)_2PS$ (Table 2). Diphenyl ether of aryl amido phosphoric acids $(C_6H_5O)_2PONHAr$ with the aryl radicals: C_6H_5, $4-NO_2C_6H_4$, $2,4-(NO_2)_2C_6H_3$, $3,4-(NO_2)_2C_6H_3$, NO_2  (Table 3).

There are 3 tables and 19 references, 10 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: April 5, 1958

Card 2/2

5(3)

AUTHORS: Kirsanov, A. V., Kirsanova, N. A. SOV/79-29-6-7/72

TITLE: Derivatives of m- and p-Benzene Disulfonic Acid (Proizvodnyye m- i p-benzoldisul'fokislot)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 6, pp 1802-1813 (USSR)

ABSTRACT: The derivatives of the p-benzene disulfonic acid can be used as initial products for new high-molecular products. The simplest derivatives of the p-benzene disulfonic acid are of particular interest. In the present paper the authors tried the synthesis of the simplest derivatives of the m- and p-benzene disulfonic acid and further that of the m,m'-diphenyl-sulfone-disulfonic acid. The methyl and ethyl esters of the m- and p-benzene disulfonic acid as well as of the m,m'-diphenyl-sulfone-disulfonic acid were obtained by the action of a benzene solution of the corresponding dichloride on sodium alcoholate solutions which were previously concentrated by evaporation in the vacuum to syrupy consistency. When using nearly dry sodium alcoholates the reaction takes place at the boiling temperature of benzene only with a considerable alcohol excess, but it is not

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possible to separate the diesters of the benzene disulfonic acids as they are strongly alkylating agents and therefore react with the excess alcohol. The reaction thus proceeds according to the scheme

$C_6H_4(SO_2Cl)_2 + 2RONa \longrightarrow 2NaCl + C_6H_4(SO_2OR)_2$;

$C_6H_4(SO_2OR)_2 + ROH \longrightarrow ROR + C_6H_4(SO_2OR)SO_2OH$. At a lower alcohol quantity the reaction proceeds slowly in the second step, and it is possible to separate the diester prior to its alkylation. The methyl and ethyl esters of the m- and p-benzene disulfonic acid are crystalline, readily melting compounds and are rapidly saponified when heated in water. It was shown that the methyl esters of the acids mentioned have an intermediary position between the methyl esters of the aryl sulfonic acids and those of the nitroaryl sulfonic acids as far as their alkylating capability is concerned. The phosphazo-reaction was carried out for the diamides of the above-mentioned acids. The following compounds were obtained: m- and p-bis-trichloro-phosphazo-sulfone-phenylene, tetra-acid chlorides of the m- and p-phenylene-bis-sulfon-amido-phosphoric acid, m- and p-bis-trialkoxy- and bis-tri-

Card 2/3

Derivatives of m- and p-Benzene Disulfonic Acid SOV/79-29-6-7/72

phenoxy-phosphazo-sulfone-phenylene and tetraesters of the m- and p-phenylene-bis-sulfonamido-phosphoric acid (5 Tables). The monoamide-monochloride of the p-benzene-disulfonic acid and a number of N-alkylated amides of the m- and p-benzene disulfonic acid were obtained. There are 5 tables and 17 references, 9 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: May 20, 1958

Card 3/3

AUTHORS: Levchenko, Ye. S., Kirsanov, A. V. SOV/79-29-6-8/72

TITLE: Reaction of Phosphorus Pentachloride With the N-Chloro-Derivatives of Aryl Sulfamides (Reaktsiya pyatikhloristogo fosfora s N-khlorproizvodnymi arilsul'famidov)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 6, pp 1813-1814 (USSR)

ABSTRACT: Two methods have so far been applied for the synthesis of the trichloro-phosphazo-compounds: The reaction of phosphorus pentachloride with acid amides (Ref 1) and the reaction of phosphorus trichloride with the sodium salts of the chloro amides of the sulfonic acids (Ref 2). The latter reaction proceeded according to the scheme $ArSO_2NNaCl + PCl_3 \longrightarrow NaCl + ArSO_2N{=}PCl_3$. It was previously assumed that the acting force of this reaction would prevalently be the tendency of the trivalent phosphorus atom to pass over into the pentavalent state. It was found, however, that also phosphorus pentachloride does not only vigorously react with the sodium salts of the N-chloro-amides of the sulfonic acids, but also with the N,N-dichloro-amides of the sulfonic acids, thus yielding trichloro-phosphazo-compounds

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Reaction of Phosphorus Pentachloride With the N-Chloro-Derivatives of Aryl Sulfamides SOV/79-29-6-8/72

and free chlorine according to the scheme $ArSO_2NNaCl + PCl_5 \longrightarrow NaCl + Cl_2 + ArSO_2N{=}PCl_3$, $ArSO_2NCl_2 + PCl_5 \longrightarrow 2Cl_2 + ArSO_2N{=}PCl_3$. This reaction proceeds readily, with good yields, and gives high-purity trichloro-phosphazo-compounds. Without solvent the reaction of phosphorus pentachloride with the above-mentioned salts takes place so abruptly that the reaction products are completely charred. In carbon tetrachloride the reaction proceeds normally under heating. The N,N-dichloro-amides of the sulfonic acids react slowly with PCl_5 in CCl_4 at room temperature, but rapidly when heated. There are 4 Soviet references.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: May 27, 1958

Card 2/2

AUTHORS: Derkach, G. I., Kirsanov, A. V. SOV/79-29-6-9/72

TITLE: C-Phosphinyl-P,P-Diaroxy-Isophosphazo-Aroyls (C-Fosfinil-P,P-diaroksiizofosfazoaroily)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 6, pp 1815-1818 (USSR)

ABSTRACT: The C-chloro-P,P-diaroxy-isophosphazo-acyls of the $ArCCl{=}NPO(OAr')_2$ type yield under the influence of water the diaryl esters of the acyl-amido-phosphoric acids (Ref 1), under the influence of sodium alcoholates and sodium arylates the corresponding esters (Ref 2). They react readily with ammomia and amines and are as acylating agents analogs of the acid chlorides of the carboxylic acids. It was of interest to find out whether this analogy also holds for the reaction of A. Ye. Arbuzov, i.e. whether the above-mentioned acyls also react with the esters of the phosphorous acid like the acid chlorides of the carboxylic acids. This was confirmed by the experiments. These acyls react already at -15° under considerable heat evolution according to Arbuzov and yield the corresponding C-phosphinyl-P,P-diaroxy-isophosphazo-aroyls

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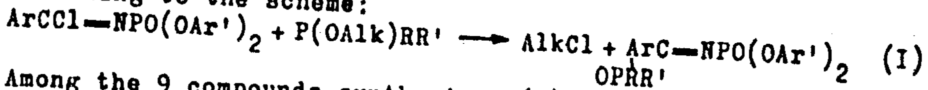
C-Phosphinyl-P,P-Diaroxy-Isophosphazo-Aroyls SOV/79-29-6-9/72

according to the scheme:



$$\mathrm{ArCCl{-}NPO(OAr')_2 + P(OAlk)RR' \longrightarrow AlkCl + \underset{OPRR'}{ArC}{-}NPO(OAr')_2} \quad (I)$$

Among the 9 compounds synthesized (I) only two have a crystalline nature, the remaining ones are dense liquids or vitreous products. Analytical data, appearance, solubility, and melting points of these compounds are given in the table. By shaking with 90 % alcohol they hydrolyze quantitatively within 4-6 hours yielding the diesters of the acyl-amido-phosphoric acids and the corresponding acid esters of the phosphorous acid, phosphinic acid or also of the free diphenyl-phosphinic acid, according to scheme 2. On the hydrolysis of the compounds (IV) and (VIII) (Table) it was possible to separate nearly quantitatively the diphenyl-phosphinic acid. There are 1 table, and 5 references, 3 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: May 27, 1958

Card 2/2

5 (3)

AUTHORS: Zhmurova, I. N., Voytsekhovskaya, I. Yu., Kirsanov, A. V. SOV/79-29-6-67/72

TITLE: Direct Amidation of Carboxylic Acids (Neposredstvennoye amidirovaniye karbonovykh kislot)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 6, pp 2083 - 2088 (USSR)

ABSTRACT: In this investigation the authors attempted to extend the scope of application of direct amidation of carboxylic acids, under "softer conditions in a pyridine solvent" (Ref 3) without examining the question of amidation under "harder conditions at higher temperatures". Different amides affect carboxylic acids quite differently. It is especially unintelligible that several homologues and analogues of trianilide of the phosphoric acid do not react with carboxylic acids, when heated in pyridine. The question was of interest, whether the amides of the monobasic phosphoric acids occur in pyridine as an agent of amidation, and whether for amidation under "soft conditions" the presence of two groups of amides in the molecule is necessary, in which at least one "free" hydrogen atom, connected with the nitrogen atom of the amide group (Ref 2) has to be present.

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Amides of the type $(RO)_2PONH_2$ and Ar_2PONH_2 and their N-substituted compounds were selected as samples to be analysed. The amide and the dimethyl amide of the diphenylphosphinic acid amidate the carboxylic acids, when heated in pyridine or dioxane and are very easily saponified. The amidation capacity of the amides of the diphenylphosphinic and diphenylthiophosphinic acids corresponds to their easiness of saponification i.e. to their capacity to combine with hydroxyl. The amide, dimethylamide and phenylamide of the diphenylthiophosphinic acid and the phenylamide of diphenylphosphinic acid do not amidize the carboxylic acid under the same conditions, and it is difficult to saponify them. The mechanism of amidation of carboxylic acids with amide and dimethylamide of the diphenylphosphinic acid differs from the mechanism of amidation of the carboxylic acids with amides of the sulphuric acid. Some amides of the diphenylphosphinic and diphenylthiophosphinic acid were synthesized. The amidation with the amide of the diphenylphosphinic acid, according to the scheme

$$RCOOH + (C_6H_5)_2PONH_2 \longrightarrow RCONH_2 + (C_6H_5)_2POOH$$

Card 2/3

takes place especially smoothly. In the table amides of both

Direct Amidation of Carboxylic Acids

SOV/79-29-6-67/72

phosphinic acids are listed. There are 1 table and 11 references, 2 of which are Soviet.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences of the Ukrainian SSR)

SUBMITTED: May 6, 1958

Card 3/3

5 (3)

AUTHORS: Kirsanov, A. V., Marenets, M. S. SOV/79-29-7-33/83

TITLE: Urethan Phosphoric Ester (Efiry uretanfosfornykh kislot)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 7, pp 2256 - 2262 (USSR)

ABSTRACT: Methylurethan-N-phosphate $CH_3OCONHPO(OCH_3)_2$ (Ref 1) which was recently synthesized by Kirsanov proved to be an active non-poisonous insecticide preparation for haematherms (further referred to as K-20-35). It was of interest to synthesize compounds similar to this preparation and to develop less complicated methods of the synthesis of K-20-35 and its analogues and to produce them industrially. They succeeded in working out two new reaction schemes for the synthesis of K-20-35, the first of which consists of three stages (76% yield) and the second of two stages (80%). [Scheme (1) and (2)]. For higher quantities scheme (II) is suited, for the homologues of K-20-35 scheme (I). According to scheme (II) a solution of methylurethan-N-phosphate (K-20-35) in methanol resulted after the second stage which contained 2 mols of HCl and 1 mol of methyl chloride per 1 mol of K-20-35. After longer standing (more than 3 hours)

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Urethan Phosphoric Ester

SOV/79-29-7-33/83

as well as in immediate evaporation of the methyl chloride the yield is considerably reduced. Among the esters of trichlorophosphazo carbonic acid of the type ROCON=PCl$_3$ hitherto only the ethyl ester (Refs 3,4) has been known (Scheme III). According to the same scheme the methyl-, isopropyl-, n-propyl-, isobutyl- and n.-butyl ester of trichlorophosphazo carbonic acid were obtained. When these esters are heated, they decompose quantitatively according to scheme (IV) (Table 1). In contrast to the earlier scheme (V), the acid dichlorides of urethan-N-phosphoric acids were obtained according to scheme (VI) in an almost quantitative yield (experimental part). In table 2 the acid dichlorides of these acids are given. The temperature of the thermal cleavage of the above esters into alkyl halides and acid dichlorides of isocyanate phosphoric acid depends on the nature of the alkyl. Some of the esters synthesized proved to be active insecticides. There are 3 tables and 6 Soviet references.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Ukrainskaya SSR)

SUBMITTED: June 9, 1958

Card 2/2

KIRSANOV, A.V.

5 (3)

AUTHORS: Levchenko, Ye. S., Zhmurova, I. N., Kirsanov, A. V. SOV/79-29-7-34/83

TITLE: Reaction of Phosphorus Pentachloride With Acid Dichlorides and Diesters of the Aryl Sulphonamidophosphoric Acids (Reaktsiya pyatikhloristogo fosfora s dikhlorangidridami i diefirami aril-sul'fonamidofosfornykh kislot)

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 7, pp 2262 - 2267 (USSR)

ABSTRACT: Kirsanov succeeded in transforming the trichloro phosphazosulphonalkyls and aryls of the type $RSO_2N=PCl_3$ into the acid dichlorides of the corresponding alkyl- and aryl sulphonamidophosphoric acids according to the scheme $RSO_2N=PCl_3+H_2O \longrightarrow HCl+ +RSO_2NHPOCl_2$ by the action of water or formic acid (Ref 1). It was of interest to find out whether a reverse transformation was possible, i.e. whether the corresponding trichlorophosphazo compounds could be obtained according to the scheme $RSO_2NHPOCl_2+ +PCl_5 \longrightarrow HCl + POCl_3 + RSO_2N = PCl_3$(I) from the acid dichlor-

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Reaction of Phosphorus Pentachloride With Acid Dichlorides and Diesters of the Aryl Sulphonamidophosphoric Acids

SOV/79-29-7-34/83

ides of aryl sulphonamidophosphoric acids. The experiments showed that the reaction (I) for the acid dichlorides of o-, m-, and p-nitrophenyl sulphonamidophosphoric acids takes place at 130 - 135° within 10-15 min in yields of from 47 to 80% as well as for phenyl ester of the N-(dichlorophosphinyl)-monoamide of p-benzene disulphonic acid at 115-120° within 20-25 min in a yield of 49%. In all cases by-products of unknown nature are formed. Also in the reaction of PCl_5 with the potassium salts of the acid dichlorides of nitrophenyl sulphonamidophosphoric acids the same yields were obtained. In the action of PCl_5 on the acid dichlorides of aryl sulphonamidophosphoric acids, the molecules of which contain no other substituents in the aromatic nucleus, no corresponding trichlorophosphazo sulphonaryls are formed. In the reaction of PCl_5 with the diphenyl esters of the above acids the diphenoxy chlorophosphazosulphonaryls, irrespective of the nature and the position of the substituents, are obtained in the aromatic nucleus of sulphonic

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Reaction of Phosphorus Pentachloride With Acid Dichlorides and Diesters of the Aryl Sulphonamidophosphoric Acids SOV/79-29-7-34/83

acid (Scheme 3). The constants, analytical data and the yields of the diphenoxy chlorophosphazosulphonaryls are tabulated. There are 1 table and 7 Soviet references.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences of the Ukrainskaya SSR)

SUBMITTED: June 23, 1958

Card 3/3

KIRSANOV, A.V. [Kirsanov, O.V.]; ZHURAVLEVA, L.P. [Zhuravl'ova, L.P.]

Diethers of N-dialkoxy- and N-diaroxyphosphinylcarbaminylphosphonic acids. Dop.AN URSR no.4:487-489 '60. (MIRA 13:7)

1. Institut organicheskoy khimii AN USSR. Chlen-korrespondent AN USSR (for Kirsanov).
(Phosphonic acid)

KIRSANOV, A.V. [Kirsanov, O.V.]; FEDOROVA, G.K. [Fedorova, H.K.]

Complexes of phosphorus pentachloride with aryl- and styrylphosphorus tetrachlorides. Dop.AN URSR no.6:801-803 '60.
(MIRA 13:7)

1. Institut organicheskoy khimii AN USSR. 2. Chlen-korrespondent AN USSR (for Kirsanov).
(Phosphorus chlorides)

KIRSANOV, A.V. [Kirsanov, O.V.]; ZHURAVLEVA, L.P. [Zhuravl'ova, L.P.]

1-aryl, 1-benzoyl- and 1,1-dimethyl-4-dichlorphosphinylsemicarbazides and their derivatives. Dop.AN URSR no.6:804-808 '60.
(MIRA 13:7)

1. Institut organicheskoy khimii AN USSR. 2. Chlen-korrespondent AN USSR (for Kirsanov).
(Semicarbazide)

KIRSANOV, A.V.; ZHURAVLEVA, L.P. [Zhuravl'ova, L.P.]

Reaction of the dichloranhydride of isocyanatophosphoric acid with water. Dop.AN URSR no.7:929-931 '60. (MIRA 13:8)

1. Institut organicheskoy khimii AN USSR. 2. Chlen-korrespondent AN USSR (for Kirsanov).

(Carbamic acid)

KIRSANOV, A.V. [Kirsanov, O.V.]; **FEDOROVA, G.K.** [Fedorova, H.K.]

Complex compounds of phosphorus pentachloride with α,α-dichloralkylphosphorus tetrachlorides. Dop.AN URSR no.8:1086-1089 '60.
(MIRA 13:9)

1. Institut organicheskoy khimii AN USSR. 2. Chlen-korrespondent AN USSR (for Kirsanov).
(Phosphorus cholorides)

5.3630

77398
SOV/79-30-1-59/78

AUTHORS: Kirsanov, A. V., Feshchenko, N. G.

TITLE: Esters of Aminobenzoylamidophosphoric Acids

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol 30, Nr 1, pp 267-270 (USSR)

ABSTRACT: Esters of aminobenzoylamidophosphoric acids were synthesized according to the following scheme:

$$NO_2C_6H_4CONH_2 \xrightarrow{+PCl_5} NO_2C_6H_4CON{=}PCl_3\,(I) \xrightarrow{+HCOOH}$$
$$\rightarrow NO_2C_6H_4CONHPOCl_2\,(I) \xrightarrow{+2ROH} NO_2C_6H_4CONHPO(OR)_2\,(II) \xrightarrow[Pt]{+H_2}$$
$$\rightarrow NH_2C_6H_4CONHPO(OR)_2.$$

Dimethyl and diphenyl esters of nitrobenzoylamidophosphoric acids were obtained by the previously described methods (A. V. Kirsanov, Izv. AN SSSR, OKhN, 1954, 646; A. V. Kirsanov, R. G. Makitra, ZhOKh, 26, 905, 907, 1956, and others). The nitrobenzoylamidophosphoric

Card 1/[illegible]

Esters of Aminobenzoylamidophosphoric Acids 77398
SOV/79-30-1-59/78

acids were reduced to the esters of aminobenzoylamidophosphoric acid in an alcoholic solution in the presence of a platinum catalyst. Yields and the properties of the esters are given in Table 1. In order to characterize the above esters, their benzoyl derivatives were prepared by the Schotten-Baumann reaction (see Table 2). There are 2 tables; and 3 Soviet references.

ASSOCIATION: Institute of Organic Chemistry, Academy of Sciences, Ukrainian SSR (Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR)

SUBMITTED: January 19, 1959

Card 2/4

S/079/60/030/05/31/074
B005/B016

AUTHORS: Levchenko, Ye. S., Kirsanov, A. V.

TITLE: Acid Chlorides of N-Dichloro-phosphinyl-arene-imino-sulfonic Acids

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 5, pp. 1553-1561

TEXT: The authors of the present paper checked a paper by I. Braun and K. Weissbach (Ref. 5) for its correctness. The investigations revealed that all statements of these authors regarding the reaction of phosphorus pentachloride with ethylamides of sulfonic acids were wrong. It was proved experimentally that in this reaction mainly PCl_3 is separated. Therefore, prevalently a chlorination occurs whereas the authors of Ref. 5 state that an oxygen atom of the sulfo group is replaced by chlorine with $POCl_3$ being separated. The principal products of the reactions of PCl_5 with the ethylamides of n-butane- and cyclohexane-sulfonic acid are liquids which do not form crystals and are distillable in vacuo with slight decomposition. In contradiction with the statements of Ref. 5, the acid chlorides of N-ethyl-butane-imino-sulfonic acid, or N-ethyl-cyclohexane-imino-sulfonic

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Acid Chlorides of N-Dichloro-phosphinyl-arene-imino-sulfonic Acids

S/079/60/030/05/31/074
B005/B016

acid, respectively, could not be isolated from these liquids. When treating the diacid chlorides of aryl-sulfonamido-phosphoric acids (I) with PCl_5, acid chlorides of N-dichloro-phosphinyl-arene-imino-sulfonic acids (II) or trichloro-phosphazo-sulfonaryls (III) are formed. If the aryl radical of the diacid chloride used as initial product contains electronegative substituents, the compounds (III) result. If the aryl radical contains no electronegative substituents, the compounds (II) are obtained in good yields. Table 1 shows 9 compounds of this type (II) ($XC_6H_4SO(-NPOCl_2)Cl$) which were prepared in this way. Yields, appearance, melting point, empirical formula, and chlorine content are given for each compound. The solubilities of the compounds (II) in the common organic solvents are presented. The compounds (II) are typical acid chlorides, but show no acid properties contrary to the diacid chlorides (I). On the action of water at room temperature they are slowly hydrolyzed. They react readily with alcohols, phenols, ammonia, amines, alcoholates, phenolates, and other compounds with active hydrogen. Under the influence of phenolates the aryl esters of N-diaroxy-phosphinyl-arene-imino-sulfonic acids (IV) result in good yield. Table 2 gives 9 compounds of type (IV) which were obtained from the compounds (II) presented in Table 1. In addition to the respective data given

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Acid Chlorides of N-Dichloro-phosphinyl-arene-imino-sulfonic Acids

S/079/60/030/05/31/074
B005/B016

in Table 1, this table contains data on the solubility in 6 organic solvents. The authors further investigated the direction of reactions of the type $XSO_2NHPOZ_2 + PCl_5 \longrightarrow XSO(=NPOZ_2)Cl$ or XSO_2-NPZ_2Cl in dependence on the character of the groups X and Z. The results are summarised in Table 3. The investigations are thoroughly discussed. In an experimental part all procedures carried out are described in detail. There are 3 tables and 7 references: 2 Soviet and 5 German.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences, Ukrainskaya SSR)

SUBMITTED: May 7, 1959

Card 3/3

LEVCHENKO, Ye.S.; SHEYNKMAN, I.E.; KIRSANOV, A.V.

Phenylamides of N-dianilidophosphinylareniminosulfonic acids. Zhur.ob.khim. 30 no.6:1941-1946 Je '60. (MIRA 13:6)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR.
(Amides) (Sulfonic acids)

LEVCHENKO, Ye.S.; DERKACH, N.Ya.; KIRSANOV, A.V.

Chlorides of N-arylsulfonylareniminosulfonic acids. Zhur.ob. khim. 30 no.6:1971-1975 Je '60. (MIRA 13:6)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR.
(Sulfonic acids) (Chlorides)

S/079/60/030/06/07/009
B002/B016

AUTHORS: Levchenko, Ye. S., Piven', Yu. V., Kirsanov, A. V.

TITLE: Alkylation of Phosphorus Diiodide

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 6, pp. 1976-1981

TEXT: In the present paper the alkylation of PI_3 and especially of P_2I_4 by means of alkyl halides is investigated. The phosphorus iodides are strongly nucleophilic compounds (the addition of an electronophilic group such as alkyl halides takes place readily in this case according to A. Ye. Arbuzov (Ref. 3) and other scientists). The reaction mechanism is explained. The reactions were carried out with benzyl iodide and benzyl chloride, further with CH_3-, C_2H_5-, n.-C_3H_7-, n.-C_4H_9-, and iso-C_5H_{11}-iodide. The mixture of P_2I_4 + benzyl iodide was heated up to 110-115°, the reaction at this temperature was exothermal. An intermediate complex was formed first, which was converted to tribenzyl phosphine, yield 95%, under the action of alkali and reducers, but not on moderate heating in

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vacuo. The reaction also proceeds in solvents with chlorobenzene being most suitable. The reaction was further shown to be possible also with red phosphorus + iodine + benzyl iodide and red phosphorus + benzyl iodide, P_2I_4 + I must be added in this connection in catalytic quantity only. It was concluded therefrom that the reaction presumably takes place via P_2I_4 being formed. PI_3 + benzyl iodide gave only a small yield of tribenzyl phosphinic oxide and dibenzyl phosphinic acid. The alkylation proceeds via the formation of P_2I_4 which was confirmed by the fact that the yield was considerably increased in the latter reaction by further phosphorus addition. p-benzyl chloro-iodide reacted like benzyl iodide, p-nitrobenzyl iodide rapidly formed resinous products. It was not possible to isolate mono and dibenzyl phosphinic acids from the reaction P_2I_4 + + benzyl iodide, since the partly alkylated products are further alkylated much more easily than P_2I_4 itself. The reaction P_2I_4 + alkyl iodides took place only in a sealed tube at 200-220°C. After hydrolysis the oxides of the corresponding trialkyl phosphines were formed. The properties of the compounds thus obtained correspond with data from publications

KIRSANOV, A.V.; SHOKOL, V.A.

Diesters of thioacylamidophosphoric acids. Zhur. ob. khim. 30 no.9:3031-3037 S '60. (MIRA 13:9)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR. (Phosphoric acid)

KIRSANOV, A.V.; ZHURAVLEVA, L.P.

Diesters of N-dialkoxy- and N-diaroxyphosphonylcarbaminylphosphonic acids. Zhur. ob. khim. 30 no.9:3038-3041 S '60. (MIRA 13:9)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR.
(Phosphonic acid)

FESHCHENKO, N.G.; KIRSANOV, A.V.

Phosphours iodides. Zhur. ob. khim. 30 no.9:3041-3043 S '60.
(MIRA 13:9)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR.
(Phosphorus iodide)

S/079/60/030/009/011/015
B001/B064

AUTHORS: Zhmurova, I. N., Kirsanov, A. V.

TITLE: Trichloro-phosphazo Aryls

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 9, pp.3044-3054

TEXT: In continuation of papers of Refs. 1-4 the authors studied the reaction of phosphorus pentachloride with a series of aromatic amines and some derivatives of aryl amido phosphoric acids. Trichloro-phosphazo acyls are obtained almost quantitatively on the action of PCl_5 on acid amides (Ref. 1). On the reaction of aromatic amines or their hydrochloric salts with PCl_5 in boiling carbon tetrachloride compounds are obtained in good yields, which, in their composition, precisely correspond to chloro-phosphazo aryls (Table 1). $ArNH_2 + PCl_5 \longrightarrow 2HCl + ArN = PCl_3$ (I)

$ArNH_3Cl + PCl_5 \longrightarrow 3HCl + ArN = PCl_3$ (II)

Amines with basicity $K_{bas} = 10^{-9} - 10^{13}$ give rise to trichloro-phosphazo aryls in the form of dimers, while low-basicity amines yield such in the form of monomers. Dimers of trichloro-phosphazo aryls obtained from amines

Card 1/3

Trichloro-phosphazo Aryls

S/079/60/030/009/011/015
B001/B064

with $K_{bas} = 10^{-9} - 10^{-10}$, are decomposed, on boiling, in benzene solutions, and not in monomers, whereas dimers from low-basicity amines are partly or wholly decomposed into monomers. Monomers of trichloro-phosphazo aryls resulting from amines with basicity $K_{bas} = 10^{-10} - 10^{-13}$, could be obtained in benzene solution only. When their solutions are evaporated, the monomers are converted into the respective dimers. Trichloro-phosphazo aryls from amines, with $K_{bas} = 10^{-14} - 10^{-19}$ resemble the trichloro-phosphazo acyls as to their physical and chemical properties. Again with respect to these properties, the dimers of trichloro-phosphazo aryls differ sharply from trichloro-phosphazo acyls and apparently possess a cyclic "benzoid structure". Dimers of trichloro-phosphazo aryls likewise result on the action of PCl_5 on a series of aryl amido phosphoric acids. The dimers of trichloro-phosphazo aryls derive their importance from the fact that they are also formed by the reaction of phosphorus pentachloride with various derivatives of aryl amido phosphoric acids (Table 2). There are 2 tables and 13 references: 1 Soviet, 6 US, 1 German, 3 British, and 2 French.

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Trichloro-phosphazo Aryls

S/079/60/030/009/011/015
B001/B064

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences of the Ukrainskaya SSR)

SUBMITTED: July 31, 1959

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Card 3/3

KIRSANOV, A.V.; FESHCHENKO, N.G.

Azo dyes based on dimethyl esters of aminophenylsulfonylamidophosphoric acids. Zhur.ob.khim. 30 no.10:3389-3392 O '61. (MIRA 14:4)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR.
(Phosphoramidic acid) (Azo dyes)

DERKACH, G.I.; SHOKOL, V.A.; KIRSANOV, A.V.

Diesters of acylamidophosphoric acids. Zhur.ob.khim. 30 no.10: 3393-3397 O '61. (MIRA 14:4)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR. (Phosphoramidic acid)

84881

5.3831 only 2209, 1370, 1372

S/079/60/030/010/023/030
B001/B066

AUTHORS: Derkach, G. I. and Kirsanov, A. V.

TITLE: Polymerization of N-Diaroxy-phosphinyl Arene Amidine

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 10, pp. 3397 - 3401

TEXT: The amidines $ArC\left[=NPO(OAr')_2\right]NH_2$ synthesized by the authors in a previous work are quickly and quantitatively polymerized by strong mineral acids to give colorless, crystalline products without basic properties (Table 1). According to their ultimate analysis and molecular weight, they are trimers of the N-diaroxy-phosphinyl arene amidines. Polymerization takes place readily and with small quantities of strong mineral acids, as well as with formic and acetic acid; benzoic acid is ineffective. If the amidine hydrochlorides are exposed to air, they are quantitatively converted into trimers after some days, which is not the case in dry air, not even after several months. Polymerization proceeds smoothly when boiling their salts in 96% ethanol and dissolving them in

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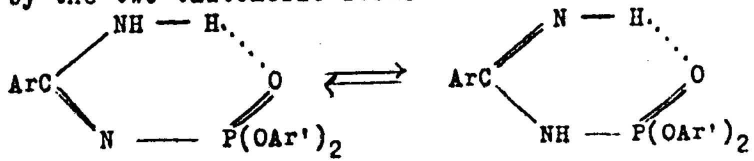
concentrated sulfuric acid. The trimers of N-diaroxy-phosphinyl arene amidines greatly differ in their properties from the initial monomers: They melt at considerably higher temperatures, are insoluble in most organic solvents (contrary to the monomers), and are not changed when treated with dilute acids and alkali lyes, not even by short boiling. Polymerization is usually caused by the unsaturated state of the molecule. Thus, a double bond causing trimerization is bound to exist in the molecules of N-diaroxy-phosphinyl arene amidines, i.e., between the carbon atom and one of the nitrogen atoms. It can thus be illustrated only by the two tautomeric forms



(I) (II)

For this work, some N-diaroxy-phosphinyl arene amidines hitherto unknown were synthesized by the previous method (Table 2). There are 2 tables

DERKACH, G.I.; DREGVAL', G.F.; KIRSANOV, A.V.

Trichlorophosphaze-N-arylsulfonyliminobenzoyls. Zhur.ob.khim. 30 no.10:3402-3407 [illegible] '61. (MIRA 14:4)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphazo compounds)

87532

S/079/60/030/012/016/027
B001/B064

5363O

AUTHORS: Fedorova, G. K. and Kirsanov, A. V.

TITLE: Reaction of Phosphorus Pentachloride With Unsaturated Hydrocarbons

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 12, pp.4044-4048

TEXT: No compound of the $RCHClCH_2PCl_4 \cdot PCl_5$ and $RCHClCH_2PCl_4$ types had hitherto been obtained in the pure state. It is hardly believable that in the hydrolysis of such compounds or under the action of SO_2 upon them, under milder conditions, a quantitative separation of HCl should take place only under the formation of unsaturated phosphinic acids or their acid dichlorides, and not under the formation of the corresponding β-chloro phosphinic acids or their acid dichlorides. It may be assumed that the reaction of PCl_5 suggested by E. Bergmann and A. Bondi (Ref.4) with unsaturated hydrocarbons may proceed in a different way, i.e., without formation of β-chloro phosphinic acid derivatives by the scheme

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87532

Reaction of Phosphorus Pentachloride With Unsaturated Hydrocarbons

S/079/60/030/012/016/027
B001/B064

$$RCH{=}CH_2 + PCl_4^+ \longrightarrow \left[(RCHCH_2PCl_4)^+\right] \longrightarrow HCl + \left[RCH{=}CHPCl_3^+\right] \xrightarrow{+PCl_6^-}$$

$\longrightarrow RCH{=}CHPCl_3^+ \cdot PCl_6^-$. It was the aim of this study to obtain the immediate reaction products of PCl_5 with unsaturated hydrocarbons and to identify them. PCl_5 which reacts readily with styrene, was the initial product. A crystalline complex $C_6H_5CH{=}CHPCl_3^+ \cdot PCl_6^-$ formed at 0°C in the course of six hours under the formation of 1 mole HCl. Thus, it may be concluded that in this case the intermediate product of the $ArCHClCH_2PCl_4 \cdot PCl_5$ (Ref.7) does either not form at all or is so unstable that it decomposes at 0°C already. The $C_6H_5CH{=}CHPCl_3^+ \cdot PCl_6^-$ yield amounted to 80%. When the complex is reacted with SO_2, styryl phosphinic acid dichloride forms in a high yield (Ref.7). Styryl phosphorus tetrachloride is obtained under the action of styrene. When reduced with red phosphorus (Ref.8), the complex is converted into styryl phosphine dichloride. All these chemical conversions together with the analytical data confirm the

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Reaction of Phosphorus Pentachloride With Unsaturated Hydrocarbons

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structure of the complex. When heated, the complex decomposes to HCl, PCl_3, and halogenated hydrocarbons. The unstable styryl phosphorus tetrachloride could not be obtained in the pure state; its structure was, however, confirmed by its conversion into styryl phosphinic acid dichloride under the action of SO_2 and by reduction with red phosphorus to styryl dichloro phosphine. Similar complexes of the $ArPCl_3^+ \cdot PCl_6^-$ type were synthesized by reacting PCl_5 with aryl phosphinic acid dichlorides: $ArPOCl_2 + 2PCl_5 \longrightarrow POCl_3 + ArPCl_3^+ \cdot PCl_6^-$. There are 9 references: 4 Soviet, 6 US, 1 British, and 3 German.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences Ukrainskaya SSR)

SUBMITTED: January 28, 1960

Card 3/3

S/079/60/030/012/017/027
B001/B064

53630

AUTHORS: Zhmurova, I. N. and Kirsanov, A. V.

TITLE: Hydrolysis and Acidolysis of Monomeric and Dimeric Trichlorophosphazoaryls

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol. 30, No. 12, pp.4048-4053

TEXT: The trichlorophosphazoaryls ($ArN — PCl_3$) obtained in the previous paper (Ref.1) are easily hydrolyzed by air moisture. They acidolyse with formic and acetic acid to aryl amidophosphoric acid dichlorides (I)-(IV) (Table 1). In contrast to monomeric trichlorophosphazo aryls the dimeric compounds are not transformed into aryl amidophosphoric acid dichlorides during hydrolysis or acidolysis. Dichlorides of the arylamidophosphoric acid (V)-(XII) (Table 1) may be obtained by the method described in Ref.1 under the action of formic acid on the solutions of monomeric trichlorophosphazoaryls according to reaction (A). The latter are easily hydrolyzed with water (some of them even by air moisture) which renders their purification difficult. On prolonged heating in dissolved state or on water bath without solvent, they gradually decompose. The authors proved

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Hydrolysis and Acidolysis of Monomeric and Dimeric Trichlorophosphazoaryls

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the identity of arylamidophosphoric acids which are mentioned by Michaelis (Ref.2). On reacting PCl_5 with arylamidophosphoric acid dichlorides the initial products were obtained in high yields, i.e., the monomeric and dimeric trichlorophosphazoaryls (Ref.1):

Vc

$$ArNHPOCl_2 + PCl_5 \longrightarrow POCl_3 + HCl + ArN{-}PCl_3$$

$$2\ ArNHPOCl_2 + 2PCl_5 \longrightarrow 2POCl_3 + 2HCl + (ArN{-}PCl_3)_2\ .$$

The structure of dimeric trichlorophosphazoaryls could be determined by partial hydrolysis only in four dimers. According to the elementary analysis, their molecular weight and the chemical properties, the reaction products obtained in this connection are acid chlorides of N,N'-diaryl-N-dichlorophosphinyl diamidophosphoric acid (Table 2). All other dimers gave only viscous resins. In crystalline state N,N'-diaryl-N-dichlorophosphinyl diamidophosphoric acid chlorides are rather stable; on heating in organic solvents or $POCl_3$, they rapidly decompose. Their structure was confirmed by converting them into the dimeric initial trichlorophosphazo aryls with 2 moles PCl_5. There are

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Hydrolysis and Acidolysis of Monomeric and Dimeric Trichlorophosphazoaryls

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2 tables and 2 references: 1 Soviet and 1 German.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences Ukrainskaya SSR)

SUBMITTED: January 28, 1960

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Card 3/3

KIRSANOV, A.V.; ZHURAVLEVA, L.P.

Derivatives of 4-phosphinylsemicarbazide. Zhur. ob. khim. 31 no.1: 210-216 Ja '61. (MIRA 14:1)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR.
(Semicarbazide)

89519

S/079/61/031/002/012/019
B118/B208

5.3630

AUTHORS: Kirsanov, A. V. and Shokol, V. A.

TITLE: Aryl esters of N-diaroxy-phosphinylimino-thiocarboxylic acids of the aromatic series

PERIODICAL: Zhurnal obshchey khimii, v. 31, no. 2, 1961, 582-593

TEXT: The diesters of thioacyl-phosphamic acids $ArC(=S)NHPO(OR)_2$ synthesized by the authors in Ref. 1 are tautomeric with N-diaroxy-phosphinylimino-thiocarboxylic acids (I) $ArC[=NPO(CR)_2]SH$. The aromatic esters of the latter were obtained by reacting the chlorides of N-diaroxy-phosphinylimino-carboxylic acids (Ref. 2) with sodium thiophenolates, or (with particular ease) with thiophenols in the presence of tertiary amines:

$$ArC\left[=NPO(OAr')_2\right]Cl \xrightarrow[\text{or } NaSAr'']{+\,HSAr'' + (C_2H_5)_3N} ArC\left[=NPO(OAr')_2\right]SAr''.$$ The esters are insoluble in water, alkali lyes, and acids. p-Nitrophenyl esters of N-diaroxy-phosphinylimino-thiocarboxylic acids are gradually decomposed on

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Aryl esters of N-diaroxy- ...

heating (250-300°C) in high vacuum to give nitriles, and also considerably carbonized. As far as the chemical properties are concerned, the esters (I) much resemble the aryl esters of N-diaroxy-phosphinylimino-carboxylic acids (Ref. 3). Esters (I) are easily saponified with aqueous-alcoholic solutions of strong mineral acids, and with 90% acetic acid. When treating the esters (I) with NH_3 or amines, the corresponding amidines and thiophenols are obtained:

$$ArC\left[=NPO(OAr')_2\right]SAr'' + RNH_2 \longrightarrow Ar''SH + ArC\left[=NPO(OAr')_2\right]NHR.$$

In alcoholic solutions, the esters (I) react with NH_3 very easily and with nearly quantitative yields. The reaction of the esters (I) with amines is much more difficult, and requires prolonged heating (up to 35 hr). To compare the properties of the esters (I) with the aryl esters of N-diaroxy-phosphinylimino-carboxylic acids (Ref. 3), the reaction of the latter with NH_3 and amines was studied. The aroxy group of these aromatic esters, which is combined with the carbon atom, was found to be also substituted by the amino group, on the action of NH_3 or amines, giving the corresponding amidines and phenols:

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Aryl esters of N-diaroxy- ...

$$\mathrm{ArC}\left[=\mathrm{NPO(OAr')_2}\right]\mathrm{OAr''} + \mathrm{RNH_2} \longrightarrow \mathrm{Ar''OH} + \mathrm{ArC}\left[=\mathrm{NPO(OAr')_2}\right]\mathrm{NHR}.$$

Concentrated HNO_3 hydrolyzes the esters (I) to diesters. When heating the esters (I) with dimethyl sulfate at 100°C, without solvent, no alkylation occurs at the sulfur atom; the initial product gradually changes to form nitriles, thiophenols, diesters of acyl-phosphamic acids, and other products of unknown structure. The sulfur in the esters (I) thus has not the properties of sulfide sulfur. There are 4 tables and 7 references: 5 Soviet-bloc and 1 non-Soviet-bloc.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences Ukrainskaya SSR)

SUBMITTED: March 7, 1960

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89520

S/079/61/031/002/013/019
B118/B208

5-3630

AUTHORS: Fedorova, G. K. and Kirsanov, A. V.

TITLE: Reaction of dichlorides of alkyl phosphinic acids with phosphorus pentachloride

PERIODICAL: Zhurnal obshchey khimii, v. 31, no. 2, 1961, 594-598

TEXT: On reaction of the dichlorides of aryl phosphinic acids with PCl_5, crystalline complexes $ArPCl_3^+ \cdot PCl_6^-$ are formed, as has been shown by the authors in Ref. 1. The purpose of the present study was to clarify whether this reaction is specific only for the dichlorides of aromatic phosphinic acids, or holds for the dichlorides of aryl and alkyl phosphinic acids. The authors studied the reaction of PCl_5 with dichlorides of ethyl-, propyl-, and butyl phosphinic acids, and found that under mild conditions (in benzene, at 80°C) not only the dichloro phosphinyl group is converted to the group $PCl_3^+ \cdot PCl_6^-$, but also complete chlorination of the α-carbon atom occurs giving complex compounds of PCl_5 with α, α-dichloro-alkyl phosphorus tetra-

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Reaction of dichlorides ...

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B118/B208

chlorides:

$RCH_2POCl_2 + 4PCl_5 \longrightarrow 2HCl + 2PCl_3 + POCl_3 + RCCl_2PCl_3^+ \cdot PCl_6^-$. The position of the chlorine atoms in the alkyl groups is confirmed by the fact that the complex $C_2H_3Cl_2PCl_3^+ \cdot PCl_6^-$ gives with SO_2 the dichloride of dichloro-ethyl phosphinic acid which corresponds to that obtained by A. M. Kinnear (Ref. 2) from α, α-acid. The complexes $RCCl_2PCl_3^+ \cdot PCl_6^-$ (Table 1) are insoluble in common solvents, and react vigorously with water and alcohols, they are hydrolyzed at different rates depending on the character of the radical. The complex $CH_3CCl_2PCl_3^+ \cdot PCl_6^-$ is hydrolyzed with water at 20°C, splitting off about nine chlorine atoms, and about ten chlorine atoms when boiling with water for two hours; the last chlorine atom cannot be split off even by prolonged boiling. The complexes $C_2H_5CCl_2PCl_3^+ \cdot PCl_6^-$ and $n\text{-}C_3H_7CCl_2PCl_3^+ \cdot PCl_6^-$ are hydrolyzed by boiling with water for one hour, splitting off all chlorine atoms. Reaction of sulfur dioxide with the complexes $RCCl_2PCl_3^+ \cdot PCl_6^-$ ($R = CH_3$, C_2H_5, $n\text{-}C_3H_7$) gives the dichlorides of α, α-dichloro-

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Reaction of dichlorides ...

alkyl phosphinic acids: $RCCl_2PCl_3^+ \cdot PCl_6^- + 2SO_2 \longrightarrow POCl_3 + 2SOCl_2 + RCCl_2POCl_2$. The complex $CH_3CCl_2POCl_2$ (I) first synthesized by A. M. Kinnear (Ref. 2) has not been characterized in detail. It is crystalline, distillable in vacuo, causes weeping, and is well soluble in organic solvents. When treating complex (I) with alcohols in the presence of pyridine monoalkyl esters of the monoacid chloride of α, α-dichloro-ethyl phosphinic acid (II), $CH_3CCl_2PO(OR)Cl$ are formed. They have a fruitlike odor and possess insecticidal properties. Complete hydrolysis of the dichloride of α, α-dichlorobutyl phosphinic acid, or of the complex $n\text{-}C_3H_7CCl_2PCl_6^+$, gave α-ketobutyl phosphinic acid ($n\text{-}C_3H_7COP(OH)_2$) which is stable in aqueous acid solutions (Ref. 4). M. I. Kabachnik and P. A. Rossiyskaya are mentioned. There are 2 tables and 5 references: 3 Soviet-bloc and 3 non-Soviet-bloc.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences Ukrainskaya SSR)

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Reaction of dichlorides ...

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SUBMITTED: March 14, 1960

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89521

S/079/61/031/002/014/019
B118/B208

5-3630

AUTHORS: Kirsanov, A. V and Zhuravleva, L. P.

TITLE: N-dichloro-phosphinyl carbamic acid

PERIODICAL: Zhurnal obshchey khimii, v. 31, no. 2, 1961, 598-604

TEXT: It was to be expected from Ref. 1 that N-dichloro-phosphinyl carbamic acid formed by treating the dichloride of isocyanato-phosphoric acid with water splits off readily CO_2 being converted to phosphamic acid dichloride. Experiments disclosed that isocyanato-phosphoric acid dichloride readily splits off CO_2 with excess water, in which connection, however, the acid chloride part of the molecule is hydrolyzed: $Cl_2PONCO + 4H_2O \longrightarrow CO_2 + 2HCl + NH_4H_2PO_4$. Addition of water only to the isocyanate group, without hydrolysis of the chlorine atoms bound to phosphorus, was possible only by the method of R. Graf (Ref. 2), i.e., with concentrated hydrochloric acid. In this way the dichloride of isocyanato-phosphoric acid gives the thermostable N-dichloro-phosphinyl carbamic acid (I):

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N-dichloro-phosphinyl ... S/079/61/031/002/014/019
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$Cl_2PONCO \xrightarrow{+H_2O} Cl_2PONHCOOH$. Its structure was confirmed by analytical data and the following reactions: 1) Complete hydrolysis gives HCl, NH_3, CO_2, and H_3PO_4; 2) reaction with PCl_5 gives HCl, $POCl_3$, and Cl_2PONCO; 3) trialkyl phosphates are formed nearly quantitatively with alcohols; 4) with aniline, the aniline salt of N-dianilidophosphonyl carbamic acid results; 5) heating to 160°C gives HCl, Cl_2PONCO, and the polymer $[HOPO = NCOOH]$. The aniline salt of N-dianilidophosphinyl carbamic acid obtained from N-dichloro phosphinyl carbamic acid and aniline hydrolyzes when treated with alkali lye to give the sodium salt of dianilidophosphoric acid, aniline, soda, and NH_3. When heating N-dichloro-phosphinyl carbamic acid, the following processes take place successively:

$$2Cl_2PONHCOOH \xrightarrow{160^\circ} Cl_2PONCO + \frac{1}{x}\left[HOPO\ (= NCOOH)\right]_x \xrightarrow{500^\circ} \frac{1}{x}(HOPONH)_x \xrightarrow{1000^\circ} \frac{1}{x}(PON)_x.$$

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N-dichloro-phosphinyl ... B118/B208

The thermal stability of N-dichloro-phosphinyl carbamic acid and N-carboxy-metaphosphimic acid is probably due to an aromatic structure formed by a hydrogen bond. There are 9 references: 1 Soviet-bloc and 8 non-Soviet-bloc.

ASSOCIATION: Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR (Institute of Organic Chemistry of the Academy of Sciences Ukrainskaya SSR)

SUBMITTED: March 21, 1960

S/079/61/031/003/013/013
B118/B207

AUTHORS: Levchenko, Ye. S. and Kirsanov, A. V.

TITLE: Nomenclature of compounds containing the N-S double bond

PERIODICAL: Zhurnal obshchey khimii, v. 31, no. 3, 1961, 1040-1042

TEXT: Comparatively few of such compounds have hitherto been known so that their nomenclature was of no practical importance. Since, however, recently the number of new types with the above bond has considerably increased, a suitable nomenclature has become indispensable. The authors take account of the nomenclature suggested by R. Appel et al. (Ref. 2: Lieb. Ann., 618, 53 (1958)), I. Whitehead, H. Bentley; they are of the opinion that the nomenclature to be developed should not deviate from the rules of nomenclature holding for other classes of compounds, and that it should characterize the chemical nature of the compound as clearly as possible, including the degree of oxidation of the atom determining the class of the compound in question. For this reason, the authors regard I. Whithead's and H. Bentley's suggestion as insufficient since the following principle holds for their nomenclature: If an imino group adds to the molecule of the compound, its name

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receives the ending "imine". This principle is little used in other classes of compounds and cannot be applied to the majority of classes of compounds whose RN= or HN= groups are linked with other atoms by double bonds. According to Whitehead's and Bentley's suggestion, aldimines (aldehyde imines) RC(=NH)OH would have the name "alkyl idenimines" since the NH= group adds to the alkyl idenes. The rules of nomenclature that have been in use for a long time, for compounds with both N=C and C=S bonds, should not be changed. Besides, the above principle does not characterize the chemical nature of the compounds. Compounds with $R_2S=NH$ bonds are no derivatives of sulfides, but of sulfoxides so that their name should characterize their relationship with sulfoxides and not with sulfides. Compounds with the $R_2S=NH$ bonds also belong to the sulfoxides, just as the aldimines belong to the aldehydes and the imino acids to the acids, so that these compounds should be termed sulfoxide imines and not sulfide imines. The ending "imine" cannot determine the valency state, since in aldimines and ketimines the valency of carbon is the same as in aldehydes and ketones. The authors recommend the following principles for the nomenclature of compounds containing HN= or RN=groups: 1) The HN= group should be called imido group only if it is linked with two acyls. 2) The HN= group should be called imino group only if it is linked with both bonds to one atom only. 3) The names of compounds with an N=S bond (or N=P bond, etc.) should be derived from the names of the respective oxygen compounds and completed by the ending "imine". For the individual classes of compounds with an N=S bond, the names listed in the table are suggested. There are 1 table and 6 Soviet-bloc references. The 3 references to English-language publications read as follows: H. Bentley, I. Whitehead, J. Chem. Soc., 1950, 2081; W. Smith, C. Tulluck, R. Smith, V. Engelhardt, J. Am. Chem. Soc., 82, 551 (1960); G. Kosolapoff, Organophosphorus compounds, N. Y. (1950).

ASSOCIATION: Institut organicheskoy khimii AN USSR (Institute of Organic Chemistry AS UkrSSR)

SUBMITTED: July 25, 1960

FESHCHENKO, N.G.; KIRSANOV, A.V.

Phenyl - and diphenylphosphorus iodides. Zhur. ob. khim. 31 no.4:1399-1400 Ap '61. (MIRA 14:4)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR.
(Phosphorus compounds)

KROPACHEVA, A.A.; DERKACH, G.I.; KIRSANOV, A.V.

N, N', N"-Triethylenetriamidophosphazo compounds and N', N", N'"-triethylene-N-diamidophosphinylarenamidines. Zhur.ob.khim. 31 no.5:1601-1604 My '61. (MIRA 14:5)

1. Institut organicheskoy khimii Akademii nauk Ukrainskoy SSR.
(Phosphazo compounds) (Amidines)

KIRSANOV, A.V.; MARENETS, M.S.

Thermal cleavage of phenyl trichlorophosphazocarbonate. Zhur.ob. khim. 31 no.5:1605-1607 My '61. (MIRA 14:5)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphazo compounds) (Carbonic acid)

KIRSANOV, A.V.; MARENETS, M.S.

Esters of urethanphosphoric acids. Part 2. Zhur.ob.khim. 31 no.5:1607-1611 My '61. (MIRA 14:4)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Urethanphosphoric acid)

LEVCHENKO, Ye.S.; KIRSANOV, A.V.

N-arylsulfonyliminothionyl chlorides. Zhur.ob.khim. 31 no.6:1968-1971 Je '61. (MIRA 14:6)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Thionyl chloride)
(Sulfonic acids)

LEVCHENKO, Ye.S.; DERKACH, N.Ya.; KIRSANOV, A.V.

Chloridea of N-arylsulfonylareniminosulfonic acids. Part 2. Zhur.ob.
khim. 31 no.6:1971-1976 Je '61. (MIRA 14:6)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Sulfonic acids) (Chlorides)

DERKACH, G.I.; SHOKOL, V.A.; KIRSANOV, A.V.

N'-diaroxyphosphinyl-N^2(N^3-arylthiocarbaminyl) arenamidines [N'-aryl-N^2(N^3-diaroxyphosphinyliminoaroyl) thiourea]. Zhur. ob.khim. 31 no.7:2275-2282 Jl '61. (MIRA 14:7)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Urea) (Amidines)

LEVCHENKO, Ye.S.; KOZLOV, E.S.; KIRSANOV, A.V.

N-carbethoxyareneimino sulfonyl chlorides. Zhur.ob.khim. 31 no.7:
2381-2385 Jl '61.
(MIRA 14:7)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Sulfonyl chlorides)

DERKACH, G.I.; DREGVAL', G.F.; KIRSANOV, A.V.

Triaryloxy phosphazo-N-arylsulfonyliminobenzoyls and N-diaryloxyphosphinyl-N'-arylsulfonylbenzamidines. Zhur.ob.khim. 31 no.7:2385-2390 Jl '61. (MIRA 14:7)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphorus organic compounds) (Benzamidines)

DERKACH, G.I.; KRUZEMENT-PRIKHOD'KO, V.V.; KIRSANOV, A.V.

N-diaminophosphinylaroylamides. Zhur.ob.khim. 31 no.7:2391-2396 Jl '61.
(MIRA 14:7)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphinic amide)

SHEVCHENKO, V.I.; SHTEPANEK, A.S.; KIRSANOV, A.V.

Isocyanatephenylphosphinyl chloride. Zhur.ob.khim. 31 no.9:3062-3066 S '61. (MIRA 14:9)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphinic chloride)

DERKACH, G.I.; LEPESA, A.M.; KIRSANOV, A.V.

Alkyl esters of N-dialkoxy- and N-diaroxyphosphinyliminocarboxylic acids. Zhur.ob.khim. 31 no.10:3424-3433 0 '61. (MIRA 14:10)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Esters) (Acids, Organic)

PROTSENKO, L.D.; DERKACH, G.I.; KIRSANOV, A.V.

Bistriethylenetriamidophosphazo derivatives of dibasic acids and diethylenediamides of bis-N-diethylenediamidophosphinylimino-carboxylic acids. Zhur.ob.khim. 31 no.10:3433-3436 O '61.
(MIRA 14:10)

1. Institut organicheskoy khimii AN Ukrainskoy SSR i Ukrainskiy nauchno-issledovatel'skiy sanitarno-khimicheskiy institut.
(Acids, Organic) (Phosphazo compounds)

DERKACH, G.I.; GUBNITSKAYA, Ye.S.; KIRSANOV, A.V.

Triphenylphosphazoaroyls, N-diphenylphosphinylphenylaryl ketimines, and N-diarylphosphinylaroyl amides. Zhur. ob. khim. 31 no. 11:3679-3684 N '61. (MIRA 14:11)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphorus organic compounds)

ZHMUROVA, I.N.; KIRSANOV, A.V.

Phenyldichlorophosphazoaryls. Zhur. ob. khim. 31 no. 11:3685-3689
N '61. (MIRA 14:11)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphorus organic compounds)

ZHMUROVA, I.N.; VOYTSEKHOVSKAYA, I.Yu.; KIRSANOV, A.V.

Triphenoxyphosphazoaryls. Zhur. ob. khim. 31 no. 11:3741-3764
N '61. (MIRA 14:11)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphazo compounds)

DERKACH, G.I.; GUBNITSKAYA, Ye.S.; KIRSANOV, A.V.

Trianilidophosphazoaroyls and N-dianilidophosphinyl-N'-aryl-arenamidines. Zhur. ob. khim. 31 no. 11:3746-3750 N '61.
(MIRA 14:11)

1. Institut organicheskoy khimii AN Ukrainskoy SSR.
(Phosphazo compounds) (Amidines)

31190

S/079/61/031/012/004/011
D228/D301

5.1320

AUTHORS: Ivanova, Zh. M., and Kirsanov, A. V.

TITLE: The aryl trifluoromonohydrides of phosphorous

PERIODICAL: Zhurnal obshchey khimii, v. 31, no. 12, 1961, 3991-3994

TEXT: The preparation of the aryl trifluoromonohydrides of P is described together with data for some of their properties. In the present study, however, the authors used KHF_2 since they were unable to verify the data previously obtained with SbF_3. Three aryl difluorophosphines were prepared by heating solutions of KHF_2, and aryl dichlorophosphines till the reaction commenced (50-60°), purification being effected by vacuum distillation in an atmosphere of N_2. Their yields and boiling points were: $\underline{n}$-$MeC_6H_4PF_3H$ - 79%, 90-91°; $PhPF_3H$ - 84%, 57-58°(I); and $\underline{n}$-$ClC_6H_4PF_3H$ - 90%, 90-91°(II). The structure of these compounds was also confirmed by chemical

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