Spitsyn, Vikt. I.

USSR/Chemistry - Conversion processes

Card 1/2 Pub. 22 - 22/43

Authors : Spitsyn, Vikt. I., Memb. Corresp., AN SSSR, and Fabrikova, Ye. A.

Title : Conversions of sodium phosphotungstate during reaction with sodium hydroxide

Periodical : Dok. AN SSSR 106-1, 84-87, Jan 1, 1956

Abstract : The reaction between sodium hydroxide and ordinary tri-substituted sodium phosphotungstate was investigated. It was found that the addition of small amounts of sodium hydroxide to the sodium phosphotungstate solution results in partial decomposition of the saturated salt and formation of phospho-9-tungstate and normal sodium tungstate. These tungstates react between each other forming a new chemical compound of the binary or complex salt type.

Institution : Moscow State University im. M. V. Lomonosov

Submitted : June 29, 1955

Card 2/2 Pub. 22 - 22/43

Periodical : Dok. AN SSSR 106/1, 84-87, Jan 1, 1956

Abstract : The possibility that the binary salt may be an intermediate product formed during the synthesis of the saturated salt from the phosphate and sodium tungstate, is discussed. Five references: 2 USSR, 2 Germ. and 1 USA (1908-1952). Tables; graphs.

Spitsyn, V.I.

2

Oxygen-isotope exchange with alkali metal sulfates at high temperatures. V. I. Spitsyn and V. G. Finikov. *Doklady Akad. Nauk S.S.S.R.* 108, 491-4(1956).—The exchange of O^{18} with the O of alkali sulfates was investigated in order to compare the O-bonding strength in these compds. The app. used in the tests is shown schematically, and the % O exchanged with Li_2SO_4, Na_2SO_4, K_2SO_4, Rb_2SO_4, and Cs_2SO_4 was detd. at 080-820° after proving that O^{18} does not interact with fused quartz at temps. below 830°. Preliminary values for the exchange activation energies obtained in kcal./mol. were 39 for Li_2SO_4, 54 for Na_2SO_4, 67 for K_2SO_4, 40 for Rb_2SO_4, and 24 for Cs_2SO_4. The O^{18} content in the sulfates after the reaction was not detd. directly, and was estd. from the O^{18} % in the gas after the reaction.

W. M. Sternberg

Chem

SPITSYN, V. I.

2

Oxygen-isotope exchange with alkali metal sulfates at high temperatures. V. I. Spitsyn and V. G. Finikov. *Proc. Acad. Sci. U.S.S.R., Sect. Chem.* 108, 293-6(1956) (English translation).—See *C.A.* 51, 3240*h*. B. M. R.

Chem

Spitsyn, V. I.

5

RML-1

Isotope exchange between heavy water and some hydrated poly compounds of tungsten. V. I. Spitsyn and Yu. F. Berezkina. *Proc. Acad. Sci. U.S.S.R., Sect. Chem.* 108, 331–4(1956)(English translation).—See *C.A.* 51, 53*f*.

B. M. R.

2/ 4E4j-1

PM

MT RML

SPITSYN, Vikt.I.; BEREZKINA, Yu.F.

Investigation of the isotopic exchange between heavy water and certain tungsten aquopolycompounds. Dokl. AN SSSR 108 no.6:1088-1091 Je '56.
(MLRA 9:10)

1. Chlen-korrespondent Akademii nauk SSSR (for Spitsyn) 2. Institut fizicheskoy khimii Akademii nauk SSSR.
(Tungsten) (Deuterium oxide)

SPITSYN, V. I.

"The use of isotope methods in investigating the structure and properties of heteropoly compounds," a paper submitted at the International Conference on Radioisotopes in Scinetific Research, Paris, 9-20 Sep 57

SPITSYN, V.

AS USSR

"Du role de l'eau dans la structure des combinaisons aquopoly," paper submitted at 16th International Congress of pure and Applied Chemistry, Paris, 18-24 July 1957

SPITSYN, Vikt. I., FINIKOV, V. G.

"Study of the Isotopic Exchange Between Gaseous Oxygen and Salts of Certain Oxygen-Containing Acids at High Temperatures."

SPITSYN, V.I.

137-58-5-10260

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 196 (USSR)

AUTHOR: Spitsyn, V.I.

TITLE: Introductory Remarks (at the Conference on the Theory and Practice of Chromium Plating) [Vstupitel'noye slovo (na soveshchanii po teorii i praktike khromirovaniya)]

PERIODICAL: V sb.: Teoriya i praktika elektrolit. khromirovaniya. Moscow, AN SSSR, 1957, pp 5-7

ABSTRACT: Bibliographic entry

1. Chromium plating--USSR

Card 1/1

SPITSYN, V.I.

78-3-3/35

AUTHOR: Spitsyn, V. I.

TITLE: Contribution on the Structure of Aquapoly- and Heteropolycompounds. (K Voprosu o Stroyenii Akvopoli- i Geteropolisoyedineniy).

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1957, Vol.II, Nr.3, pp. 502-509. (USSR)

ABSTRACT: In this report, presented at the Seventh All-Union Conference on the chemistry of complex compounds held on 10th October, 1956, the author describes some previous work on heteropoly and similar compounds and describes an investigation in which tracer atoms were used to study the first stages in the formation of phosphotungstates. Solutions of Na_2HPO_4, Na_2WO_4 or their mixtures, marked with radioactive indicators, were poured into capillaries with sealed bottoms, these then being immersed in a solution of exactly the same composition but without radioactive isotopes. From the change in the concentration of tracer atoms in the capillary diffusion coefficients for the anions studied were calculated.

Card 1/3

ASSOCIATION: Physical Chemistry Institute of the Academy of Sciences of the USSR (Institut Fizicheskoy Khimii Akademii Nauk SSSR) Moscow State University imeni Lomonosova, Chair of

Card 2/3

Inorganic Chemistry.
Universitet im. Lomonosova, Kafedra Neorganicheskoy Khimii.)

SUBMITTED: October 24, 1956.

AVAILABLE: Library of Congress.

Card 3/3

Spitsyn, V. I.

19

✓Application of the radiometric method of analysis to the study of the composition of phosphotungstates. V. I. Spitsyn and N. B. Mikheev. *Zhur. Neorg. Khim.* 2, 1107-70(1957).—A radiometric method was described for detg. the compn. of phosphotungstates by detg. the P:W ratio. The compds. are prepd. to include 2 radioactive elements which differ in their half-lives. By measuring the decrease in the radioactivity for each of the elements it was possible to det. the P:W ratio for sodium phosphotungstate. This method gives more precise results than does chem. analysis. J. Rovtar Leach

3

RMR

[redacted]

RMR

SPITSYN, Vikt. I.; PIROGOVA, G.N.

Investigating sodium paratungstate solutions by the method of dialysis. Zhur.neorg.khim. 2 no.9:2102-2108 S '57. (MIRA 10:12)

1.Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova, Laboratoriya neorganicheskoy khimii.
(Sodium tungstates) (Dialysis)

SPITSYN, Vikt.I.; MIKHAYLENKO, I.Ye.

Studying the conditions of interaction between sulfuric anhydride and normal sulfates of alkali elements. Zhur. neorg. khim. 2 10:2416-2422 O '57. (MIRA 11:3)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova, Kafedra neorganicheskoy khimii.
(Sulfuric anhydride) (Sulfates) (Alkali metals)

Spitsyn, V. I.

7

Röntgenographic investigation of pyrosulfates of alkali elements. I. E. Mikhailenko, V. I. Spitsyn, and Yu. P. Simanov (M. V. Lomonosov State Univ., Moscow). *Zhur. Neorg. Khim.* 2, 2520-8(1957).—X-ray diffraction pictures of pyrosulfates prepd. by the slow method (I) and by the rapid method (II) were studied. In method I SO_3 was added to the sulfates. In method II concd. H_2SO_4 was added to *N* solns. of sulfates of Li, Na, and K and to *N* solns. of chlorides of Ru and Cs. The pyrosulfates thus prepd. were heated to const. wt. at: Li 200, Na 250, K 300, Rb and Cs 400°. None of them contained the normal sulfates or solid solns. of M_2SO_4 with $M_2S_2O_7$. The crystal structure of $Li_2S_2O_7$ by either method was the same, but the structures of the other pyrosulfates prepd. by I were different from the structures of those prepd. by II. The former were of the $M_2SO_4.SO_3$ type and the latter of the type $M_2S_2O_7$. I. Bencowitz

1/1

Distr: 4E4j

SPITSYN, V. I.

SPYCIN, V.I.; KOPECKA, L.[translator]

Problem of radioactive waste in modern technology. Jaderna energie 3 no.2:58-62 F '57.

1. Dopisujici clen akademie S.S.S.R. (for Spycin).

SPITSYN, VIKT. I.

89-9-12/32

AUTHOR: **SPITZYN, VIKT. I., MIKHEYEV, N.B.**

TITLE: The Analytical Determination of Radio-Cesium in Form of a Tungstate-Phosphor. (Analiticheskoye opredeleniye radiotseziya v vide fosfornovol'framata)

PERIODICAL: **Atomnaya Energiya,** 1957, Vol 3, Nr 9, pp 255-256 (U.S.S.R.)

ABSTRACT: For the analytical determination of radio cesium the following is used:

1.) A solution of C_sCl 7gl

2.) A solution of 5,5 g $Na_3 H_4 [P(W_2O_7)_6] \cdot 19 \cdot H_2O$ in 100 ml 5% HNO_3

3.) 15% NaOH

4.) 15% KOH

5.) 0,1% solution of $Fe(NO_3)_3$

By means of these chemicals the process of analyzation, which is described in detail, is carried out.

Card 1/2

SPITSYN, Vikt.I.; FINIKOV, V.G.

Study of isotope exchange between gaseous oxygen and salts of several
oxygen containing acids, at high temperature. Probl. kin. i kat. 9:
264-266 '57. (MIRA 11:3)
(Alkali metal sulfates) (Oxygen--Isotopes)
(Chemical reaction--Conditions and laws)

SPICYN, V.I; LAVRUCHINA, A.K. (Lavrukhina, A.K.); KRATOCHVIL, G., inz.
(translator)

Use of nuclear energy in Czechoslovakia. Jaderna energie 3 no.8:
253-254 Ag '57

SPITSYN, V. I., LABEDEV, I. A., PIKAYEV, A.K., and SAVICH, I. A.

"Synthesis of a Number of Schiff Bases Derived From Aromatic o-Hydroxyaldehydes and Heterocyclic Amines," by I. A. Savich, A. K. Pikayev, I. A. Labedev, and V. I. Spitsyn, Chair of Inorganic Chemistry, Moscow State University, Vestnik Moskovskogo Universiteta, Vol 11, No 1, Jan/Feb 57, pp 225-231

According to the text of the paper, 13 hitherto unknown Schiff bases have been synthesized. Their properties are described. It has been established that these bases can be used for the precipitation of a number of cations. The precipitates formed by Cu^{++}, Ni^{++}, Ag^{+}, Fe^{++}, Fe^{+++}, Co^{++}, UO_2^{++}, Cr^{+++}, La^{+++}, and Zr^{4+} with 2-(2-hydroxy-1-naphthylamino) pyridine were found to have specific colors which vary from cation to cation. These colors are listed.

[Comment: Methods for the precipitation and analytical determination of uranium, zirconium, and lanthanum are of importance in connection with nuclear energy work.]

Sum 1258

SPITSYN, V. I., SAVICH, I. A., and ZELENTSOV, V. V.

"Synthesis of a Number of Schiff Bases Derived From 2-Hydroxy-1-naphthaldehyde and Some Amines," by I. A. Savich, V. V. Zelentsov, and V. I. Spitsyn, Chair of Inorganic Chemistry, Moscow State University, Vestnik Moskovskogo Universiteta, Vol 11, No 1, Jan-Feb 57, pp 233-237

The article describes methods for the preparation of and the properties of 11 newly synthesized, hitherto unknown Schiff bases derived from 2-hydroxy-1-naphthaldehyde and some aromatic amines. The qualitative reactions of the bases with cations of Al, Pb, Cd, Co, Ni, Fe (ferric and ferrous), Hg, Cu, Mn, and Cr were investigated.

[Comment: Methods for the precipitation and analytical determination of cadmium are of importance in connection with nuclear energy work.]

Sum 1258

SPITSYN, V.I.

HUNGARY/Inorganic Chemistry - Complex Compounds. C.

Abs Jour : Ref Zhur - Khimiya, No 14, 1958, 46237

Author : V.I. Spitsyn

Inst : Academy of Sciences of Hungary.

Title : Application of Tagged Atoms to Study of Chemistry of Complex Compounds.

Orig Pub : Acta chim. Acad. sci. hung., 1957, 12, No 2, 119-140

Abstract : A review mainly of works of the author and his collaborators.
Bibliography with 33 titles.

Card 1/1

SPITSYN, V.I.

Progress of inorganic chemistry in the U.S.S.R. in forty years.
Khim.v shkole 12 no.5:9-20 S-O '57. (MIRA 10:10)

1. Chlen-korrespondent AN SSSR.
(Russia--Chemistry, Inorganic)

SPITSYN, V.I.; LAVRUKHINA, A.K., doktor khimicheskikh nauk.

[redacted]

Utilization of atomic energy in Czechoslovakia. Vest. AN SSSR 27 no.6:76-81 Je '57. (MIRA 10:7)

1. Chlen-korrespondent Akademii nauk SSSR (for Spitsyn).
(Czechoslovakia--Atomic energy)

Spitsyn, Viktor

7

4

4E4j
4E2c

Structure of aquopoly and heteropoly compounds. Wiktor I. Spicyn (Acad. Sci. U.S.S.R., Moscow). *Roczniki Chem.* 31, 809–30(1957)(in Russian)(Polish summary).—The first stages of formation of paratungstates (I) and tungstophosphates (II) were studied by the tracer method. The low rate of I formation in acidic Na_2WO_4 solns. increases with temp. and lowering of pH. The reaction between HPO_4^{--} and WO_4^{--} starts at pH 8–9 and leads to formation of II, or of double compds. with normal tungstates. The properties of Na paratungstate were investigated by dialysis, chromatography, absorption spectra, and polarography. The $W_{12}O_{41}^{10-}.28H_2O$ ions present in freshly prepd. solns. transform themselves to $[H_2O.W_6O_{21}]^{6-}.12.5\ H_2O$ (III). III, or macromol. anions, is formed in acidic Na_2WO_4 solns. The formation of aquopoly and heteropoly compds. depends on the appearance of H bonds between the anions of the reacting acids. The existence of oxonium groups should be taken into account. The structure of heteropoly compds. (of the molybdophosphate or tungstosilicate type) may be represented by the general formula $H_m[RO_4(H_2XO_4)_{12}.(H_2O)_n]$, where R is the complex-forming nonmetallic element, *m* is the acid-base equiv. of the acid corresponding to R, and X is Mo or W. A. Kreglewski

1/1

SPITSYN, VIKT. I

20-2-35/62

AUTHOR	SPITSYN, Vikt. I., Corresponding Member of the Academy, and PIROGOVA, G.N.
TITLE	An Investigation of Aqueous Solutions of Sodium Paratungstate. (Issledovaniye vodnykh rastvorov paravol'framata natriya, Russian)
PERIODICAL	Doklady Akademii Nauk SSSR 1957, Vol 115, Nr 2, pp 322-325 (U.S.S.R.)
ABSTRACT	The mechanism of the reactions which take place on acidification of solutions of normal tungstates is comparatively little investigated. Paratungstates develop in the region from pH 8 to 6. These are the very important representatives of the class of aquo-poly compounds. One of the authors expressed the opinion that in the mentioned process the simultaneous presence of ions of hydroxonium, tungstates and molecules of tungstic acid play an important part. They interact in the solution due to the formation of hydrogen bonds. The water plays a constitutional part in it. The authors studied the properties of sodium-paratungstate solutions ad dependent on their conditions of production, heating temperature and duration of storage. The methods of dialysis

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20-2-35/62

An Investigation of Aqueous Solutions of Sodium Paratungstate.

polarography, chromatography and light absorption were employed. After boiling the molecular weight of the anions sinks to 1500-1600, that is practically by half. This phenomenon is described by an equation. Evaporation leads to the formation of crystalline paratungstate which again exhibits a double molecular weight in the solution. On acidification of a Na_2Wo_4-solution by HNO_3 the composition of the resulting anions depends on the pH and on the duration of reaction. It is only in the case of pH 7,0-6,6 that hexatungstate ions develop immediately. At pH 6,3-6,1 first develop ions with a molecular weight of 5.000 - 10.000. After 10 days it decreases to 1500. There probably occurs a desagregation of the high-molecular ions which first developed. At pH 5,8-5,6 the molecular weight at the beginning rises to the enormous height of 55.000 - 120.000, in order decrease to 14.000 after 10 days. This would correspond to sodium tungstate polymerized about 12-fold. The results of the polarographic investigation confirm the above-mentioned transformations. The hexatungstate ion is in its structure apparently related to metatungstate. Perhaps it its structural part(unit). The kinetics of the transformation of paratungstate ions into those

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20-2-35/62

An Investigation of Aqueous Solutions of Sodium Paratungstate.

of hexatungstate can also be traced by absorption spectra in the ultraviolet region (220-290 mμ). Freshly prepared sodium-paratungstate solutions give a sharply descending curve with an increase in wave length. If the solution is left standing, the descending of the curve slows down in the region of 245-260 mμ. This maximum increases with time and reaches a constant value one month from the day of preparation of the solution. For another year no changes can be discovered. Analogous but faster phenomena manifest themselves on heating of the paratungstate solution to the boiling point. After 3 hours the maximum forms in the region 256-257 mμ. Its height reaches a constant value after 10-16 hr boiling of the solution. The agreement of the light-absorption values of long standing and of heated solutions permits the statement that one and the same process occurs in both cases: the transformation of ions of paratungstate into such of

CARD 3/4

20-2-35/62

An Investigation of Aqueous Solutions of Sodium Paratungstate.

hextungstate. The mentioned maximum corresponds to that.
(4 Illustrations, 3 Tables, 1 Slavic reference)

ASSOCIATION:	Moscow State University M.V. Lomonosov (Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova)
PRESENTED BY:	-
SUBMITTED:	23. 3. 57
AVAILABLE:	Library of Congress.

CARD 4/4

V.I. SPITSYN, (V.D. Balukova), (A.F.Naumova), (G.I. Frafov)

"MIGRATION OF RADIOELEMENTS IN SOILS" by V. I. Spitsyn, V. D. Balukova,

A. F. Naumova, G. I. Grafov

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

SPITSYN, V.I

AUTHORS: Zelentsov, V. V., Savich, I. A., Spitsyn, Vikt. I. SOV 156-58-1-14/46

TITLE: The Intra-Complex Compounds of the Hexavalent Molybdenum With Several Schiff Bases (Vnutrikompleksnyye soyedineniya shestivalentnogo molibdena s nekotorymi shiffovymi osnovaniyami)

PERIODICAL: Nauchnyye doklady vysshey shkoly, Khimiya i khimicheskaya tekhnologiya, 1958, Nr 1, pp. 54 - 58 (USSR)

ABSTRACT: After a survey of publications (Refs 1-5) the authors say that all elements of the VIth side-subgroup of the periodic law of D.I.Mendeleyev are able to form oxy-compounds which contain a MeO_2^{2+} -radical. Owing to the similarity of the structure and several properties of the oxychlorides of chromium, molybdenum, tungsten, and uranium it may be assumed that this subgroup of elements is able to form complexes with Schiff (Shiff) bases. Preliminary experiments have shown that the intra-complex compounds may be obtained only by means of molybdenum oxychloride. 8-oxyquinoline and several of its derivatives form stable intra-complex compounds with the MoO_4^{2-}-

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SOV/156-58-1-14/46

The Intra-Complex Compounds of the Hexavalent
Molybdenum With Several Schiff Bases

ion, as is known. These compounds are used to a great extent in analytical practice. However, compounds like those mentioned in the title have never been produced. In the case of the method described in the present paper absolute ether and the solutions of corresponding Schiff (Shiff) bases are used which were formed by salicyl-, 2-oxy-1-naphthoe aldehyde and by a number of aromatic amines. The production methods of the molybdenum oxychloride and the Schiff bases are described in an experimental part. Furthermore the production of the intra-complex molybdenum compounds is described: 1)Molybdenyl-salicylal-anilinate. 2) Molybdenyl-salicylal-p-nitroanilinate. 3) Molybdenyl-salicylal-nitroanilinate. 4) Molybdenyl-2-oxy-1-naphthalanilinate. 5) 2-oxy-1-naphthal-p-nitroanilinate ("molybdenyl" is missing in the original, the reviewer). 6) Molybdenyl-2-oxy-1-naphthal-p-anisidinate. 7)Molybdenyl-2-oxy-1-naphthal-p-toluidinate. Some properties of the above mentioned synthetized substances are described. There are 9 references, 4 of which are Soviet.

Card 2/3

The Intra-Complex Compounds of the Hexavalent Molybdenum With Several Schiff Bases SOV 156-58-1-14/46

ASSOCIATION: Kafedra neorganicheskoy khimii Moskovskogo gosudarstvennogo universiteta im.M.V.Lomonosova (Chair of Inorganic Chemistry of the Moscow State University imeni M.V. Lomonosov)

SUBMITTED: September 25, 1957

Card 3/3

Spitsyn, Vikt. I.

AUTHORS: Spitsyn, Vikt. I., Mikhaylenko, I. Ya. 78-2-39/43

TITLE: On the Exchange of Sulfur Isotopes in Alkali Pyrosulfates
(K voprosu ob izotopnom obmene sery v pirosul'fatakh
shchelochnykh metallov)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 2,
pp. 526-532 (USSR)
Received: April 5, 1958

ABSTRACT: The authors performed a thorough investigation of the structure of the pyrosulfates of alkali metals with the radioactive indicator S^{35}, especially the investigation of the equivalence of the sulfur atoms in sulphurous anions. For the investigation of the exchange of the sulfur isotopes in pyrosulfates preparations were produced by rapid melting of normal sulfates with SO_3 under atmospheric pressure. The exchange of the sulfur isotopes between radioactive sulfate and SO_3 takes place in the moment of the formation of pyrosulfate. In the pyrosulfates of lithium and sodium the loss of activity in the sulfates during the exchange of sulfur by SO_3 amounts to 3o-35%. The radioactive sulfates of lithium and sodium do not enter into an isotope exchange

Card 1/3

with SO_3 at 100°C. In the case of the pyrosulfates of potassium, rubidium and caesium the loss of activity of the sulfates by an exchange of sulfur with SO_3 amounts to 50-55%. The investigations show that in lithium pyrosulfate an equal distribution of S^{35} takes place. In the pyrosulfates of sodium, potassium, rubidium and caesium an enrichment of S^{35} takes place in the residue of the normal sulfate, which indicates an irregular distribution of the sulfur atoms. Moreover it follows from these results that the normal sulfates of sodium, rubidium and caesium in the reaction with SO_3 form compounds in which the two sulfur atoms are not equivalent. The degree of exchange of the sulfur atoms in the pyrosulfates to be investigated decreases in the order $Li_2S_2O_7 \rightarrow Cs_2S_2O_7$. This difference is probably due to the decrease in the polarizing action of the ions in the order $Li^+ \rightarrow Cs^+$. The obtained experimental values for the exchange of the sulfur isotopes in pyrosulfates of the alkali elements confirm the assumption of an existence of isomeric pyrosulfates with the following structure: $Me_2SO_4.SO_3$ and $Me_2(S_2O_7)$. There are 1 figure, 8 tables, and 6 references, 3 of which are Slavic.

Card 2/3

On the Exchange of Sulfur Isotopes in Alkali Pyrosulfates 78-2-39/43

ASSOCIATION: **Moscow State University imeni M. V. Lomonosov, Chair for Anorganic Chemistry** (Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova, Kafedra neorganicheskoy khimii)

SUBMITTED: April 29, 1957

AVAILABLE: Library of Congress

Card 3/3

SPITSYN, VIKT I

78-3-5-34/39

AUTHORS: Spitsyn, Vikt. I., Mikhaylenko, I. Ye.

TITLE: Investigation of the Isotope Exchange Between Some Sulfates of the Alkali Elements and Sulfur Trioxide at High Temperatures (Izucheniye izotopnogo obmena mezhdu nekotorymi sul'fatami shchelochnykh elementov i sernym angidridom pri vysokoy temperature)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol 3, Nr 5, pp 1254-1260 (USSR)

ABSTRACT: The ion exchange between normal sulfates of the alkali elements and SO_3, and between alkali pyrosulfates and SO_3 was investigated in view of determining the stability of the bond between the sulfur atoms in these compounds. The exchange reaction was carried out at 450°C. The initial preparations of the pyrosulfates and sulfates of earth alkali elements were produced with radioactive sulfuric acid and solutions of Na_2SO_4. The obtained results show that the velocity of exchange in all pyrosulfates of the alkali elements is almost equal, and amounts to ~ 90%. In molten pyrosulfates at 450°C, the sulfuric atoms in the anion $S_2O_7^{2-}$ have greatest mobility,

Card 1/3

Investigation of the Isotope Exchange Between Some Sulfates 78-3-5-34/39
of the Alkali Elements and Sulfur Trioxide at High Temperatures

and the velocity of the isotope exchange is therefore high. The isotope exchange of sulfur between the normal sulfates of lithium, sodium, potassium, rubidium and SO_3 at temperatures of 700 to 850°C shows that the smallest ion exchange takes place in the system $K_2SO_4-SO_3$. The isotope exchange in the systems $MeSO_4-SO_3$ is supposed to be of atomic character and an immediate exchange between the sulfur atoms from the SO_3 and SO_4^{2-} groups takes place. The amount of activation energy of the isotope exchange of sulfur in the $Li_2SO_4-SO_3$ system with a value of 16 K cal/Mol and in the $NaSO_4-SO_3$ system with 24 K cal/Mol was likewise calculated.
It results from these figures that the stability of the bond between the sulfur atoms and the oxygen atoms in the crystal lattice of $LiSO_4$ is smaller than in sodium sulfate.
There are 3 figures, 6 tables, and 9 references, 9 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova, Kafedra neorganicheskoy khimii; Institut fizicheskoy khimii Akademii nauk SSSR (Moscow State

Card 2/3

Investigation of the Isotope Exchange Between Some Sulfates 78-3-5-34/39
of the Alkali Elements and Sulfur Trioxide at High Temperatures

University imeni M. V. Lomonosov, Chair of Inorganic
Chemistry; Institute of Physical Chemistry, AS USSR)

SUBMITTED: August 20, 1957

AVAILABLE: Library of Congress

1. Alkali sulfates--Exchange reactions 2. Pyrosulfates--Exchange reactions 3. Sulfur trioxide--Exchange reactions 4. Ion exchange --Applications

Card 3/3

SOV/78-3-8-45/48

AUTHORS: Spitsyn, Vikt. I., Savich, I. A.

TITLE: The Effect of the Addition of Some Salts on the Solubility of Calcium Molybdate (Vliyaniye dobavok nekotorykh soley na rastvorimost' molibdata kal'tsiya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol. 3, Nr 8, pp. 1979-1981 (USSR)

ABSTRACT: The solubility of calcium molybdate in the case of additions of the chlorides and sulfates of sodium were investigated. No noticeable increase of the solubility occurs at low concentrations of NaCl and Na_2SO_4 (0,001-0,01 N). With the increase of the concentration of the salts mentioned above to 0,1 N a considerable increase of the solubility of calcium molybdate occurs. The solubility further increases with an increase in the concentration from 0,5 to 1 N. Sodium sulfate solution because of its considerable ionic force, with otherwise equal concentrations, exerts the greatest effect on the solubility of calcium molybdate. The activity coefficient of the ions Ca^{2+} and MoO_4^{2-} in saturated solutions of calcium molybdate

Card 1/2

SOV/78-3-8-45/48

The Effect of the Addition of Some Salts on the Solubility of Calcium Molybdate

amounts to 0,78. Contrary to sodium chloride solutions the activity coefficient of the ions Ca^{2+} and MoO_4^{2-} is rapidly decreased with sodium sulfate solutions. The activity coefficient of the ions in NaCl solutions with concentrations of 0,1-1N differs between 0,75 and 0,26. In solutions of sodium sulfate with the same concentrations the activity coefficient differs between 0,37 and 0,20.
There are 2 figures, 2 tables, and 4 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova Kafedra neorganicheskoy khimii (Moscow State University imeni M. V. Lomonosov, Chair of Inorganic Chemistry)

SUBMITTED: November 15, 1957

Card 2/2

SOV/78-3-10-16/35

AUTHORS: Mikheyev, N. B., Spitsyn, Vikt. I.

TITLE: Investigation of the Properties of Salt-Forming Ions of Hydrogen in Phosphotungstic Acid (Izucheniye svoystv soleobrazuyushchikh ionov vodoroda fosfornovol'framovoy kisloty)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 10, pp 2320-2322 (USSR)

ABSTRACT: The presence of hydroxonium ions in phosphotungstic acid was investigated by the method of isomorphous exchange by means of radioactive indicators. Since the potassium ion has nearly the same ion radius as the hydroxonium ion, it was used as hydroxonium exchange-ion H_3O^+ has a ion radius of 1,33 Å, whereas K^+ has one of 1,35 Å. An analysis was carried out of the action exercised by the concentration of nitric acid and hydrochloric acid on the potassium content of the precipitate of phosphotungstic acid. It follows from radiometric analyses that in the range analyzed an uninterrupted series of solid solutions is formed by phosphotungstic acid and potassium phosphorus tungstate. The results obtained show that phosphotungstic acid must be regarded as a hydroxonium compound with the following formula:

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SOV/78-3-10-16/35

Investigation of the Properties of Salt-Forming Ions of Hydrogen in Phosphotungstic Acid

$(H_3O)_3[PW_{12}O_{40}]\cdot 26\ H_2O$. In this compound the salt-forming hydrogen ions were exchanged by hydroxonium ions. There are 1 figure, 2 tables, and 16 references, 5 of which are Soviet.

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

SUBMITTED: July 17, 1957

Card 2/2

SOV/78-3-12-31/36

AUTHORS: Torchenkova, Ye. A., Spitsyn, Vikt. I.

TITLE: Investigation of the Isotope Exchange Between the Anions of Several Heteropoly Acids (Issledovaniye izotopnogo obmena mezhdu anionami nekotorykh geteropolikislot)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 12, pp 2798-2800 (USSR)

ABSTRACT: The authors investigated in detail the influence of the pH of the medium upon the velocity of exchange of inner addenda between phosphoro-tungstic and silico-tungstic acids. W^{185} isotopes were used in the investigations. In acid medium ($pH \sim 2$) the exchange at room temperature is independent of the time and amounts to about 20%. At boiling temperature the exchange increases to 30% after three hours and to 50% after 16 hours. In weakly acid medium ($pH \sim 4$) the exchange is complete. In almost neutral solutions the exchange is 40%, although this reaches 80% at the boiling temperature. The velocity of the exchange apparently depends upon two factors, the degree of hydrolysis of the heteropoly anions and the nature of the tungstate ions formed.

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SOV/78-3-12-31/36

Investigation of the Isotope Exchange Between the Anions of Several Heteropoly Acids

There are 2 tables and 6 references, 4 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova, Kafedra neorganicheskoy khimii (Moscow State University imeni M. V. Lomonosov, Chair of Inorganic Chemistry)

SUBMITTED: October 28, 1957

Card 2/2

SOV/89-5-2-7/36

AUTHORS: Spitsyn, Vikt. I., Kuzina, A. F.

TITLE: On the Production of Weighable Amounts of Tc^{99} From Molybdenum Irradiated With Neutrons (O poluchenii vesomykh kolichestv Tc^{99} iz obluchennogo neytronami molibdena)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 2, pp. 141-146 (USSR)

ABSTRACT: MoO$_3$, which was irradiated in a research reactor for 70 days by a neutron flow of 2,5 . 10^{13} n/cm^2.sec, served as initial material for the production of technetium. The irradiated preparation was stored for 1 - 3 years so that the activities produced at the same time died down completely. Separation took place with MgHPO$_4$.3H$_3$O and MgNH$_4$PO$_4$.0,5 H$_2$O. The separation is based upon the co-precipitation of technetium with difficultly soluble phosphates. After precipitation the precipitant was chromatographically purified. By the method elaborated and tested by laboratory experiments it was possible to separate milligrams of technetium. 200 g of MoO$_3$ which, as described, was irradiated, yielded 0,5 mg Tc^{99}. Identification of Tc^{99} took place spectroanalytically and by measuring the absolute activity of the β-energy.

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SOV/89-5-2-7/36

On the Production of Weighable Amounts of Tc^{99} From Molybdenum Irradiated With Neutrons

Volatility of technetium, after various forms of treatment of its concentrates, was determined chemically. The data obtained agree with published data (Ref 15). There are 5 figures, 3 tables, and 15 references, 4 of which are Soviet.

SUBMITTED: May 10, 1958

Card 2/2

SOV/89-5-4-6/24

AUTHORS: Spitsyn, Vikt. I., Gromov, V. V.

TITLE: Investigation of the Law of the Sorption of Radioactive Strontium on Montmorillonite and Its Fixation by the Method of Calcination (Izucheniye zakonomernostey sorbtsii radioaktivnogo strontsiya na montmorillonite i zakrepleniya yego metodom prokalivaniya)

PERIODICAL: Atomnaya energiya, 1958, Vol 5, Nr 4, pp 446-452 (USSR)

ABSTRACT: The sequence of the various cations decreasing the absorption of $Sr^{89,90}$ in montmorillonite (from Oglanlinsk, Krym, Kazakhstan) is as follows:

$$Al^{+3} > Fe^{+3}$$

$$Ba^{+2} \geqslant Ca^{+2} > Mg^{+2} \geqslant H^{+} > NH_4^{+} > K^{+} > Na^{+}$$

It was stated that the sorption of $Sr^{89,90}$ by montmorillonite has the character of ion interchange and obeys the law of mass action. The presence of anions such as CO_3^{-2}, SO_4^{-2}, $C_2O_4^{-2}$, which, with strontium, form a difficultly soluble salt, does not change the absorption mechanism. They do, however, decrease

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SOV/89-5-4-6/24

Investigation of the Law of the Sorption of Radioactive Strontium on Montmorillonite and Its Fixation by the Method of Calcination

the amount of the absorbed strontium, which is probably due to the forming of radioactive colloids. Calcination at 850-900°C and extended duration of calcination over more than 1-2 hours does not exercise any influence upon the degree of fixation of $Sr^{89,90}$ in montmorillonite. Activity, which can be washed out by river- or sea water, amounts to $\sim 2\%$.

It is assumed that already before the crystal lattice begins to change (T = 800°C) fixation is brought about by the formation of difficultly soluble strontium compounds with the absorber. Above 800°C the modifications of the crystal lattice structure and the step-like vitrification of the material become effective. There are 7 figures, 1 table, and 19 references, 9 of which are Soviet.

SUBMITTED: January 7, 1958

Card 2

SOV/89-5-4-12/24

AUTHORS: Spitsyn, Vikt. I., Mikhaylenko, I. Ye.

TITLE: On the Problem of the Influence Exercised by Radioactive Radiation Upon the Rate of Isotopic Exchange (K voprosu o vliyanii radioaktivnogo izlucheniya na skorost' izotopnogo obmena)

PERIODICAL: Atomnaya energiya, 1958, Vol 5, Nr 4, pp 463-464 (USSR)

ABSTRACT: The influence exercised by β-radiation of S^{35} upon the extent of the isotopic exchange in the system K_2SO_4 - SO_3 at high temperatures was investigated. The potassium sulfate contained various amounts of S^{35}. The total activity of the two samples used amounted to $2,6.10^{-2}$ mC/g and 16,2 mC/g respectively. The experimental apparatus is shown schematically (simple glass apparatus). In preparation 1 the degree of exchange amounted to an average of 11,5%, and in preparation 2 to 36,6%. The decomposition of the potassium sulfate in preparation 2 cannot be explained merely on a radio-chemical basis. It is more probable that the β-particles cause an excitation of the preparation and lead to an additional ionization of the

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SOV/89-5-4-12/24

On the Problem of the Influence Exercised by Radioactive Radiation Upon the Rate of Isotopic Exchange

SO_4^{2-}-ions in the K_2SO_4-lattice. The excited SO_4^{2-}-ion participates in a higher degree in the ion exchange. It is further mentioned that preparation 2 turned a violet color five days after its production. The change of color could be prevented by heating. Also these phenomena confirm the assumption that the influence exercised by electrons upon the velocity of the ion exchange in an irradiated system is of decisive importance. There are 1 figure, 5 tables, and 2 references. 0 of which is Soviet.

SUBMITTED: September 2, 1957

21(1), 21(4), 21(10) SOV/30-58-11-10/48

AUTHORS: Spitsyn, V. I., Academician,
Alad'yev, I.T., Candidate of Technical Sciences

TITLE: Nuclear Congress at Chicago (Yadernyy kongress v Chikago)

PERIODICAL: Vestnik Akademii nauk SSSR, 1958, Nr 11,
pp 56 - 61 (USSR)

ABSTRACT: The Congress was held in Chicago from March 17 to 21, 1958. In connection with it there was an exhibition in which more than 100 firms participated. The Congress has been convened by the American Nuclear Society and 28 other scientific and engineering associations of the USA as well as the US Atomic Energy Commission. More than 800 specialists in the various fields took part. There were also present scientists from the USSR, India, England, Canada, the Federal Republic of Germany, Italy, Japan, and other countries. More than 220 reports were given dealing with subjects from the following fields: the plans and construction of some nuclear power plants; the construction and operation of test reactors; the use of nuclear reactors

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SOV/30-58-11-10/48

Nuclear Congress at Chicago

as sources of heat for industrial purposes; questions pertaining to nuclear fuel and associated materials; chemical processes in the production of nuclear fuel; questions in connection with the training of new experts in nuclear science. A number of American universities and institutes were toured and personal contacts with American scientists were established. It was also found that there were quite a few foreign students and post-graduate scholars working at American Universities, among them people from Japan, Australia, Yugoslavia, Czechoslovakia etc. V.I.Spitsyn (USSR) delivered a report on radiochemical research in the USSR at the chemical department of the university of Pennsylvania, and at Boston university on the use of tracer atoms in the physicochemical examination of some anorganic poly-compounds.

Card 2/2

5(4) SOV/62-58-11-4/26

AUTHOR: Spitsyn, Vikt.I.

TITLE: Effect of Radioactive Radiation on the Physico-Chemical Properties of Solids (Vliyaniye radioaktivnogo izlucheniya na fiziko-khimicheskiye svoystva tverdykh tel)
Lecture Delivered at the Plenary Meeting of the Department of Chemical Sciences AS USSR on May 22, 1958 (Doklad na obshchem sobranii Otdeleniya khimicheskikh nauk Akademii nauk SSSR 22 maya 1958 g.)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye khimicheskikh nauk, 1958, Nr 11, pp 1296 - 1302 (USSR)

ABSTRACT: The author and his collaborators investigated the influence of the radioactive radiation of solids on the phenomena of isotope exchange, adsorption and other processes which take place in heterogeneous systems under the participation of these solids. The work was carried out in cooperation with the Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry AS USSR) and Khimicheskiy fakul'tet Moskovskogo gosudarstvennogo universiteta imeni M.V. Lomonosova (Faculty of Chemistry of Moscow State University imeni M.V. Lomonosov). Spitsyn and Mikhaylenko

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Effect of Radioactive Radiation on the Physico-Chemical SOV/62-58-11-4/26
Properties of Solids. Lecture Delivered at the Plenary
Meeting of the Department of Chemical Sciences AS USSR on May 22, 1958

investigated the effect of the β-radiation intensity of sulfur-35 on the degree of isotope exchange of sulfur between solid potassium sulfate marked with S^{35} and the gaseous sulfuric anhydride. K_2SO_4 preparations differing from each other as to the degree of specific activity were investigated at 840° under the same conditions. The scheme of the device is represented on figure 1. 4 - 6 experiments were carried out with each preparation of different specific activity. Spitsyn and Finikov investigated another system of heterogeneous isotopic exchange. The isotopic exchange of oxygen was investigated according to the dynamometric method in a temperature range from 680 to 790° and controlled by a mass spectrometer. The experimental conditions corresponded to those of reference 8. It was observed that the rate of the isotope exchange of sulfur in the $K_2\overset{*}{S}O_4 - SO_3$ system and of oxygen in the $Na_2\overset{*}{S}O_4 - O_2$ system at high temperatures mainly depends on the radioactivity level (with respect to S^{35}) of the sulfate samples

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investigated. Spitsyn and Gromov directly investigated the effect of the specific activity of the solid phase on the adsorption processes of liquid or gaseous media. For this purpose the system $BaSO_4$ - methylene blue, investigated already several times, was used. The data on the specific surface and the specific activity are given in table 3. The experimental results are revealed in figure 5. Balandin, Spitsyn, Dobrosel'skaya, and Mikhaylenko investigated the reaction velocity of dehydration of cyclohexane in a temperature range from 335 - 415°. Different amounts of S^{35} in the form of radioactive sodium sulfate were introduced into the catalyst which consisted of a mixture of $MgSO_4$ and Na_2SO_4. It was observed experimentally that the curve corresponding to the radioactive catalyst lies in all cases above the curve on the non-radioactive catalyst. Computations show that the apparent activation energy of the catalytic process investigated is not considerably but still to a certain degree reduced by the introduction of the radioactive isotope S^{35} into the catalyst. Thus, it may be assumed

Effect of Radioactive Radiation on the Physico-Chemical SOV/62-58-11-4/26
Properties of Solids. Lecture Delivered at the Plenary
Meeting of the Department of Chemical Sciences AS USSR on May 22, 1958

as certain that the radioactive radiation of the catalyst at sufficient intensity influences its catalytic activity and the activation energy of the process. The increase in catalytic activity apparently is connected with the increase in the number of active centers which form due to the defects in the crystal lattice and on the surface of the catalyst. It equally depends on the effect of the β-particles on the catalytically active centers which have adsorbed the molecules of the reacting substance. There are 7 figures, 3 tables, and 10 references, 3 of which are Soviet.

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

SUBMITTED: July 4, 1958

Card 4/4

SOV/48-22-9-35/40

AUTHORS: Babushkin, A. A., Yukhnevich, G. V., Berezkina, Yu. V., Spitsyn, V. I.

TITLE: Spectroscopic Investigations of the Structure of Some Complex Compounds (Spektroskopicheskiye issledovaniya stroyeniya nekotorykh kompleksnykh soyedineniy)3. Influence of Water on the Structure of Para- and Meta- Sodium-Tungstenate. (3. Vliyaniye vody na stroyeniye para- i metavol'framatov natriya)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1958, Vol 22, Nr 9, pp 1134 - 1135 (USSR)

ABSTRACT: This is a condensation of the paper published under the above subtitle Nr 3 in the "Izvestiya Akademii nauk SSSR" by A.A.Babushkin . It covers the investigation of the infrared absorption spectra of paratungstenates ($5Na_2O.12WO_3$) with a composition of 28 H_2O, 19 H_2O, 9 H_2O, 4 H_2O, 2 H_2O and of water-free tungstenate. Two ranges, that of the valence- and deformation oscillations of the tungstenate ion (700 — 1700 cm^{-1}) and that range

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Spectroscopic Investigations of the Structure of Some SOV/48-22-9-35/40
Complex Compounds. 3. Influence of Water on the Structure of Para- and
Meta-Sodium-Tungstenates

($3000 — 3800\ cm^{-1}$) which is especially favorable for a study of the aqueous state were investigated. Besides, the absorption spectra of meta-sodium-tungstenate ($Na_2W_4O_{13}$) with a composition of 10 H_2O, 7 H_2O, 2H_2O and of a water free meta-sodium-tungstenate were studied. A comparison of the results of the investigation of various hydrates of para- and of meta-tungstenates permits a joint treatment. An immediate connection between the coordination of the water in the complex and the anion structure of the iso-poly compounds was established to exist. A modification of the water coordination at a dehydration leads to an alteration of the structure of the anion. The maintenance of a stable coordination of the water does not lead to an alterartion of the structure of the complex. There are 2 figures.

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

Card 2/2

PALATNIK, L. S., and SPITSYN, V. I.

"Concerning the Structure of Heteropoly Compounds, especially of phosphorous Wolframates, and the great Mobility of oxygen- and hydrogen atoms in them."

report presented at the UNESCO Conf. on the Utilization of Radioactive Isotopes
in Scientific Research, Paris, 9-20 Sept 1957.
Vestnik AN SSSR, 1958, v. 28, No. 1, pp. 71-78. (author Vinogradov, A. P.)

SPITSYN, V.I., akademik; ALAD'YEV, I.T., kand. tekhn. nauk.

Nuclear Congress in Chicago. Vest. AN SSSR 28 no.11:56-61 N '58.
(MIRA 11:12)

(Chicago--Atomic energy--Congresses)

76-32-5-30/47

AUTHORS: Spitsyn, Vikt. I., Spiridonov, F. M., Kolli, I. D.

TITLE: The Application of the Self-Diffusion Method for Investigating the Formation Mechanism of Heteropoly Compounds (Primeneniye metoda samodiffuzii k izucheniyu mekhanizma obrazovaniya geteropolisoyedineniy)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 5, pp.1143-1148 (USSR)

ABSTRACT: According to Jander (Ref 1) an anion of the aquopoly compound forms on the acidification of solutions containing salts of acids forming heteropoly compounds; Spitsyn and Koneva (Refs 2, 3) carried out corresponding investigations of sodium phosphate-tungstenate mixtures from which could be concluded that an interaction between the ions takes place already in the alkaline medium. In order to check the latter the authors investigated in the present paper sodium phosphate and normal sodium tungstenate by means of the method of self-diffusion using isotopes P^{32} and W^{185}. The technique of determination is similar to that elaborated by Anderson and Saddington

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(Ref 4); the authors used an arrangement the diagram of which is given. The diffusion coefficient was calculated according to an equation and the results are mentioned in a table. It can be seen that at a pH of about 9 the diffusion coefficient of the phosphate ion exceeds that of the tungstenate ion almost three times, while at a pH = 6 - 8 an abrupt change of the diffusibility of the ions takes place. Already in the weakly alkaline medium the addition of tungstenate changes the magnitude of the diffusion coefficient of the phosphate ions, so that in mixtures the self-diffusion of phosphate ions approaches the magnitudes characteristic for tungstenate ions, and at pH = 7,8 (as shown by isotope marking) practically the same values are obtained for phosphorus and tungsten. A method of operation was used which in principle is analogous to that by Spitsyn and Koneva (Ref 3). At a pH below 8,4 a process of complex formation takes place which does not prove the assumption by Jander. From the diagram of the ionic weights can be seen that an area with a mass close to that of W_4^{-2} is present, as well as one containing about 12 corresponding ion groups. It is assumed

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The Application of the Self-Diffusion Method for Investigating the Formation Mechanism of Heteropoly Compounds

that the molecular ratio of phosphate-tungstenate ions of the used mixture has an effect on the composition of the complex, namely, the more WO_4^{-2} ions are present the more acidous the medium must be in order to reach the same diffusion coefficient. There are 4 figures, 4 tables, and 5 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 18, 1957

1. Sodium phosphate--Diffusion 2. Sodium tungstate--Diffusion 3. Radioisotopes--Applications

Card 3/3

Spitsyn, Vikt. I.

20-1-30/58

AUTHORS: Spitsyn, Vikt. I., Corresponding Member of the AN USSR, Lapitskiy, A. V., Aistova, R. I., Nishanov, D., Pchelkin, V. A.

TITLE: Studies of the Isotopic Exchange of Oxygen Between Heavy-Oxygen Water and Some Niobates and Tantalates (Izucheniye izotopnogo obmena kisloroda mezhdu tyazhelokislorodnoy vodoy i nekotorymi niobatami i tantalatami).

PERIODICAL: Doklady AN SSSR, 1958, Vol. 118, Nr 1, pp. 107-109 (USSR).

ABSTRACT: Individual authors (references 1-8) ascribe different structures to the niobates and tantalates. In several cases the part played by the water and the position of the water are not taken into account. All pertinent papers except references 9,10 deal with the character of the binding between the central atom and the oxygen atoms. In the paper by Spitsyn, Aistova and Vasil'yev (reference 12) the method of isotopic exchange which was also employed by the authors in the present paper was employed in the investigation of another binding. In the tests they used water enriched with O^{18} (1,28 atom-% O^{18}). The exchange was carried out at 95°C in saturated solutions of these salts: sodium-penta- and -hexa-tantalate, as well as potassium-hexa- and -meta-niobate. The duration of test was 5 hours. By hydrolysis the solutions had an alkaline reaction (pH = 11-12). The method was described in the above-mentioned paper (reference 12). Table 1 records

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Studies of the: 20-1-30/58
Isotopic Exchange of Oxygen Between Heavy-Oxygen Water and Some Niobates and Tantalates.

ASSOCIATION: Institute for Physical Chemistry AN USSR (Institut fizicheskoy khimii Akademii nauk SSSR).
Moscow State University imeni M. V. Lomonosov (Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova).

SUBMITTED: July 25, 1957.

AVAILABLE: Library of Congress.

Card 3/3

SOV/20-120-5-31/[illegible]

AUTHORS: Kovba, L. M., Ippolitova, Ye. A., Simanov, Yu. P., Spitsyn, Vikt. I., Corresponding Member, Academy of Sciences, USSR

TITLE: An X-Ray Investigation of Alkali Metal Uranates (Rentgenograficheskoye issledovaniye uranatov shchelochnykh elementov)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 5, pp. 1042-1044 (USSR)

ABSTRACT: A survey of publications is given at the beginning (Refs 1-5). Experimental data on the structure of the diuranates are lacking. The authors obtained monocrystals of the normal lithium uranates (α-modification), sodium (β-modification), furthermore of the diuranates of sodium, potassium, and rubidium. Table 1 gives the lattice parameters of the investigated uranates, their density and other data. They were calculated from X-ray diffraction patterns and determined by means of a pycnometer. The calculation of the intensities confirms the structures which are described below. Tetragonal or pseudotetragonal layers $(UO_2)O_2$ were found in the structures of α-Li_2UO_4, β-Na_2UO_4, K_2UO_4, Rb_2UO_4 and Cs_2UO_4 which were

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analogous to those of the $BaUO_4$- and β-$UO_2(OH)_2$ structures (Refs 3, 4). The atoms of the alkaline elements are placed between the layers. The normal potassium-, rubidium-, and cesium uranates are isostructural. The values of the parameters $z_{Me'}$ (where Me' is an alkaline element) and z_{O_1} are given in table 2 as well as the interatomic distances U-O, Me'-O and of the shortest distances from O to O. The structures of the mentioned compounds are described in detail. The structures of the lithium-, sodium-, and potassium monouranates are different from those described by Zachariasen (Zakhariasen, Ref 5). The structures of the diuranates of Na, K and Rb are defective structures. The parameters x_{O_1} and y_{O_1} are given in table 3. Hexagonal layers of a composition $UO_{3,5}$ were found in the structures. The oxygen atoms may partly be substituted by fluorine under formation of a fluoro-uranate. The authors obtained uranates (V) of these metals by reduction of Na- and K-diuranates at 450-500°. They both belong to the structural type of the perovskite. They are normally soluble in nitric acid, however, only slightly in acetic acid. Thus they are no analogues of "tungsten

SOV/20-120-5-31/67

An X-Ray Investigation of Alkali Metal Uranates

bronzes". There are 5 tables and 7 references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: February 11, 1958

1. Alkali metal uranates--Structural analysis 2. X-ray diffraction analysis--Applications 3. Alkali metal uranates--Properties 4. Single crystals--Analysis

Card 3/3

SOV/20-121-2-34/53

AUTHORS: Spitsyn, Vikt. I., Corresponding Member, Academy of Sciences, USSR, Mikhaylenko, I. Ye.

TITLE: The Influence of the Intensity of the Radioactive S^{35}-Radiation on the Rate of the Isotopic Exchange of Sulfur in the System $K_2\overset{*}{S}O_4$-SO_3 (Vliyaniye intensivnosti radioaktivnogo izlucheniya S^{35} na skorost' izotopnogo obmena sery v sisteme $K_2\overset{*}{S}O_4$-SO_3)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 2, pp. 319 - 321 (USSR)

ABSTRACT: In the investigation of the isotopic exchange of sulfur between solid alkali sulfates and gaseous sulfur anhydrides at high temperatures (Ref 1) the authors discovered an influence of the level of radioactivity of the investigated preparations on the rate of the isotopic exchange. In this paper a report is given on the investigation of this influence. The β-radiation of K_2SO_4 which was marked with S^{35} was investigated at 840°C. The employed device is depicted in figure 1 and described subsequently. The results of the investigations are compiled in

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SOV/20-121-2-34/53

The Influence of the Intensity of the Radioactive S^{35}_{*}-Radiation on the Rate of the Isotopic Exchange of Sulfur in the System K_2SO_4-SO_3

2 tables. The authors also investigated heterogeneous systems concerning the effect of radioactive radiation on adsorbing layers. The results of these investigations are not published here. There are 2 figures, 2 tables, and 2 references, 1 of which is Soviet.

ASSOCIATION: Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, AS USSR) Moskovskiy gosudarstvenyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: April 27, 1958

Card 2/2

21(8), 5(4) SOV/20-121-3-28/47

AUTHORS: Balandin, A. A., Academician, Dobrosel'skaya, N. P., Mikhaylenko, I. Ye., Spitsyn, Vikt. I., Academician

TITLE: Radioactive Catalysts (Radioaktivnyye katalizatory) The Dehydration of Cyclohexanol Over the Sulphates of Magnesium and Sodium (Degidratatsiya tsiklogeksanola nad sul'fatami magniya i natriya)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 121, Nr 3, pp 495 - 498 (USSR)

ABSTRACT: Some recent investigations used the irradiation by γ-rays or neutrons for the influencing of the processes of heterogeneous catalysis. In the present paper, however, the catalyst itself is used as a source of the ionizing radiation for the heterogeneous catalysis of gaseous substances. This catalyst contained various quantities of the radioactive isotope (β-radiator). It is assumed that the continuous bombardment by β-particles will energetically influence the processes which occur on the boundary solid body-gas. There may be also an influence of the radiation on the structure

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Radioactive Catalysts. The Dehydration of Cyclo-
hexanol Over the Sulphates of Magnesium and Sodium

SOV/20-121-3-28/47

of the catalyzer (especially a change of the properties of its surface) and a radiation-chemical influence of radiation on the gaseous reagents even before their contact with the catalyzer. The object of the investigation was the catalytic dehydration of cyclohexanol over the sulphates of magnesium and sodium, in which the sulphur was substituted by various quantities of radioactive sulphur S^{35}. The investigation was carried out by means of a catalytic apparatus of the flowing type with an inserted reactor. This apparatus was placed in a tubular furnace with automatic feeding. The radioactive preparations $MgSO_4$ and the measurement of the radioactivity of the catalysts are then discussed. No gaseous products were generated by this reaction. The apparatus did not indicate the presence of any radioactive contaminants. The more non-radioactive sodium sulphate is added to the magnesium sulphate , the more does catalytic activity decrease. Also anhydrous sodium sulphate is a catalyzer for the dehydration of cyclohexanol, although it is rather less active than magnesium sulphate.

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Radioactive Catalysts. The Dehydration of Cyclohexanol Over the Sulphates of Magnesium and Sodium

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The degree Δ of the conversion of cyclohexanol into cyclohexene increases with an increase of the radioactivity of the catalyst, but these increases are not proportional which respect to one another. The Arrhenius (Arrenius) equation can be applied to the cases discussed in this paper. The paper showed experimentally that the radioactive radiation of the catalyst has an influence on catalytic activity and on activation energy. Finally, some possible explanations of the results of this paper are discussed. The discussed phenomena are a completely new effect of simultaneous action of the electrons and active centers of the catalyst. It may be assumed that the β-particles act upon the catalytically active centers which had adsorbed cyclohexanol molecules. The β-particles diminish the activation energy of the dehydration of cyclohexanol. Investigations are being continued. There are 4 figures, 1 table, and 8 references, 5 of which are Soviet.

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Radioactive Catalysts. The Dehydration of Cyclohexanol Over the Sulphates of Magnesium and Sodium

SOV/20-121-3-28/47

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im.M.V.Lomonosova (Moscow State University imeni M.V.Lomonosov) Institut fizicheskoy khimii Akademii nauk SSSR (Institute of Physical Chemistry, AS USSR)

SUBMITTED: April 23, 1958

Card 4/4

SOV/20-122-1-21/44

AUTHORS: Zelentsov, V. V., Savich, I. A.,
Spitsyn, Vikt. I., Member, Academy of Sciences, USSR

TITLE: On the Problem of Stereochemistry of Intracomplex Compounds of Vanadyl (K voprosu o stereokhimii vnutrikompleksnykh soyedineniy vanadila)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 1, pp 80 - 81 (USSR)

ABSTRACT: Some problems as mentioned in the title concerning the stereochemistry of vanadyl compounds with azomethyl derivatives of the aromatic o-oxy-aldehydes are discussed in this paper. Although the magnetic moment of the complex compounds of vanadyl does not depend upon the coordination number of the central atom it is possible to draw some conclusions on the mentioned stereochemistry by comparing this moment with the results of analyses. The crystalline intracomplex vanadyl compounds which were synthetized by the authors were analyzed after having been dried until a constant weight was reached and their magnetic susceptibility

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On the Problem of Stereochemistry of Intracomplex Compounds of Vanadyl

SOV/20-122-1-21/44

was determined. The chemical analysis proves that they contain no solvents (Table 1). As table 2 shows the magnetic moments of the synthetized compounds are between 1,76 and 1,80 mv. If the oxygen atom takes as a rule a single place in the coordination system the coordination number of vanadium is not six but five in these compounds. This is in contrast to reference 2. The assumption that the vanadium ion lies in the base of a tetragonal pyramid is more likely to be right. This is proved by the fact that in vanadyl-o-oxy-quinolinate (Ref 4) the pyridine molecule is connected with the central ion as regards the coordination. The free pair of electrons of the nitrogen atom takes the free 4p-orbit in the pyridine molecule. The square pyramid grows steadily until it is an octahedron. Based upon the mentioned facts the authors are of opinion that the initially mentioned vanadyl compounds have the structure of a square pyramid. Thanks to the d^2sp^2 hybridization the σ-bindings exist. Apart from this a 3d-orbit of vanadium takes part in the formation

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On the Problem of Stereochemistry of Intracomplex Compounds of Vanadyl

SOV/20-122-1-21/44

of a solid π-binding with an oxygen atom. The structure of those compounds is explained by means of the formulae A and B. There are 2 tables and 6 references, 1 of which is Soviet.

SUBMITTED: May 27, 1958

Card 3/3

SOV/20-123-4-42/53

5(4)

AUTHORS: Spitsyn, Vikt. I., Academician, Gromov, V. V.

TITLE: The Influence of the Radioactivity of Barium Sulfate on Its Sorptive Properties (Vliyaniye radioaktivnosti sul'fata bariya na yego sorbtsionnyye svoystva)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 123, Nr 4, pp 722-724 (USSR)

ABSTRACT: The authors of the present report investigate the influence of radioactivity on the sorptive properties of solids. Barium sulfate, which had already previously been thoroughly investigated (Refs 6, 7, 8), was used as a sorbent. The present paper deals with the adsorption from aqueous solutions of acid orange dye (Orange AT2B $(C_{16}H_{11}O_4N_2S)Na$ and of two basic dyes methylene-blue $(C_{16}H_{18}N_3S)Cl$ and brilliant green $(C_{27}H_{35}N_2)Cl$, occurring on these sorbents. S^{35}, which was introduced into the barium sulfate during its precipitation, served as a source of radioactive radiation. The production of the $BaSO_4$-preparations is described in short. 3 g of the

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SOV/20-123-4-42/53

The Influence of the Radioactivity of Barium Sulfate on Its Sorptive Properties

precipitate to be investigated was shaken at a temperature of $(25 \pm 0.5)^\circ$ for four hours with 15 ml of the coloring substance solution of the corresponding concentration. After this, the coloring substance content in the liquid phase was spectrophotometrically determined by means of the apparatus SF-4 and SF-2M. Measuring errors amounted to 3-4%. The results obtained by these investigations are shown by three diagrams. The acid orange dye is to the largest extent adsorbed by the $BaSO_4$, viz. by one order of magnitude more than the other coloring agents. Methylene-blue is adsorbed somewhat more than brilliant green. The sorption of the two basic coloring substances diminishes with increasing specific radioactivity of the barium sulfate. Thus, the sorption capacity for methylene-blue at activities of 0.01 - 10 millicurie/g depends linearly on the logarithm of the specific activity of $BaSO_4$. The authors also carried out special investigations for the purpose of solving the problem as to whether the decrease of the adsorption of the

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SOV/2o-123-4-42/53

The Influence of the Radioactivity of Barium Sulfate on Its Sorptive Properties

investigated basic coloring substances is only imagination, and whether it is not due to loss of color under the influence of radiation. Also these experiments are described in short. According to the results obtained the variation of the sorption of coloring substances is not due to destruction of these substances by the action of S^{35} radiation. Moreover, no visible chemical or radio-chemical changes could be observed in the liquid phase that might have exercised any influence upon the stability of coloring substances or upon the intensity of their sorption. According to the authors' opinion, the variation of the sorption of coloring substances observed may be connected with the occurrence of a positive charge on the precipitate of the radioactive barium sulfate (in consequence of the continuous β-radiation). There are 4 figures, 1 table, and 8 references, 3 of which are Soviet.

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SOV/20-123-4-42/53

The Influence of the Radioactivity of Barium Sulfate on Its Sorptive Properties

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

SUBMITTED: July 25, 1958

Card 4/4

NEMKOVA, O.G.; BUROVA, Ye.I. [deceased]; VOROB'YEVA, O.I.; IPPOLITOVA, Ye.A.; LAPITSKIY, A.V.; SPITSYN, V.I., akademik, red.; KONDRASHKOVA, S.F., red.; LAZAREVA, L.V., tekhn.red.

[Handbook for practical studies in inorganic chemistry] Rukovodstvo k prakticheskim zaniatiiam po neorganicheskoi khimii. Pod red. V.I.Spitsyna. Izd-vo Mosk.univ., 1959. 299 p. (MIRA 12:3)
(Chemistry, Inorganic--Laboratory manuals)

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 Radio-
elements 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. Masel'.

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 bury-
ing 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. N. Prusakov edited the
present volume. Most of the reports are accompanied by references. Con-
tributors to individual investigations are mentioned in annotations to
the Table of Contents.

SPITSYN, V. I.

[illegible]

(31)

SPITSYN, V. I.

5(2)

AUTHOR: Zvyagintsev, O. Ye. SOV/78-4-9-43/44

TITLE: The 8th Mendeleyev Congress on General and Applied Chemistry

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 9, pp 2178-2182 (USSR)

ABSTRACT: The Congress mentioned in the title was held in Moscow from March 16 to 23, 1959. More than 4000 delegates and guests from 19 countries participated. It was opened by the President of the Organisatory Committee, Academician A. N. Nesmeyanov, who asked the participants to discuss the development of chemistry and chemical technology in the USSR in the light of the decisions of the 21st Congress of the CPSU. The following Members read papers in the plenary sessions: V. S. Fedorov, Chairman of the Gosudarstvennyy komitet soveta Ministrov SSSR po khimii (State Committee on Chemistry of the Council of Ministers, USSR): Tasks of Scientific and Technical Progress in the Chemical Industry; V. A. Kargin: Basic Problems of Polymer Chemistry; A. N. Nesmeyanov: The Periodic System and Organic Chemistry; N. N. Semenov: Basic Problems of Chemical Kinetics; V. I. Spitsyn: The Present State of D. I. Mendeleyev's Periodic Law; A. P. Vinogradov: Basic Problems of Radiochemistry; V. A. Engel'gardt: Basic Problems of Biochemistry; A. V. Sokolov: Chemical Problems of Agriculture in the USSR; V. D. Nikolayev: Main Tasks of the Construction of Chemical Machinery and Apparatus; Ya. K. Syrkin: Basic Problems of the Theory of Chemical Linkage; and A. P. Aleksandrov: Chemical Prospects for the Use of Atomic Energy. An appeal to all chemists of the USSR was drawn up in which they are exhorted to devote all their strength to the fulfillment of the great tasks posed by the 21st Congress of the CPSU.

SPITSYN, Vikt. I.; GROMOV, V.V.

Effect of the radioactivity of precipitates on their sorptive properties. Radiokhimiia 1 no.2:181-184 '59. (MIRA 12:8)
(Radioactive substances) (Sorption)

(SPITZYN, Viktor) SPITSYN, V. I.

"The Problem of Basicity of Heteropoly acids and the Nature of So-called Salts of High Substitution," report to be submitted for Int'l Conf. on Coordination Chemistry, IUPAC, LONDON, England, 6-11 Apr 59.

Institute of Physical Chemistry, Moscow.

SPITSYN, V.I.

"Uniformities in the Absorption of Fission Products During
Infiltration through Soils."

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

Spitsyn, V.I.

21(8) 5(0) SOV/55-59-3-29/32

AUTHOR: Lapitskiy, A.V.

TITLE: The First All-Union Conference of Universities and Colleges on Radiochemistry

PERIODICAL: Vestnik Moskovskogo universiteta. Seriya matematiki, mekhaniki, astronomii, fiziki, khimii, 1959, Nr 3, pp 221-223 (USSR)

ABSTRACT: This conference was convened by the initiative of the laboratoriya radiokhimii khimicheskogo fakul'teta MGU (Laboratory of Radiochemistry of the Department of Chemistry of Moscow State University) and was held in Moscow from April 20 to April 25, 1959. It was attended by professors, teachers, and scientific collaborators of 32 universities and colleges of the Soviet Union. In his opening address, An.N.Nesmeyanov, Doctor of Chemical Sciences, stressed the importance of radiochemistry. 30 lectures were delivered by members of Moscow State University: Laboratoriya yadernoy fiziki (Laboratory of Nuclear Physics) J.P.Rudenko, A.I.Sevast'yanov: Production of Beryllium-7 by the Reaction (T,2n); I.Stary, N.P.Rudenko: Production of Radioactive Isotopes by Extraction as β-Diketonates. Laboratoriya radiokhimii (Laboratory of Radiochemistry): An.N. Nesmeyanov, B.M. Korolev, L.A.Sazonov: Separation of Radioactive Isotopes in the Irradiation of Colloids; An.N.Nesmeyanov, Ye.A.Borisov, E.S.Filatov, V.Kondratenko, Chzhan Tszin-zyan, K.Panek, B.Shukla: Secondary Reactions of the Recoil Atoms ^{80}Br and ^{82}Br in Methyl Bromides; B.G.Dzantiyev, I.M.Barkalov, V.V.Khrapov: Reactions of "Hot" Sulfur- and Nitrogen Atoms With Hydrocarbons; B.Z.Iofa, L.V.Bobrov, A.B.Batov: The State of Radioactive Isotopes in Extremely Dilute Solutions; M.S. Meruklova, I.V.Mel'khov: General Theory of the Coprecipitation of Radioactive Elements With Non-isomorphous Crystalline Precipitates; A.V.Lapitskiy, I.A.Savich, Chzhuan Ya-u: Coprecipitation of Protactinium With Complex Compounds of Ti, Nb, and Ta; V.M.Fedoseyev, V.V.Ivanenkov, V.S.Bochkarev: Application of Radioactive Paper Chromatography"; K.B. Zaborenko, A.M.Babeshkin, M.S.Aulichenko: Accumulation and Separation of Recoil Atoms on the Basis of the Example Ra^{224} and Ra^{228}; K.B.Zaborenko, A.M.Babeshkin, V.A.Boyevskaya, L.L.Mel'khov: Application of the Emanation Method for the Investigation of the Transformation of Solids; V.I.Spitsyn, K.B.Zaborenko, A.M.Babeshkin, M.A.Radicheva: Transformation of Heteropoly-compounds; K.B.Zaborenko, A.M.Babeshkin, V.I. Kovalenko: Geochemistry of Radium; K.B.Zaborenko, V.I. Korobkov: Microanalytical Determination of Uranium by Means of Nuclear Emulsions. An.N.Nesmeyanov, De Dyk-Men: Partial Vapor Pressure of Co in Alloys With Ni; Yu.A.Priselkov, Yu.A. Sapozhnikov, A.V.Tseplyayeva, V.V.Karelin: The Behavior of a Molecular Metal Beam in the High-frequency Field; I.V.Golubtsov, A.V.Lapitskiy, V.K.Shiryayev: Vapor Pressure of Niobium Dioxide; I.V.Golubtsov, Yu.A.Likhachev, Ye.K.Zakov: Various Constructions of the Scintillation Attachment to the Apparatus of the Type B. Kafedra analiticheskoy khimii (Chair of Analytical Chemistry): I.P.Alimarin, N.P.Borzenkova: $Niobium^{95}$ as a Radioactive Tracer; I.P.Alimarin, I.A.Belyavskaya, Wu Bin-ven': Sorption of Zr by Ion Exchangers; A.I.Busev, V.M. Byr'ko: The Use of Complex Pyrazolinedithiocarbamates in Radiometry. Kafedra neorganicheskoy khimii (Chair of Inorganic Chemistry): Ye.A.Ippolitova, Yu.P.Simanov, L.M.Kovba, G.P. Polunina, I.A. Sereznikova: Uranates of Some Bivalent Metals; V.G.Knyagina, O.G. Nezkova: Uranium Compounds With Acids of Low-valence P; V.I. Spitsyn: The Influence of the Radioactive Radiation of Solids on Their Physico-chemical Properties; I.Ye.Mikhaylenko, V.I.Spitsyn: Isotope Exchange in the System $K_2SO_4 - SO_3$ at High Temperature. Kafedra khimicheskoy kinetiki (Chair of Chemical Kinetics): I.V.Berezin, V.L.Antonovskiy, M.F.Kazanskaya: Application of Tritium for the Purpose of Determining the Velocity Constants of the Separation of Organo-hydrogen Compounds. An.N.Nesmeyanov delivered a detailed lecture on the Methodology of Radiochemical Instruction at the chemical departments of universities.

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SOV/78-4-4-19/44

5(4)

AUTHORS: Babushkin, A. A., Yukhnevich, G. V., Berezkina, Yu. F., Spitsyn, Vikt. I.

TITLE: Investigation of the Effect of Water on the Structure of Sodium Para-tungstate and Sodium Meta-tungstate Using the Method of Infra-red Absorption Spectra (Issledovaniye vliyaniya vody na stroyeniye para- i metavol'framatov natriya metodom infrakrasnykh spektrov pogloshcheniya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 4, pp 823-829 (USSR)

ABSTRACT: The authors investigated the effect of water upon the structure of sodium para and meta tungstate and the type of bonding of the water in the anions of these compounds. The infra-red absorption spectra of sodium para and meta tungstate were plotted for different water contents using the IKS-1 spectrophotometer with sodium chloride and lithium fluoride prisms. The infra-red absorption spectra for sodium para-tungstate with $28H_2O$, $19H_2O$, $9H_2O$, $4H_2O$, $2H_2O$ and $0.2H_2O$ per molecule of $Na_{10}W_{12}O_{41}$ as well as the anhydrous para-tungstate were investigated. The investigation was carried out over the spectral ranges 700-1700 cm^{-1}

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Investigation of the Effect of Water on the Structure of Sodium Para-tungstate and Sodium Meta-tungstate Using the Method of Infra-red Absorption Spectra

and 3000-3800 cm^{-1}. For sodium para-tungstate hydrates in the transition from $19H_2O$ to $9H_2O$ a marked change in the structure of the coordination water and in the structure of the anions occurred. The structures of the hydrates of the sodium meta-tungstate remained unchanged. Using spectroscopic methods and isotope exchange of hydrogen against deuterium it was found that in the sodium para-tungstate with $28H_2O$ three forms of the coordination water exist. One of these forms is present as the hydroxyl group, which is bound directly to the tungsten atom. Likewise in the hydrates of the sodium meta-tungstate there is a form of the coordination water as the hydroxyl group bound directly to the tungsten atom. Infra-red absorption spectra of sodium meta-tungstate were plotted for 10.7 and $2H_2O$ and the anhydrous sodium meta-tungstate in the ranges of 3000-3800 cm^{-1} and 1300-600 cm^{-1}. These are shown in figures 4 and 5. These spectra show that there is no difference between the absorption spectra of these hydrates of sodium meta-tungstate.

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SOV/78-4-4-19/44

Investigation of the Effect of Water on the Structure of Sodium Para-tungstate and Sodium Meta-tungstate Using the Method of Infra-red Absorption Spectra

No specific absorption was found for the anhydrous sodium meta-tungstate in the range 3000-3800 cm^{-1}. The differences in the optical densities of the various hydrates are shown in a table. A further table gives the wave numbers (cm^{-1}) of the absorption maxima of the hydrates of sodium meta-tungstate. There are 5 figures, 2 tables, and 8 references, 4 of which are Soviet.

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

SUBMITTED: January 13, 1958

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SOV/78-4-4-20/44

5(4)

AUTHORS: Spitsyn, Vikt. I., Matyazh, P. Ya.

TITLE: Investigation of Phosphotungstic and Luteophosphotungstic Acids in Strong Acid Medium (Issledovaniye fosfornovol'framovoy i lyuteofosfornovol'framovoy kislot v sil'nokisloy srede)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 4, pp 830-838 (USSR)

ABSTRACT: The authors investigated the content of phosphotungstic and luteophosphotungstic acids in hydrochloric, sulfuric, and nitric acid solutions of various concentrations. The stability of phosphotungstic acid toward several complex-forming acids (H_2SiO_3, H_3PO_4, and H_3BO_3) was investigated. Phosphotungstic and luteophosphotungstic acids were produced by the ether method (Ref 3). An analysis showed that the starting compounds had the following compositions: phosphotungstic acid - $H_3[PW_{12}O_{40}] \cdot 24H_2O$ and luteophosphotungstic acid - $H_{12}[P_2O_5(W_2O_7)_9] \cdot 36H_2O$. The results show that these compounds are stable in solutions 1 to 12 N in HCl, H_2SO_4, and HNO_3.

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Investigation of Phosphotungstic and Luteophosphotungstic Acids in Strong Acid Medium

With longer exposure to these acids at room temperature (90 to 320 days) and in boiling solutions of these acids (1 to 2 days) the P:W ratio in the prepared compounds was not altered. The solubilities of the phosphotungstic and luteophosphotungstic acids were investigated at 25° in 1 to 11 N HCl, H_2SO_4, and HNO_3. It was found that the solubility of the phosphotungstic acid, as opposed to that of the luteophosphotungstic acid, decreases markedly with an increase in the acid concentration. The results of the determination of the solubility of the phosphotungstic acid are given in table 1. Hydrochloric acid appears to be the most suitable reagent for precipitating phosphotungstic acid. The composition was determined of the crystal hydrates of phosphotungstic and luteophosphotungstic acids which separated out from the acid solution at 25°. In 1 to 5 N HCl phosphotungstic acid has 14 molecules of water, while in 6 to 12 N HCl it is present with 8 molecules of water. In HNO_3 and at all concentrations only the phosphotungstic acid with 7 molecules of water is present. The reaction of phosphotungstic acid with several complex-forming acids was

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SOV/78-4-4-20/44

Investigation of Phosphotungstic and Luteophosphotungstic Acids in Strong Acid Medium

investigated. In H_2SiO_3 and H_3BO_3 no reaction takes place. H_3PO_4 reacts with solutions with an acidity of 0.4 N and below to cause the phosphotungstic acid to be converted to the luteophosphotungstic acid. In 40-50% phosphotungstic acid solutions, after neutralizing with sodium hydroxide to an acidity of 0.5 to 0.2 N and boiling the solutions, a glassy mass forms which has the composition 6-7 $Na_2O.P_2O_5.22-24WO_3.45-60H_2O$. It was not determined whether this product is a new compound of the double salt type or whether it represents a complex compound. Two tables give the solubility of phosphotungstic acid in concentrated solutions of HCl and H_2SO_4 and the solubility of luteophosphotungstic acid in H_2SO_4, HCl, and HNO_3 at 25°. In table 3 are given the compositions of the products which were insoluble in acetone and which were formed by boiling phosphotungstic acid with complex-forming acids and NaOH. A further table gives the interplanar distances for the hydrolysis products of table 3. There are 3 figures, 5 tables, and

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SOV/78-4-4-20/44

Investigation of Phosphotungstic and Luteophosphotungstic Acids in Strong Acid Medium

12 references, 8 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova Kafedra neorganicheskoy khimii (Moscow State University imeni M. V. Lomonosov, Chair of Inorganic Chemistry)

SUBMITTED: December 23, 1957

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SPITSYN, V. I.

SOV/78-4-6-2/44

5(2)

AUTHOR: Spitsyn, I. Vikt.

TITLE: Tasks of the Soviet Inorganic Chemistry in Connection With the Resolutions of the XXIst Congress of the CPSS (Zadachi sovetskoy neorganicheskoy khimii v svyazi s resheniyami XXI s"yezda KPSS)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 6, pp 1227-1232 (USSR)

ABSTRACT: The resolutions of the XXIst Congress of the CPSS demand an intensive development of inorganic chemistry. Above all, the production of inorganic synthetic polymerization substances is demanded. It is necessary to establish theoretical bases for the explanation of the condensation of the metal hydroxides, the production of heteropoly acids, polysilicates, and polyphosphates. In the forthcoming Seven-year Plan a systematic intensification in the investigation of the individual chemical elements of the periodic law is demanded. The investigation of the elements of the rare earths and of the rare elements is suggested, above all the production of purest metals, oxides, and other compounds of the rare elements. The complex chemistry for the production of new molecular complex compounds

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SOV/78-4-6-2/44

Tasks of the Soviet Inorganic Chemistry in Connection With the Resolutions of the XXIst Congress of the CPSS

is to be further developed. The experimental work for the production of highly temperature-stable materials is continued. The technology and economy of the production of nitric acid, sulphur, and phosphoric acid are to be improved. A further development of the production of mineral salts, and the production of potassium, magnesium, and boron is demanded. The Seven-year Plan calls upon the Russian inorganic chemists to a responsible cooperation.

SUBMITTED: March 24, 1959

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SOV/78-4-6-15/44

5(4)

AUTHORS: Spitsyn, I. Vikt., Zedelashvili, Ye. N.

TITLE: Investigation of the Isotopic Exchange of Tungsten in Sodium-tungsten Bronzes (Issledovaniye izotopnogo obmena vol'frama v natriy-vol'framovykh bronzakh)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 6, pp 1305-1308 (USSR)

ABSTRACT: The isotopic exchange of the tungsten atoms in the tungsten bronzes was investigated by means of the radioactive isotope W^{185} ($T\ 1/2 = 73.2$ days). Sodium-tungsten bronzes were produced according to the method of O. Brunner. The results showed that the tungsten atoms in the sodium-tungsten bronzes are equivalent. The investigation results of the yellow and purple tungsten bronzes are given in tables 1 and 2. The synthesis of the tungsten bronzes from $NaWO_4$ and low tungsten oxides was carried out in the vacuum furnace (construction given in figure 1). The formulas $NaWO_3$ or $Na_2O.W_2O_5$ are suggested for the golden yellow tungsten bronzes. The formula $Na_2O.W_3O_8$ was suggested for the purple bronze. Two tungsten atoms in

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SOV/78-4-6-15/44

Investigation of the Isotopic Exchange of Tungsten in Sodium-tungsten Bronzes

this formula are pentavalent, one atom hexavalent. No isotopic exchange takes place between the solid phases Na_2WO_4 and the low oxides of tungsten at 400°. This is also the case in normal sodium tungsten solutions which contain active low tungsten oxides after six hours heating up to the boiling point. There are 1 figure, 2 tables, and 8 references, 1 of which is Soviet.

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

SUBMITTED: December 29, 1958

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