L 45934-66
ACC NR: AT6020589

process of formation and rheological properties of such plastic dispersed systems as the bentonite lubricants. Orig. art. has: 2 figures and 2 tables.

SUB CODE: 11/ SUBM DATE: 01Dec65/ ORIG REF: 007

Card 2/2

VDOVENKO, N.V.; BONDARENKO, S.V.

Thermodynamics of the sorption of water vapors in modified polygorskite. Ukr.khim.zhur. 30 no.2:160-165 '64. (MIRA 17:4)

1. Institut obshchey i neorganicheskoy khimii AN UkrSSR.

POKHODNYA, G.A. [Pokhodnia, H.A.]; VDOVENKO, N.V.; OVCHARENKO, F.D., akademik

Effect of the structure of amine salts on the kinetics of their sorption by argillaceous minerals. Dop. AN URSR no.8:1060-1063 '65. (MIRA 18:8)

1. Institut obshchey i neorganicheskoy khimii AN UkrSSR.
2. AN UkrSSR (for Ovcharenko).

POKHODNYA, G.Ya., VDOVENKO, N.V.

Kinetics of sorption of octadecylamine acetate on minerals. Koll. zhur. 27 no.1:90-94 Ja-F '65. (MIRA 18:3)

1. Institut obshchey i neorganicheskoy khimii AN UkrSSR, Kiyev.

L 04981-67 EWT(m)/EWP(j)/T LJP(c) RM

ACC NR: AP6031518 SOURCE CODE: UR/0073/66/032/009/0979/0982

AUTHOR: Tarasenko, Yu. G.; Bondarenko, S. V.; Gordiyenko, S. A.; Uskov, I. A.; Solomko, V. P.; Vdovenko, N. V.; Ovcharenko, F. D.

ORG: Kiev State University im. T. G. Shevchenko (Kiyevskiy gosudarstvennyy universitet); Institute of General and Inorganic Chemistry, AN UkrSSR (Institut obshchey i neorganicheskoy khimii AN UkrSSR)

TITLE: Hydrophobic fillers in amorphous polymers

SOURCE: Ukrainskiy khimicheskiy zhurnal, v. 32, no. 9, 1966, 979-982

TOPIC TAGS: kaolinite, filler, modified kaolinite, polymethylmethacrylate, kaolin, amorphous polymer

ABSTRACT: Nonmodified kaolinite is an active filler for poly(methyl methacrylate) [PMMA]. A study has been made of the effect of modified kaolinite on the properties of PMMA. Treatment of kaolinite with hydrolyzed polyacrylamide [HPAA] did not change the size of kaolinite particles and had no effect on their aggregation, but considerably affected the surface properties of the modified product. It was shown that introduction of small amounts of HPAA in the surface layer of the filler lowers its capacity to form hydrogen bonds with PMMA macromolecules, while large amounts of HPAA screen the OH surface groups of

Card 1/2 UDC: 678.046+541.183

L 04981-67

ACC NR: AP6031518

O

the filler and render it incompatible with PMMA. Thus, imparting water repellency (even with simultaneous "organophylization") to a filler does not necessarily increase its activity with respect to polymers containing polar groups. Orig. art. has: 4 figures. [BO]

SUB CODE: 11,07/SUBM DATE: 25Dec64/ ORIG REF: 010/ OTH REF: 002

Card 2/2 fdh

Vdovenko, O.F.

24(7) PHASE I BOOK EXPLOITATION SOV/1700

L'vov. Universitet

Materialy X Vsesoyuznogo soveshchaniya po spektroskopii, 1956. t. II: Atomnaya spektroskopiya (Materials of the 10th All-Union Conference on Spectroscopy, 1956. Vol 2: Atomic Spectroscopy) [L'vov] Izd-vo L'vovskogo univ., 1958. 568 p. (Series: Its: Fizicheskiy sbornik, vyp. 4(9)) 3,000 copies printed.

Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po spektroskopii.

Editorial Board: G.S. Landsberg, Academician, (Resp. Ed.); B.S. Neporent, Doctor of Physical and Mathematical Sciences; I.L. Fabelinskiy, Doctor of Physical and Mathematical Sciences; V.A. Fabrikant, Doctor of Physical and Mathematical Sciences; V.G. Koritskiy, Candidate of Technical Sciences; S.M. Rayskiy, Candidate of Physical and Technical Sciences; L.K. Klimovskaya, Candidate of Physical and Mathematical Sciences; V.S. Miliyanchuk (Deceased), Doctor of Physical and Mathematical Sciences; A.Ye. Glauberman, Doctor of Physical and Mathematical Sciences; Ed.: S.L. Gazer; Tech. Ed.: T.V. Saranyuk.

PURPOSE: This book is intended for scientists and researchers in the field of spectroscopy, as well as for technical personnel using spectrum analysis in various industries.

COVERAGE: This volume contains 177 scientific and technical studies of atomic spectrography presented at the 10th All-Union Conference on Spectroscopy in 1956. The studies were carried out by members of scientific and technical institutes and include extensive bibliographies of Soviet and other sources. The studies cover many phases of spectroscopy: spectra of rare earths, electromagnetic radiation, physicochemical methods for controlling uranium production, physics and technology of gas discharge, optics and spectroscopy, abnormal dispersion in metal vapors, spectroscopy and the combustion theory, spectrum analysis of ores and minerals, photographic methods for quantitative spectrum analysis of metals and alloys, spectral determination of the hydrogen content of metals by means of isotopes, tables, and atlases of spectral lines, spark spectrographic analysis, statistical study of variation in the parameters of calibration curves, determination of traces of metals, spectrum analysis in metallurgy, thermochemistry in metallurgy, and principles and practice of spectrochemical analysis.

Card 2/31

(Cont.)

Card 21/31

KUL'SKAYA, O.A.; VDOVENKO, O.F.

Spectral method for the quantitative determination of scandium in silicate minerals, in chemically produced separated concentrates and in coal ashes. Fiz.sbor. no.4:368-370 '58. (MIRA 12:5)

1. Institut geologicheskikh nauk AN USSR.
(Scandium--Spectra)

VDOVENKO, O.T.

KUL'SKAYA, O.A.; VDOVENKO, O.T.

Spectral method for quantitative determination of scandium in natural substances and coal ashes. Ukr.khim.zhur. 23 no.6:799-804 '57. (MIRA 11:1)

1. Institut geologicheskikh nauk AN USSR.
(Scandium--Spectra)

34727
S/137/62/000/002/142/144
A052/A101

5.5310

AUTHORS: Kul'skaya, O. A., Vdovenko, O. F.

TITLE: The spectral method of determining germanium, beryllium and scandium in coal ashes

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 2, 1962, 9, abstract 2K43 (V sb. "Khim., fiz.-khim. i spektr. metody issled. rud redk. i rasseyan. elementov"., Moscow, Gosgeoltekhizdat, 1961, 135-139)

TEXT: Methods of determining (in %) Ge $3 \cdot 10^{-3}$ - 0.3, Be $5 \cdot 10^{-5}$ - $3 \cdot 10^{-2}$ and Sc $2 \cdot 10^{-3}$ - 0.2 in coal ashes and some other natural objects are developed. The sample is mixed with the internal standard in proportion 1 : 1 (for Sc 2 : 1), crushed, and 25 mg of the mixture is placed in the hole of a graphite electrode 2.25 mm in diameter and 8 mm deep. As the base for the preparation of the internal standard a mixture of a pure carbon with quartz (1:1) is used and 5% Bi $(NO_3)_3$ and 10% $BaCl_2$ (for Sc 2% ZrO_2) are added to it. The spectra are excited in the direct current arc (10 a) with the sample as anode. During the first 15 sec of arc burning the electrodes are brought together then the analytical space is increased up to 4 mm and is kept constant during

Card 1/2

S/137/62/000/002/142/144
A052/A101

The spectral method of determining ...

the exposure. The time of exposure = 3 min. The following analytical pair of lines are used: Ge 2651.17 - Bi 2627.90, Ge 2651.17 - Ba 2634.78, Ge 3039.06 - Bi 3024.63, Be 2348.61 - Ba 2347.57, Sc 2552.35 - Zr 2550.74, Sc 3353.73 - Zr 3357.26. Reproducibility of the analysis = 8 - 12%. There are 19 references.

V. Slavnyy

[Abstracter's note: Complete translation]

Card 2/2

ZHERBIN, M.M., kand. tekhn. nauk; VDOVENKO, O.S.; VINOGRADOV, S.M. [Vynohradov, S.M.]; SLIVKO, V.M.[Slyvko, V.M.], inzh.; SHTEPAN, Ya.G.[Shtepan, IA.H.], otv. za vypusk; LOKTEVA, V.A. [Loktieva, V.A.], red.

[Device for drying corn on the cob with a gas and air stream] Ustanovka dlia sushinnia kukurudzy v kachanakh haropovitrianym strumenem. Kyiv, Derzh. vyd-vo tekhn. lit-ry URSR, 1961. 36 p. (MIRA 15:3)

1. Ukrains'kyi naukovo-doslidnyi i proektnyi instytut derzhplanu URSR. 1961.
(Corn (Maize))—Drying (Drying apparatus)

L 25034-65 EWT(m)/EWA(d)/[illegible]

ACCESSION NR: AT4048711 S/0000/64/000/000/0163/0165

AUTHOR: Samsonov, G.V.; Verkhoglyadova, T.S.; Vdovenko, S.A.

TITLE: Chemical compounds of the system scandium-boron and their properties

SOURCE: [illegible]

TOPIC TAGS: scandium boron system, scandium boride, scandium diboride, scandium tetraboride, scandium tetraboride resistivity

ABSTRACT: In a continuation of earlier work, detailed studies of the requirements for the preparation of scandium diboride are reported, as well as a search for phases of other possible compositions (ScB, ScB_2, ScB_4, ScB_{12}). ScB_2 was obtained from Sc_2O_3 by reduction with B_4C and carbon at [illegible]°C for 2 hours. Under X-ray, it showed a hexagonal structure of the AlB_2 type. [illegible] reaction mixture or by [illegible] $ScB_2 + 4ScB_4 + 3B_2O_3$. [illegible] obtained under these experimental [illegible] properties of ScB_2 and ScB_4

Card 1/2

L 25034-65

ACCESSION NR: AT4048711

are reported (resistivity, thermal e.m.f., microhardness, thermal expansion coefficient). SnBi was [illegible] the physical properties [illegible]

Card 2/2

OVCHARENKO, Fedor Danilovich, akademik; KUKOVSKIY, Yevgeniy Georgiyevich; NICHIPORENKO, Sergey Petrovich; VDOVENKO, Sergey Petrovich; VDOVENKO, Nadezhda Vasil'yevna; [redacted]ch; KRUGLITSKIY, Nikolay Nikolayevich; PANASEVICH, Aleksandr Aleksandrovich; POKROVSKAYA, Z.S., red. izd-va; MONZHERAN,P.F., tekhn. red.

[Colloid chemistry of palygorskite] Kolloidnaia khimiia palygorskita. Pod obshchei red. F.D.Ovcharenko. Kiev, Izd-vo AN Ukr.SSR, 1963. 119 p. (MIRA 16:7)

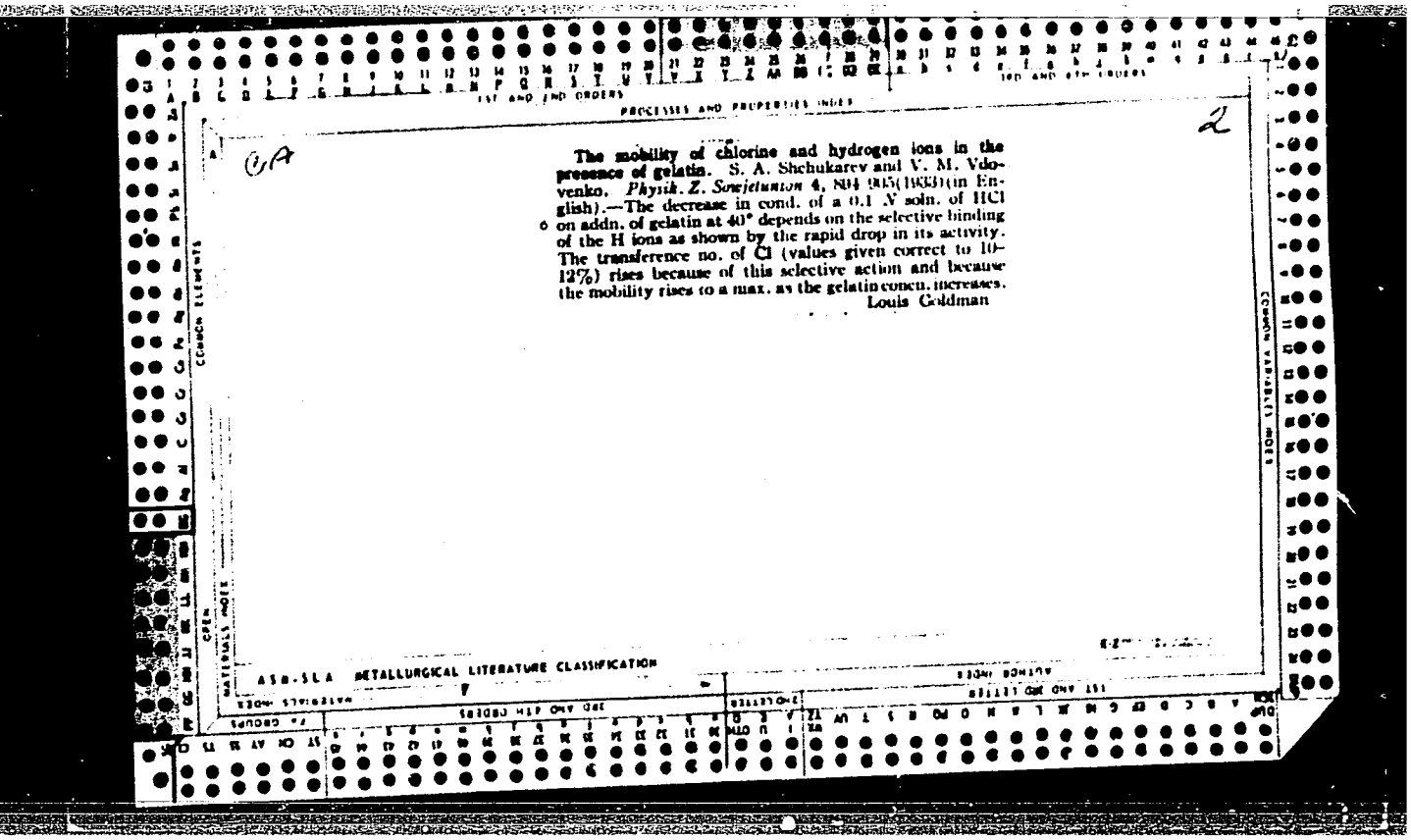
1. AN Ukr.SSR (for Ovcharenko).
(Palygorskite) (Colloids)

VDOVENKO, V.M.; ROMANOV, G.A.; SHCHERKBAKOV, V.A.

Complex formation of U (IV) with halide, sulfate, and perchlorate anions studies by the proton resonance method. Radiokhimiia 5 no. 6:668-674 '63. (MIRA 17:7)

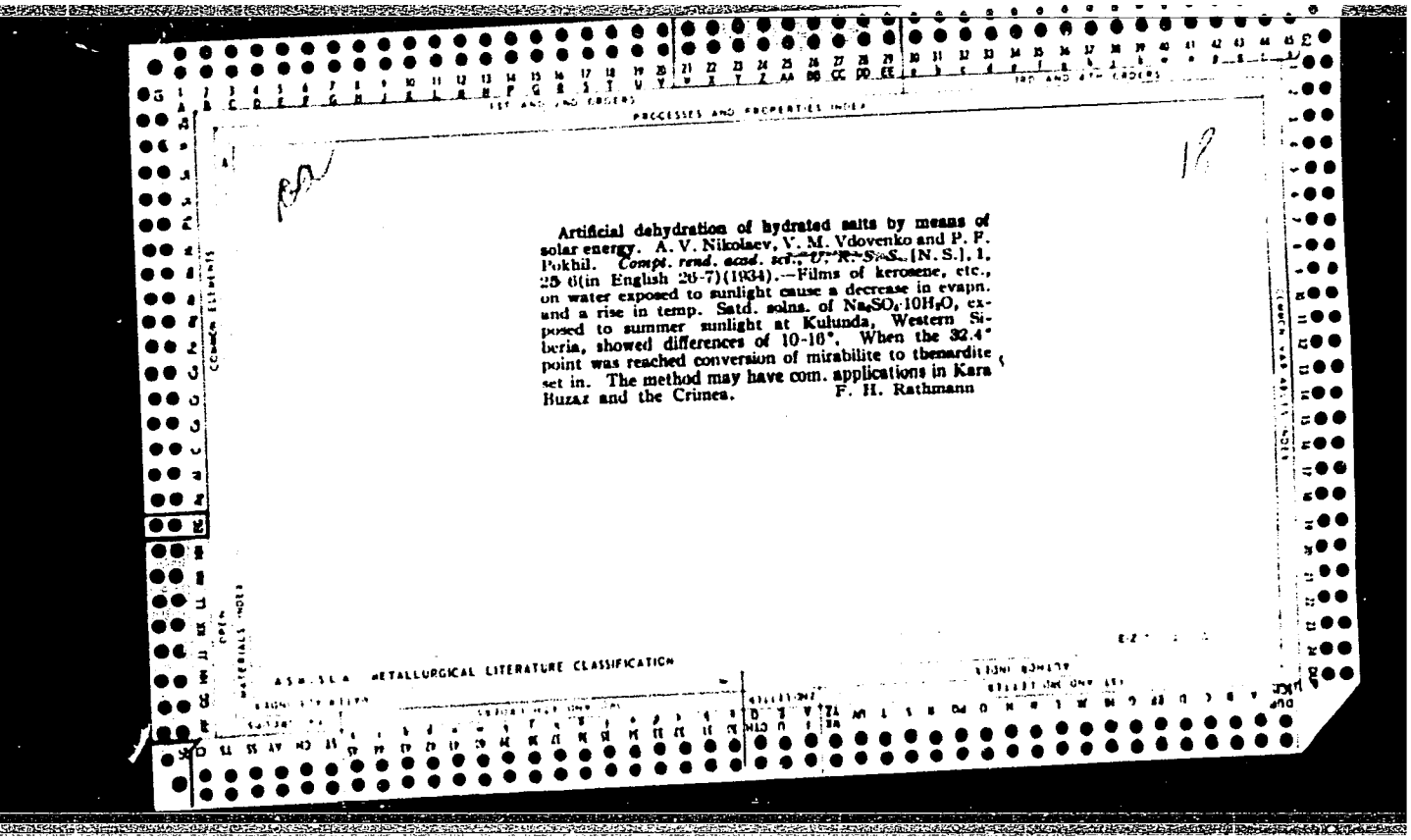
VDOVENKO, V.M.; DEM'YANOVA, T.A.; KUZINA, M.G.; LIPOVSKIY, A.A.

Hydrogen bonding in alkyl ammonium salts. Part 1: Infrared spectra and structure of trioctyl ammonium nitrate. Radiokhimiia 6 no. 1:49-55 '64. (MIRA 17:6)

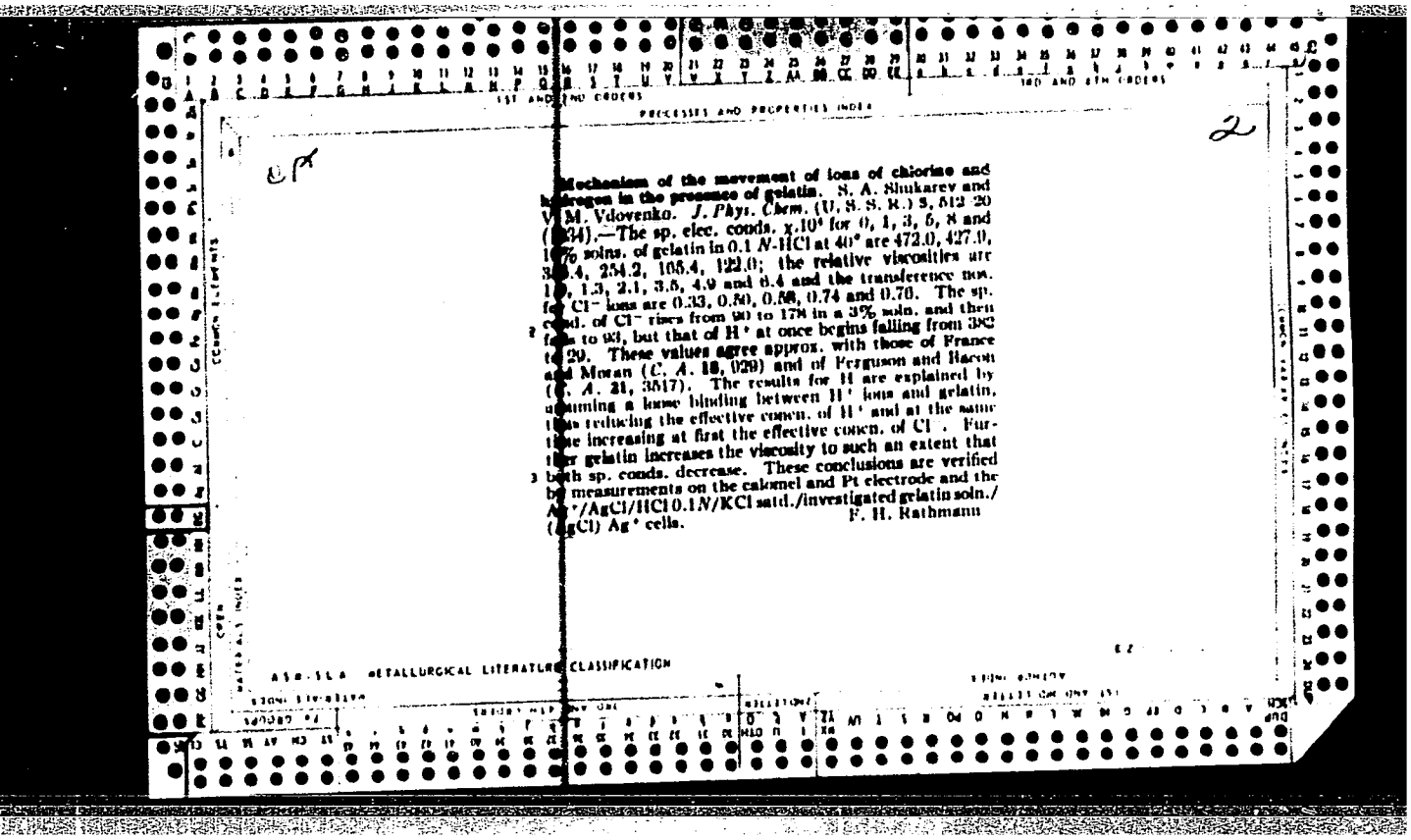


The mobility of chlorine and hydrogen ions in the presence of gelatin. S. A. Shchukarev and V. M. Vdovenko. *Physik. Z. Sowjetunion* 4, 804-915(1933)(in English).—The decrease in cond. of a 0.1 *N* soln. of HCl on addn. of gelatin at 40° depends on the selective binding of the H ions as shown by the rapid drop in its activity. The transference no. of Cl (values given correct to 10–12%) rises because of this selective action and because the mobility rises to a max. as the gelatin concn. increases.

Louis Goldman

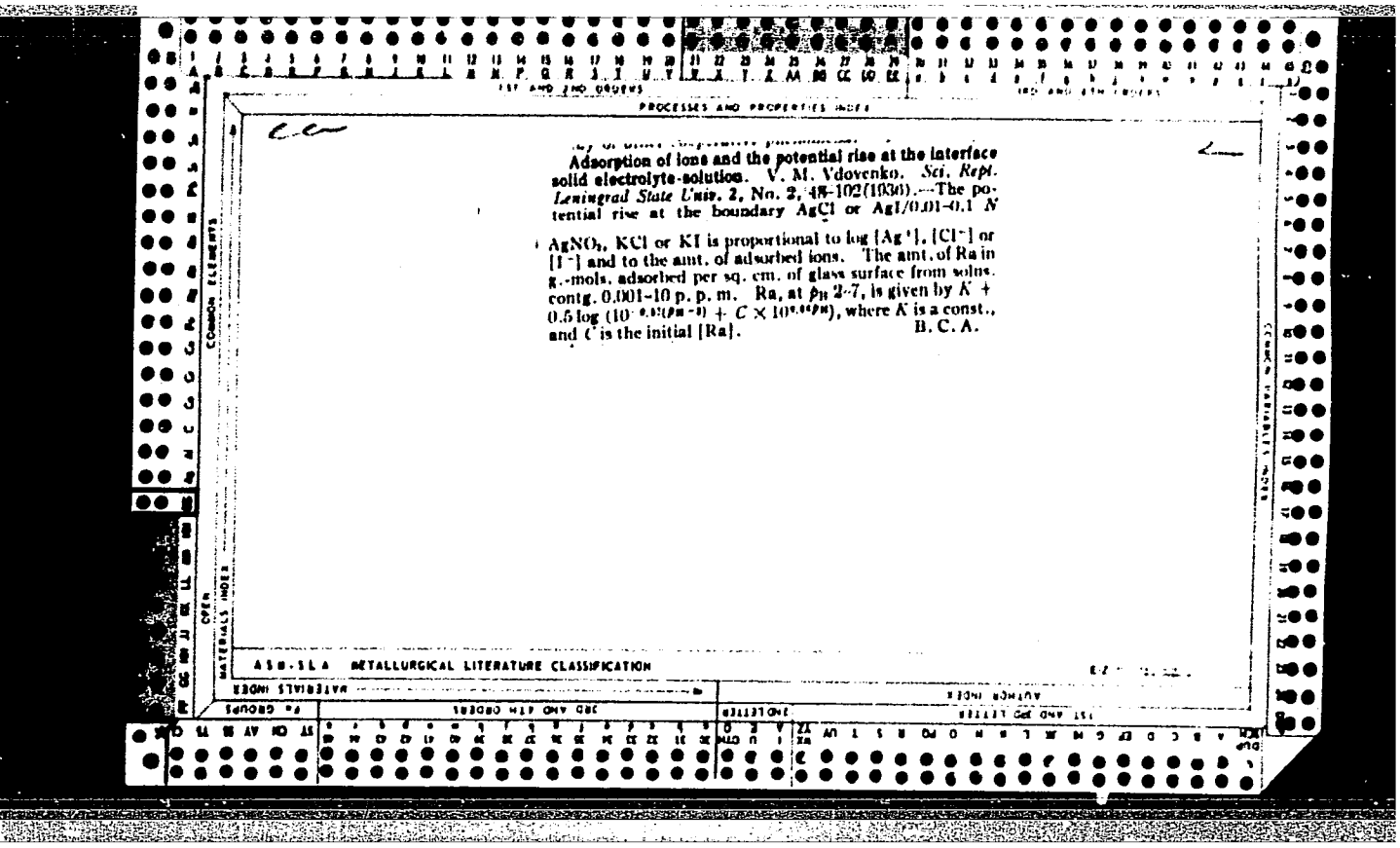


Artificial dehydration of hydrated salts by means of solar energy. A. V. Nikolaev, V. M. Vdovenko and P. F. Pokhil. *Compt. rend. acad. sci., U.R.S.S.*, [N. S.], 1, 25-6(in English 26-7)(1934).—Films of kerosene, etc., on water exposed to sunlight cause a decrease in evapn. and a rise in temp. Satd. solns. of $Na_2SO_4 \cdot 10H_2O$, exposed to summer sunlight at Kulunda, Western Siberia, showed differences of 10-16°. When the 32.4° point was reached conversion of mirabilite to thenardite set in. The method may have com. applications in Kara Buzar and the Crimea. F. H. Rathmann

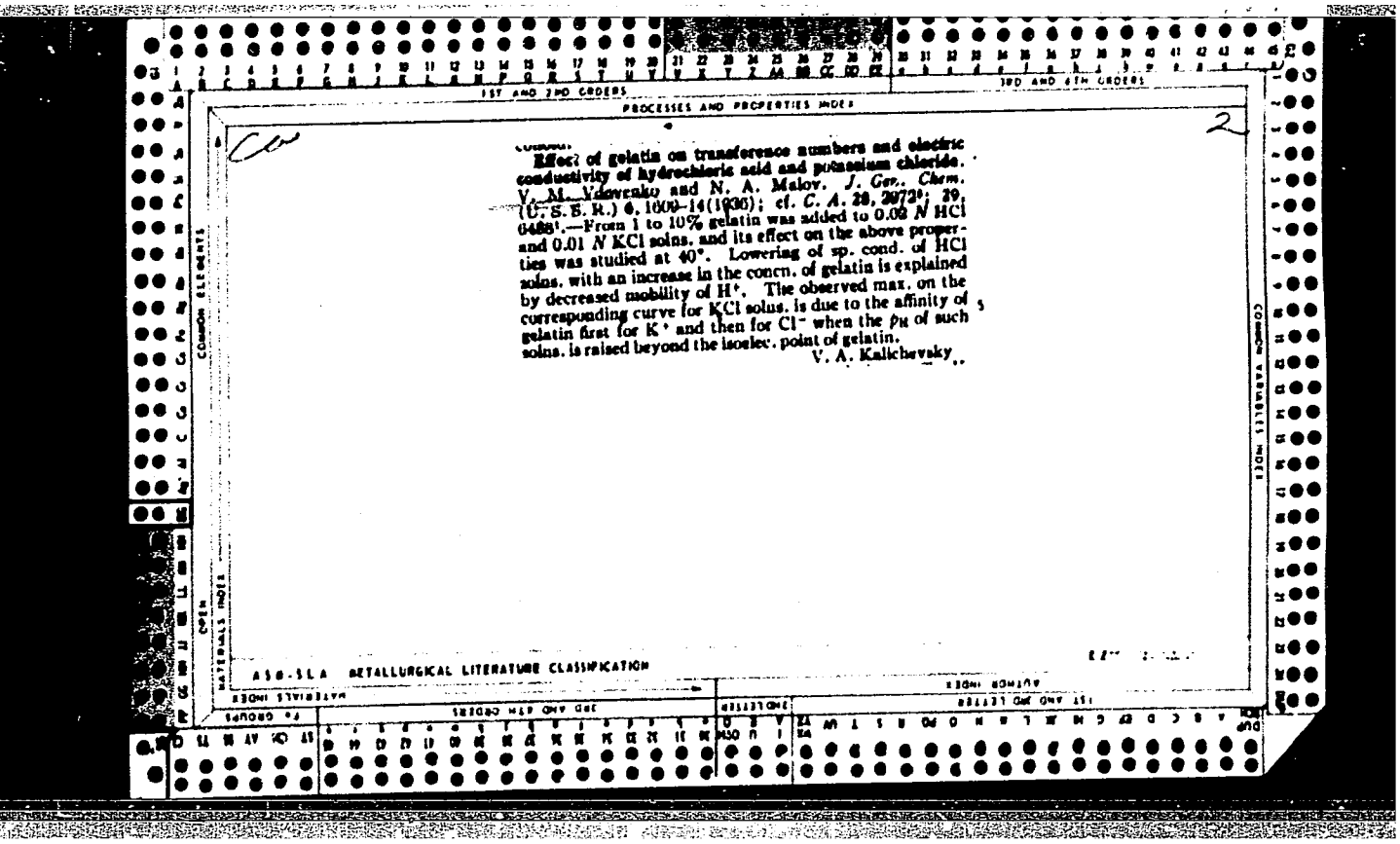


Mechanism of the movement of ions of chlorine and hydrogen in the presence of gelatin. S. A. Shukarev and V. M. Vdovenko. *J. Phys. Chem.* (U. S. S. R.) 8, 512-20 (1934).—The sp. elec. conds. $\chi \cdot 10^4$ for 0, 1, 3, 5, 8 and 10% solns. of gelatin in 0.1 *N*-HCl at 40° are 472.0, 427.0, 338.4, 254.2, 165.4, 122.0; the relative viscosities are 1.0, 1.3, 2.1, 3.5, 4.9 and 6.4 and the transference nos. for Cl^- ions are 0.33, 0.50, 0.68, 0.74 and 0.76. The sp. cond. of Cl^- rises from 90 to 178 in a 3% soln. and then falls to 93, but that of H^+ at once begins falling from 382 to 29. These values agree approx. with those of France and Moran (*C. A.* 18, 929) and of Ferguson and Hacon (*C. A.* 21, 3517). The results for H are explained by assuming a loose binding between H^+ ions and gelatin, thus reducing the effective concn. of H^+ and at the same time increasing at first the effective concn. of Cl^-. Further gelatin increases the viscosity to such an extent that both sp. conds. decrease. These conclusions are verified by measurements on the calomel and Pt electrode and the $Ag^+/AgCl/HCl$ 0.1*N*/KCl satd./investigated gelatin soln./(AgCl) Ag^+ cells.

F. H. Rathmann



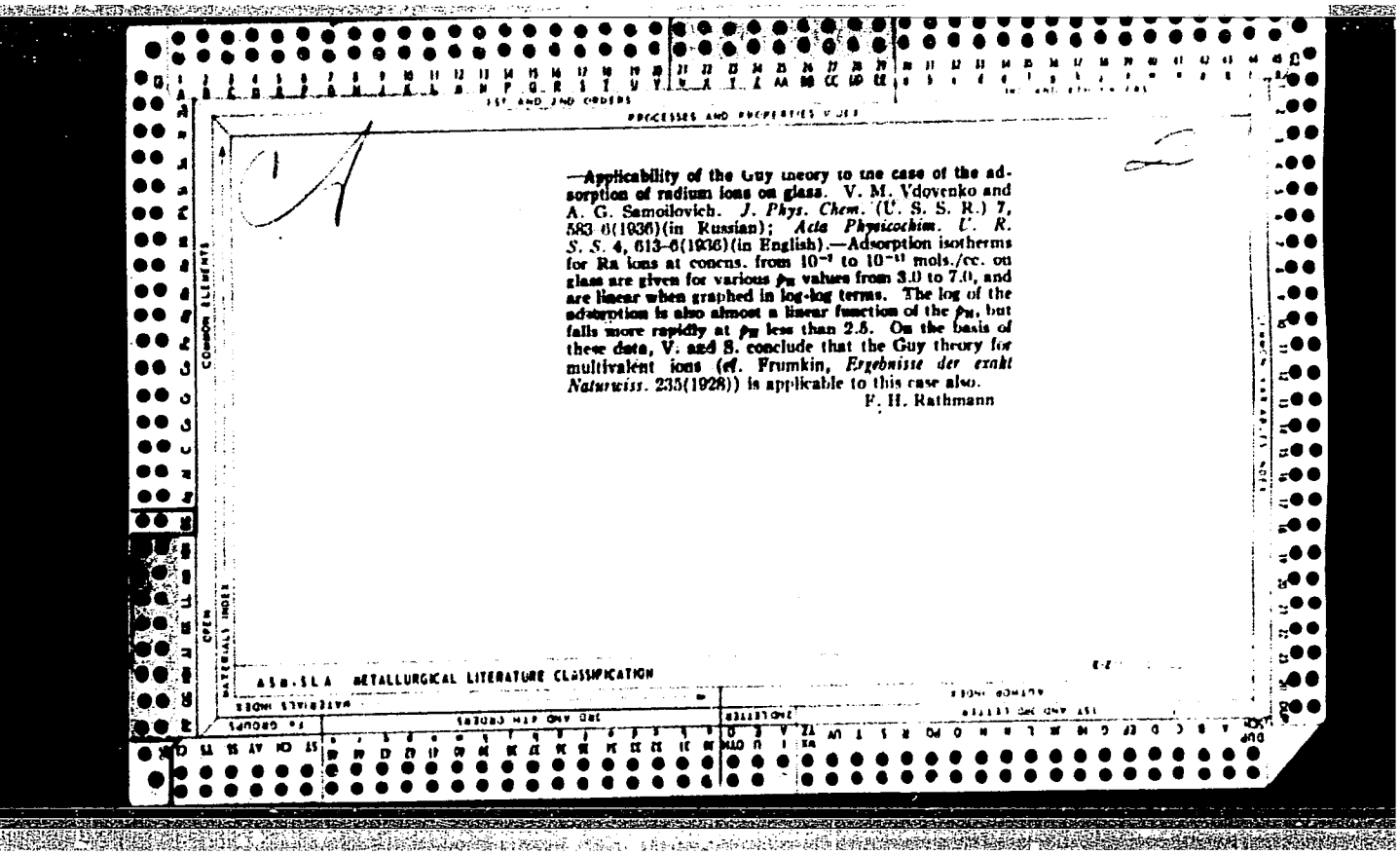
Adsorption of ions and the potential rise at the interface solid electrolyte-solution. V. M. Vdovenko. *Sci. Rept. Leningrad State Univ.* 2, No. 2, 98–102(1950).—The potential rise at the boundary AgCl or AgI/0.001–0.1 *N* $AgNO_3$, KCl or KI is proportional to log [Ag^+], [Cl^-] or [I^-] and to the amt. of adsorbed ions. The amt. of Ra in g.-mols. adsorbed per sq. cm. of glass surface from solns. contg. 0.001–10 p. p. m. Ra, at *p*H 2–7, is given by $K + 0.5 \log (10^{-0.03(pH-3)} + C \times 10^{0.06pH})$, where *K* is a const., and *C* is the initial [Ra]. B. C. A.



PROCESSES AND PROPERTIES INDEX

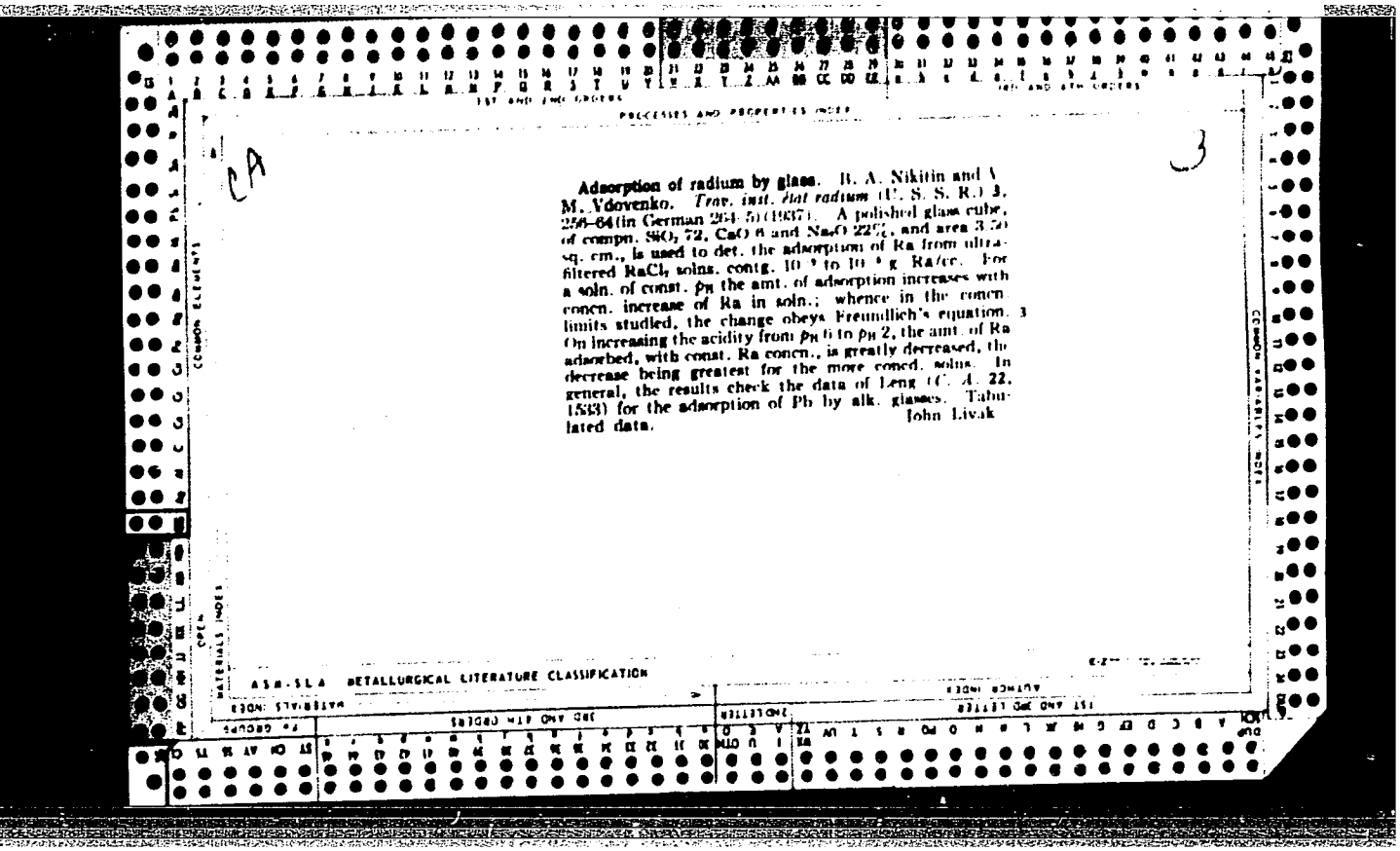
Effect of gelatin on transference numbers and electric conductivity of hydrochloric acid and potassium chloride. V. M. Vdovenko and N. A. Malov. *J. Gen. Chem.* (U. S. S. R.) 6, 1009–14 (1936); cf. *C. A.* 28, 2072[3]; 29, 6488[1].—From 1 to 10% gelatin was added to 0.02 *N* HCl and 0.01 *N* KCl solns. and its effect on the above properties was studied at 40°. Lowering of sp. cond. of HCl solns. with an increase in the concn. of gelatin is explained by decreased mobility of H^+. The observed max. on the corresponding curve for KCl solns. is due to the affinity of gelatin first for K^+ and then for Cl^- when the p_H of such solns. is raised beyond the isoelec. point of gelatin.
V. A. Kalichevsky

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



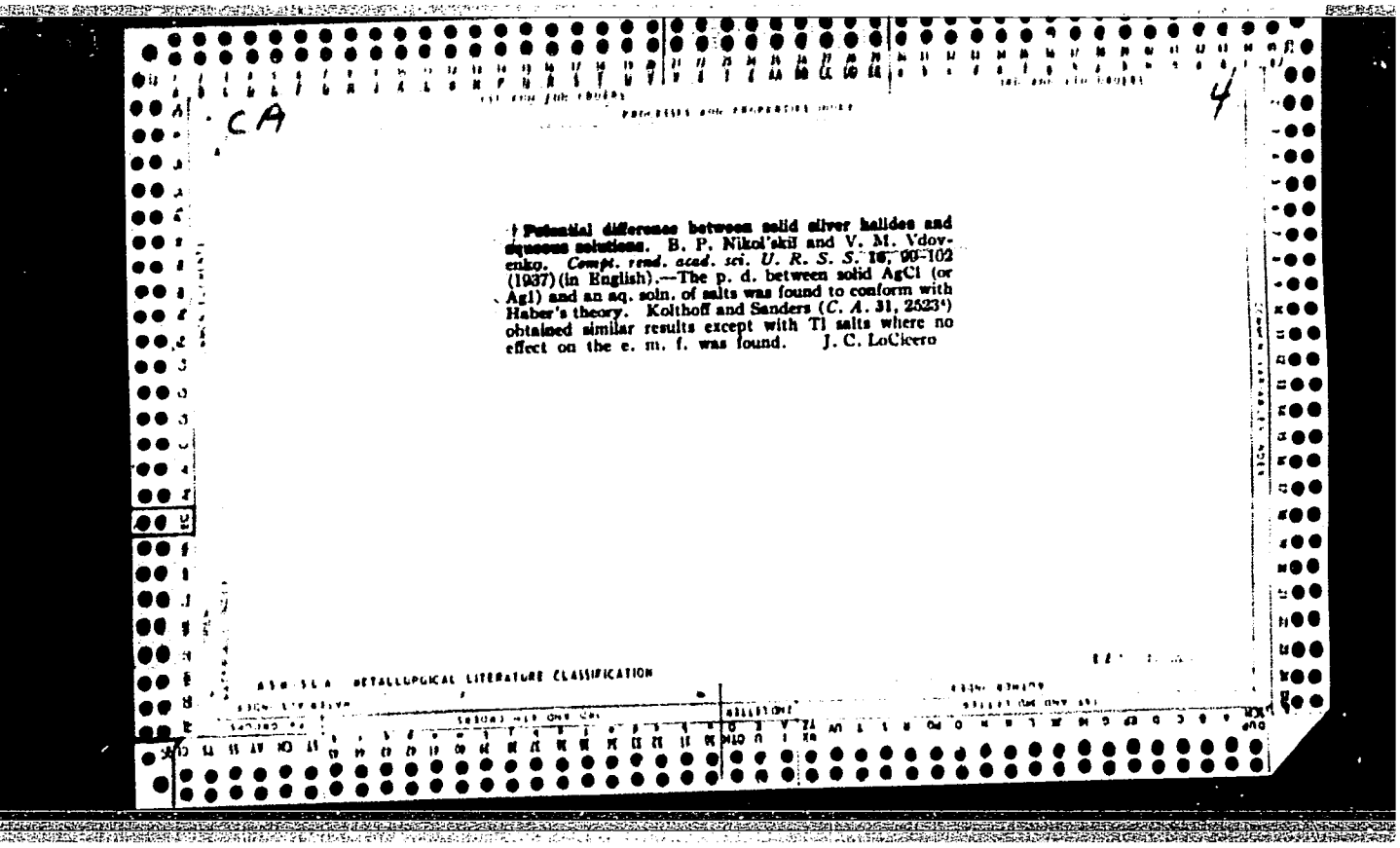
—Applicability of the Guy theory to the case of the adsorption of radium ions on glass. V. M. Vdovenko and A. G. Samoilovich. *J. Phys. Chem.* (U. S. S. R.) 7, 583-6(1936)(in Russian); *Acta Physicochim. U. R. S. S.* 4, 613-6(1936)(in English).—Adsorption isotherms for Ra ions at concns. from 10^{-9} to 10^{-11} mols./cc. on glass are given for various p_H values from 3.0 to 7.0, and are linear when graphed in log-log terms. The log of the adsorption is also almost a linear function of the p_H, but falls more rapidly at p_H less than 2.5. On the basis of these data, V. and S. conclude that the Guy theory for multivalent ions (cf. Frumkin, *Ergebnisse der exakt Naturwiss.* 235(1928)) is applicable to this case also.

F. H. Rathmann



Adsorption of radium by glass. B. A. Nikitin and V. M. Vdovenko. *Trav. inst. Rat radium* (U. S. S. R.) 3, 256–64 (in German 264–5) (1937). A polished glass cube, of compn. SiO_2 72, CaO 6 and Na_2O 22%, and area 3.50 sq. cm., is used to det. the adsorption of Ra from ultra-filtered RaCl, solns. contg. 10^{-9} to 10^{-8} g. Ra/cc. For a soln. of const. p_H the amt. of adsorption increases with concn. increase of Ra in soln.; whence in the concn. limits studied, the change obeys Freundlich's equation. On increasing the acidity from p_H 6 to p_H 2, the amt. of Ra adsorbed, with const. Ra concn., is greatly decreased, the decrease being greatest for the more concd. solns. In general, the results check the data of Leng (*C. A.* 22, 1533) for the adsorption of Pb by alk. glasses. Tabulated data.

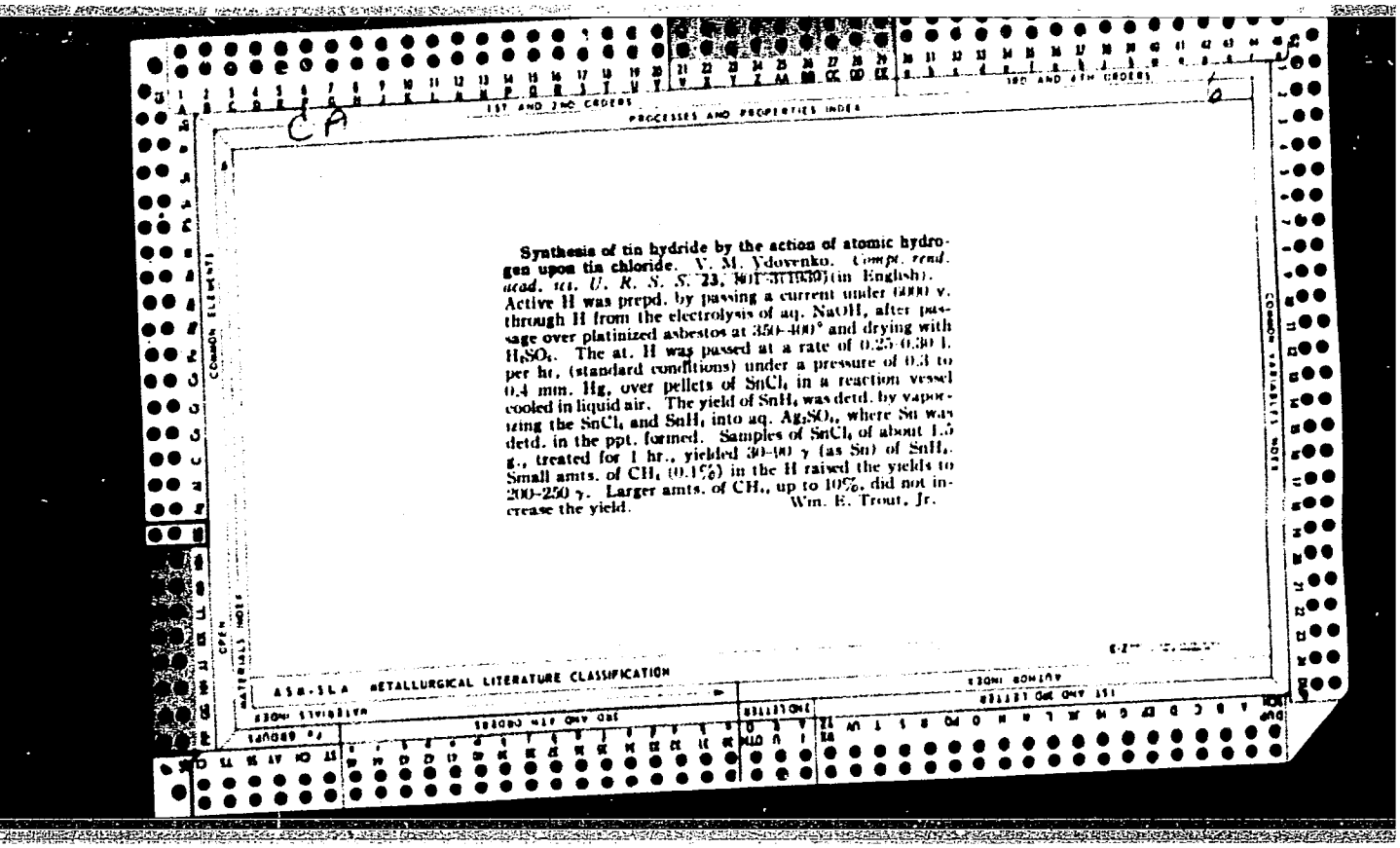
John Livak



CA

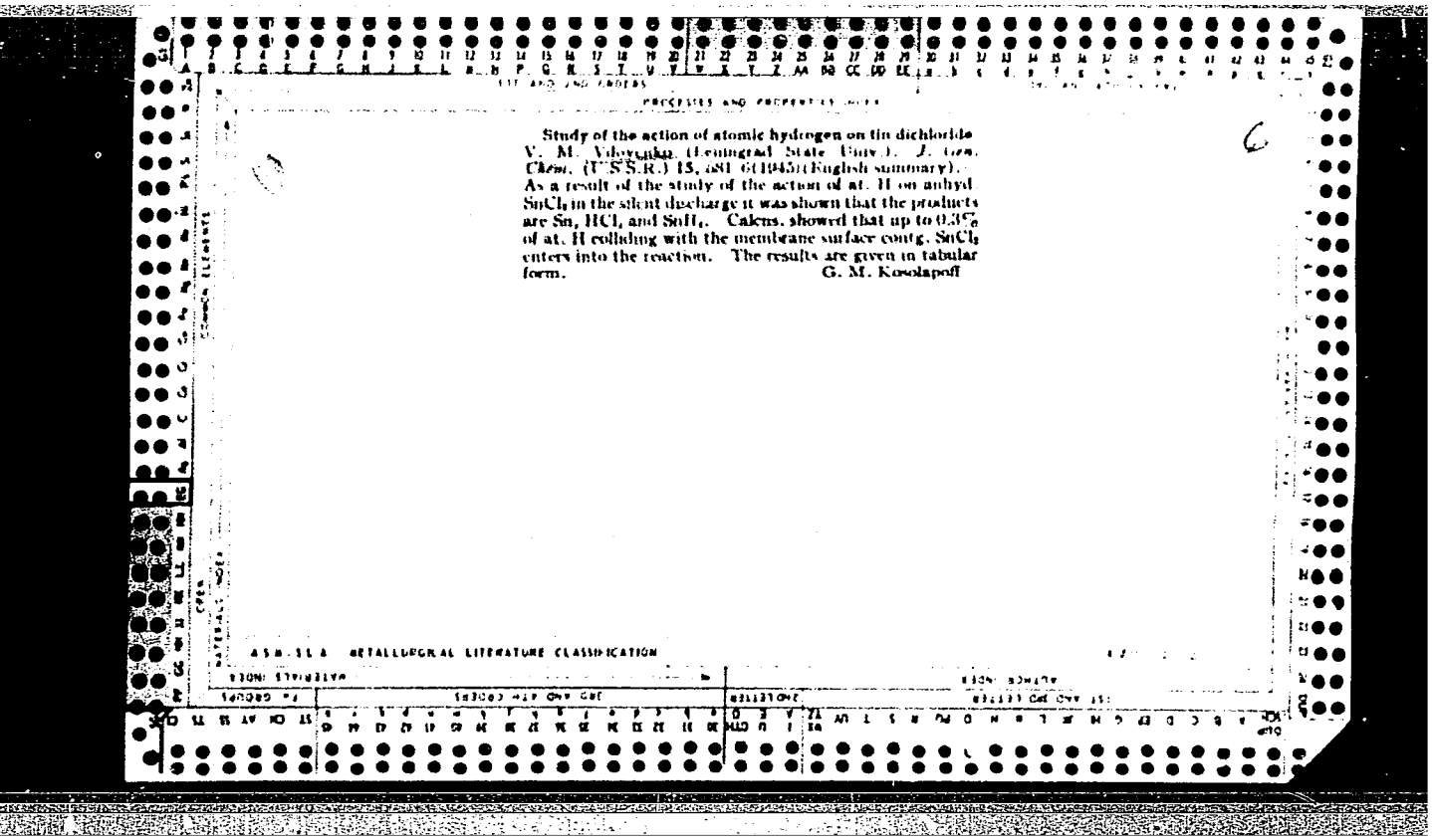
4

Potential difference between solid silver halides and aqueous solutions. B. P. Nikol'skiĭ and V. M. Vdovenko. *Compt. rend. acad. sci. U. R. S. S.* 16, 99–102 (1937) (in English).—The p. d. between solid AgCl (or AgI) and an aq. soln. of salts was found to conform with Haber's theory. Kolthoff and Sanders (*C. A.* 31, 2523⁴) obtained similar results except with Tl salts where no effect on the e. m. f. was found. J. C. LoCicero



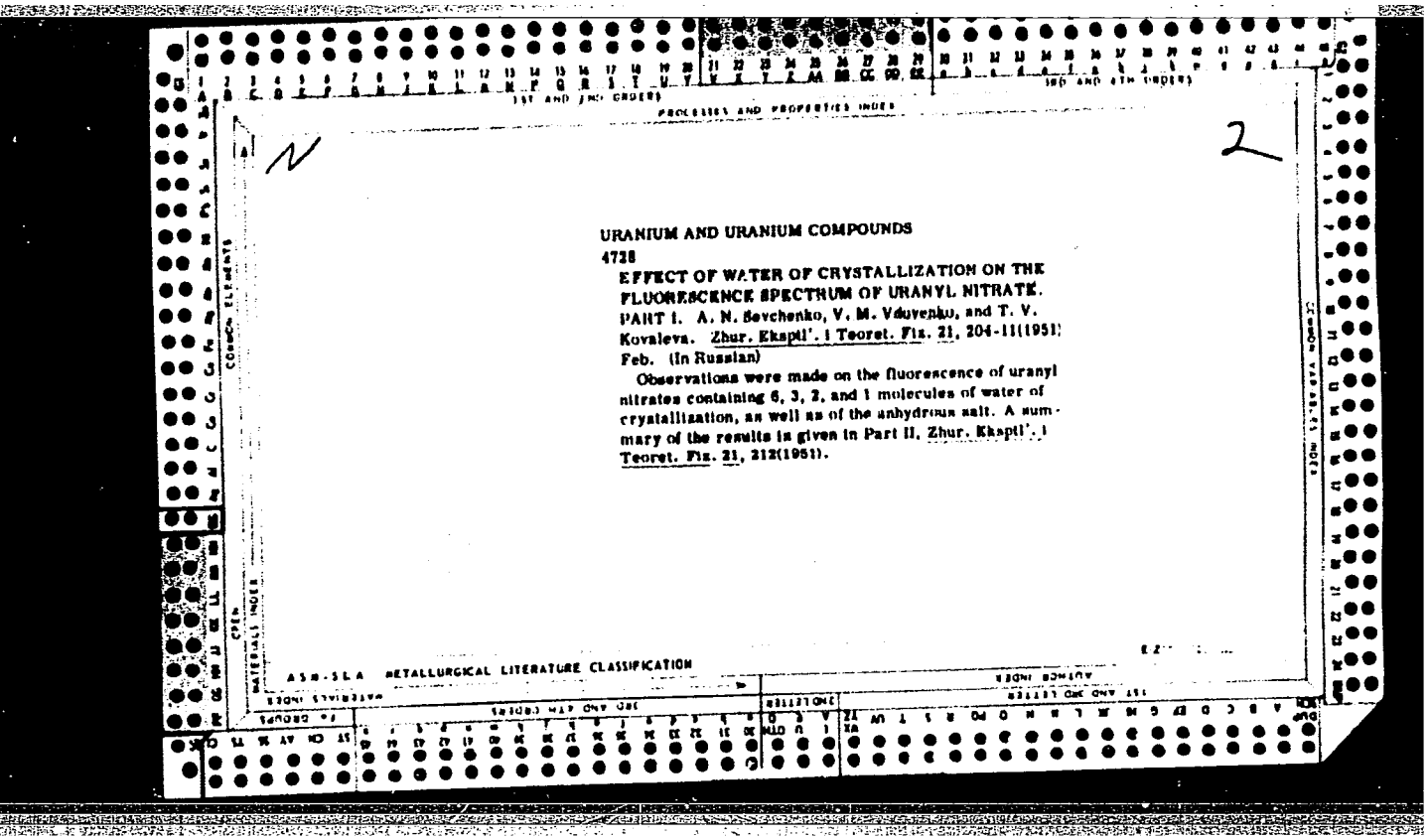
Synthesis of tin hydride by the action of atomic hydrogen upon tin chloride. V. M. Vdovenko. *Compt. rend. acad. sci. U. R. S. S.* 23, [illegible] (in English). Active H was prepd. by passing a current under 6000 v. through H from the electrolysis of aq. NaOH, after passage over platinized asbestos at 350–400° and drying with H_2SO_4. The at. H was passed at a rate of 0.25–0.30 l. per hr. (standard conditions) under a pressure of 0.3 to 0.4 mm. Hg, over pellets of $SnCl_4$ in a reaction vessel cooled in liquid air. The yield of SnH_4 was detd. by vaporizing the $SnCl_4$ and SnH_4 into aq. Ag_2SO_4, where Sn was detd. in the ppt. formed. Samples of $SnCl_4$ of about 1.5 g., treated for 1 hr., yielded 30–40 γ (as Sn) of SnH_4. Small amts. of CH_4 (0.1%) in the H raised the yields to 200–250 γ. Larger amts. of CH_4, up to 10%, did not increase the yield.

Wm. E. Trout, Jr.



Study of the action of atomic hydrogen on tin dichloride
V. M. Vdovenko (Leningrad State Univ.). *J. Gen. Chem.* (U.S.S.R.) 15, 681–6 (1945) (English summary).
As a result of the study of the action of at. H on anhyd. $SnCl_2$ in the silent discharge it was shown that the products are Sn, HCl, and SnH_4. Calcns. showed that up to 0.3% of at. H colliding with the membrane surface contg. $SnCl_2$ enters into the reaction. The results are given in tabular form.
G. M. Kosolapoff

A.S.M.-S.L.A. METALLURGICAL LITERATURE CLASSIFICATION



URANIUM AND URANIUM COMPOUNDS

4728

EFFECT OF WATER OF CRYSTALLIZATION ON THE FLUORESCENCE SPECTRUM OF URANYL NITRATE. PART I. A. N. Sevchenko, V. M. Vdovenko, and T. V. Kovaleva. Zhur. Eksptl'. i Teoret. Fiz. 21, 204-11(1951) Feb. (In Russian)

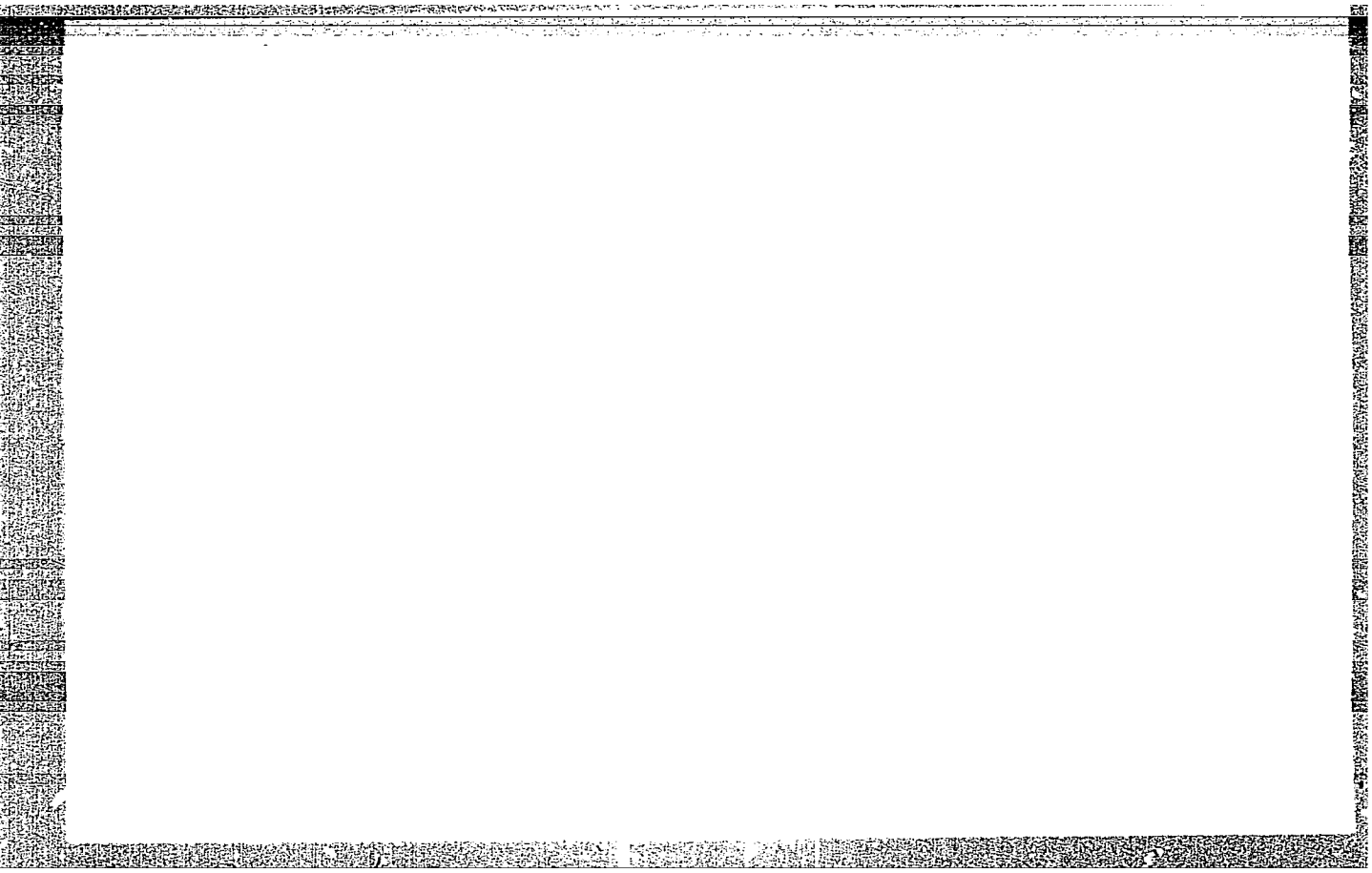
Observations were made on the fluorescence of uranyl nitrates containing 6, 3, 2, and 1 molecules of water of crystallization, as well as of the anhydrous salt. A summary of the results is given in Part II, Zhur. Eksptl'. i Teoret. Fiz. 21, 212(1951).

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

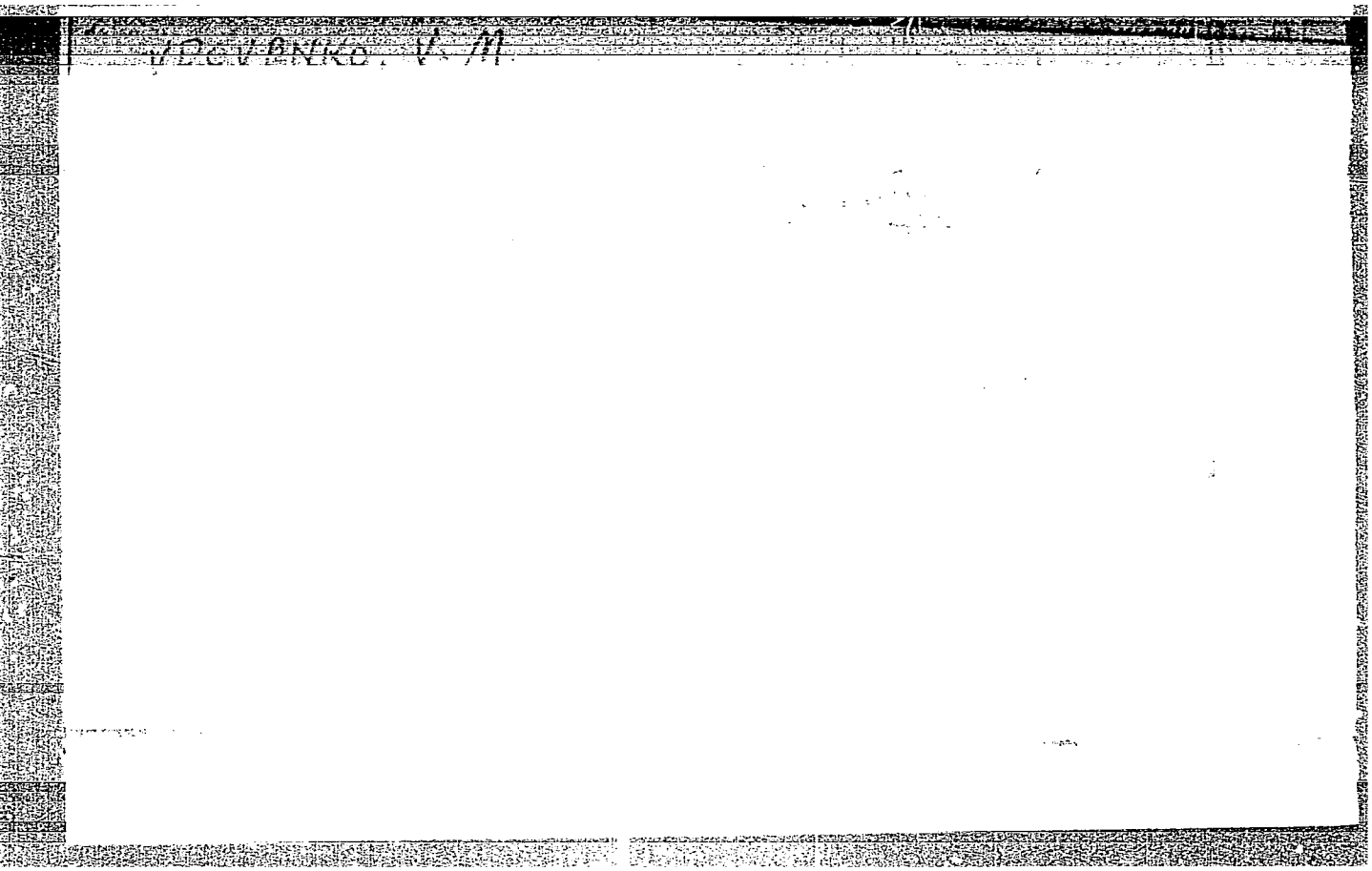
VDOVENKO, V.M.

Boris Aleksandrovich Nikitin; obituary. Usp.khim. 22 no.8:1030-1031 Ag '53. (MLRA 6:9)

(CA 48 no.2:414 '54) (Nikitin, Boris Aleksandrovich, 1906-1952)



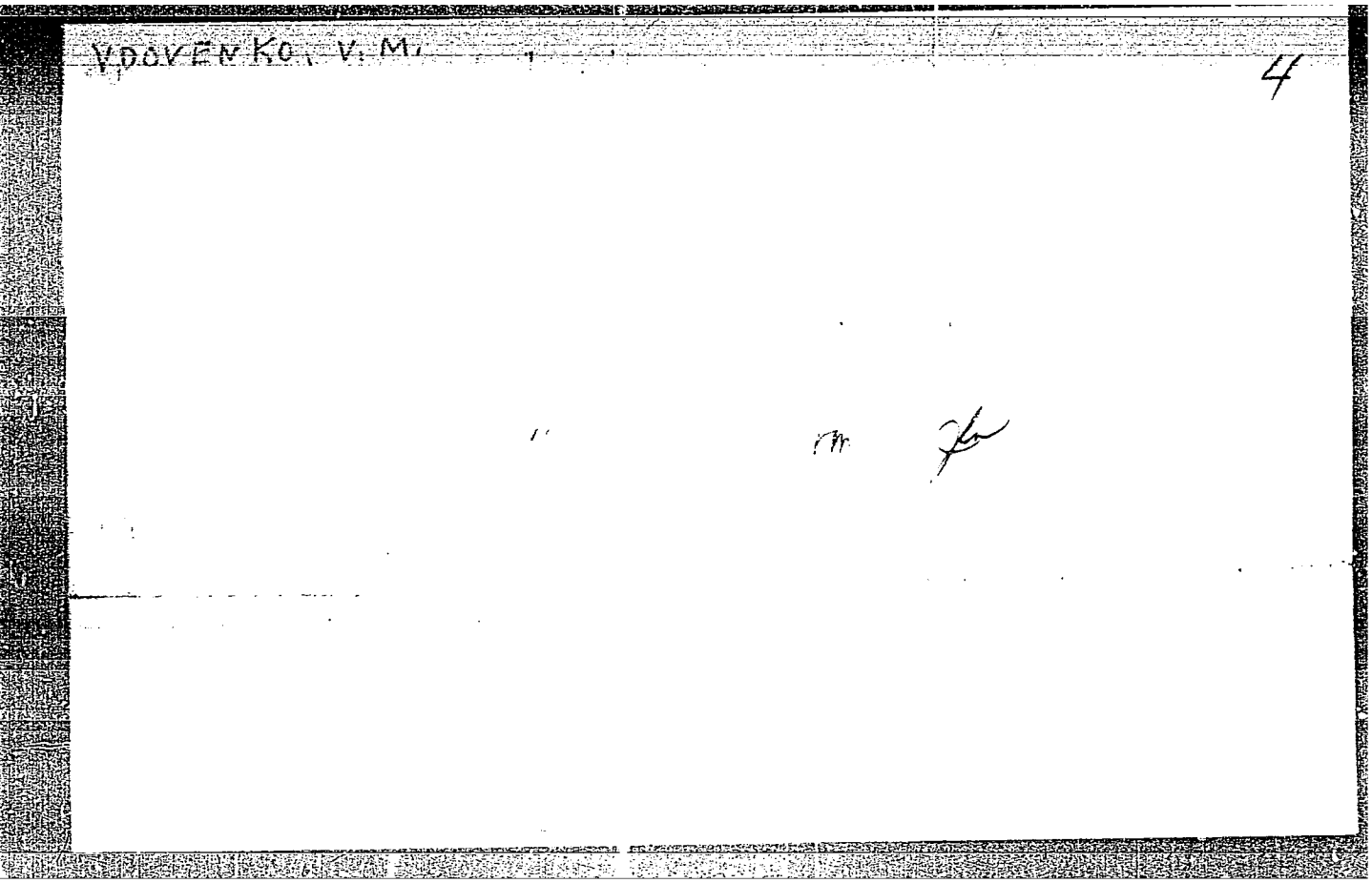
APPROVED FOR RELEASE: 08/31/2001 CIA-RDP86-00513R001859210014-0"



V. Dovenko, V. M.

VDOVENKO, V.M.; KOVAL'SKAYA, M.P.; KOVALEVA, T.V.

Uranyl nitrate complexes with diethyl ether. Zhur.neorg.khim. 2 no.7:1677-1681 Jl '57. (MIRA 10:11)
(Uranyl nitrate) (Ethyl ether) (Electrolytes)

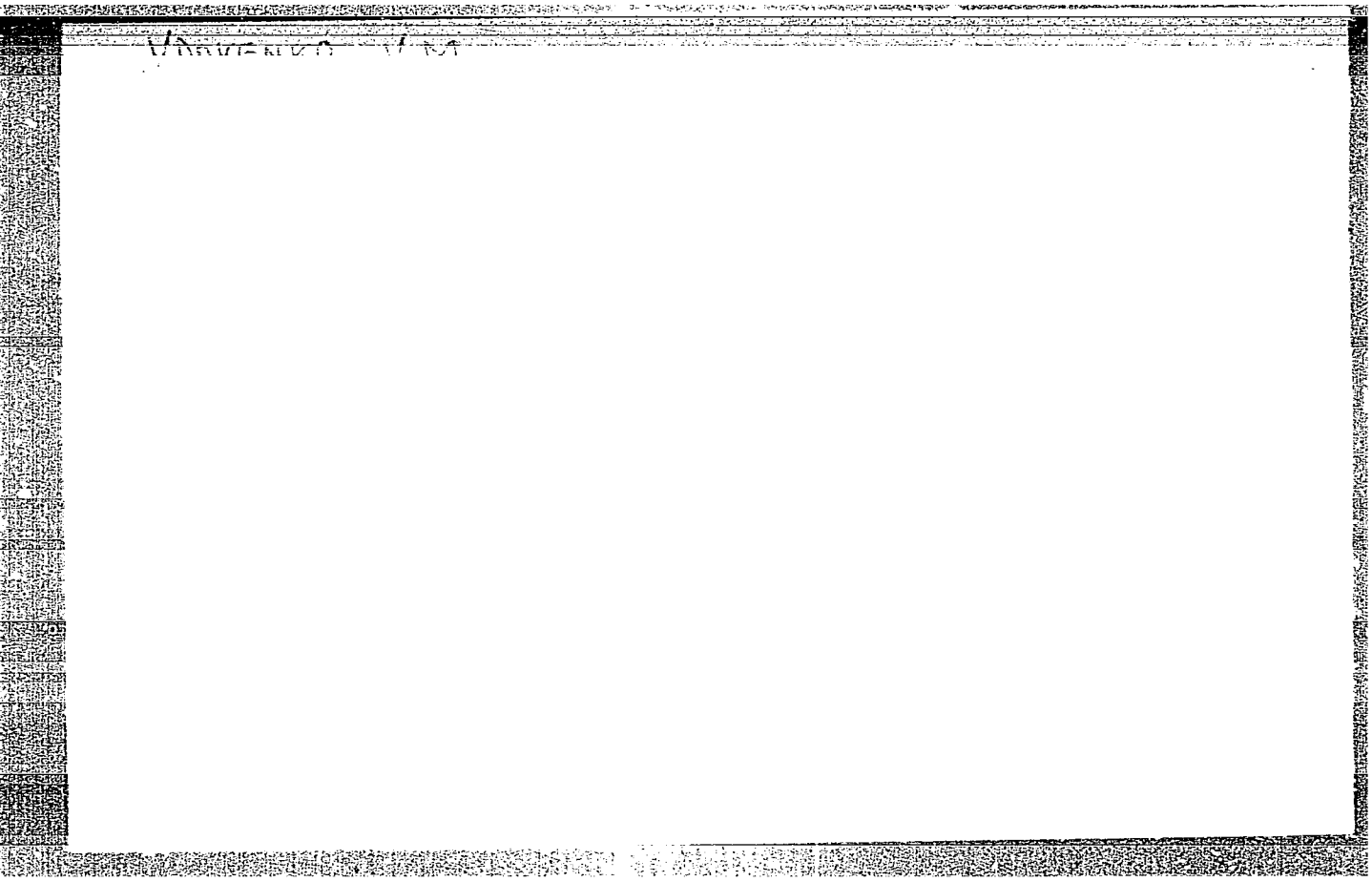


VDOVENKO, V.M.; DOBROTIN, R.B. (Leningrad)

D.I. Mendeleev and the problems of radioactivity. Vop.ist.est. i tekh. no.5:175-177 '57. (MIRA 11:2)
(Mendeleev, Dmitrii Ivanovich, 1834-1907)
(Radioactivity)

VDOVENKO, V.M.

In memory of Boris Aleksandrovich Nikitin. Trudy Radiev. inst. AN SSSR 6:12-16 '57. (MIRA 11:2)
(Nikitin, Boris Aleksandrovich, 1906-1952)



VDOVENKO, V. M.

AUTHOR: Vdovenko, V. M. 54-4-12/20

TITLE: The Use of Radioactive Methods in Analytical Chemistry (Primeneniye radioaktivnykh metodov v analiticheskoy khimiy)

PERIODICAL: Vestnik Leningradskogo Universiteta Seriya Fiziki i Khimii, 1957, Vol. 22, Nr 4, pp. 93-102 (USSR)

ABSTRACT: This lecture was held in Leningrad on occasion of a conference, which was dedicated to the "marked" atoms and their use at chemical investigations and to the manufacture control. It was organized by Chemical Society D.I. Mendeleyev and the chemical faculty of the Leningrad State University imeni A. A. Zhdanov, from October 30 to November 1, 1956.
The use of radioactive indicators in form of isotopes and so called "marked" atoms becomes more and more common in the analytical chemistry. Investigations on the solubility, precipitations, on substances difficult to seperate, on biochemical, medical, metallurgical and other problems, as well as on the natural radioactivity itself are carried out by means of radioactive methods. Isotopes with a too high activity ought not to be used, as the energy emitted by

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them might, change the composition of the system to be examined during the examination. The reactions, affected by radiations, belong to the field of research of the radiation-chemistry. The measurements by means of radioactivity are not too exact as compared with well elaborated analytical methods; the errors may amount up to some percents. The use of radioactive marked atoms in analytical chemistry has two great advantages. Firstly an enormous sensibility, which permits to work with smallest quantities. Secondly the possibility of an examination without separation, in some cases without having to destroy the sample to be examined. The methods of investigations actually at disposal of the analytic chemistry by aid of specific methods, which are based on radioactive transmutation, develop into three directions. The use and development of methods, which are based on the investigation of the natural radioactivity. The development of methods of the activated analysis. The use of the method of "marked" atoms (of radioactive indicators). Examples for these methods are cited and commented. The sensibility of the analytical methods with radioactive indicators depends upon the specific activity of the used indicator-combinations.

The Use of Radioactive Methods in Analytical Chemistry 54-4-12/20

The highest sensibility is reached at the use of carrier-free indicators. The problem of the isolation of radioactive indicators in the pure radiochemical state, i. e. without ana other radioactive element, is discussed. Upon the kind of the nuclear reaction depends the possibility and the kind of isolation of a radioactive isotope. The development of the separation methods of artificial isotopes is largely based on studies of many years of the natural radioactive elements in minimum concentrations. There are 21 references, all of which are Slavic.

SUBMITTED: June 1, 1957

AVAILABLE: Library of Congress

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"Extraction Processes and Their Significance in Obtaining and Purifying Radioactive Isotopes"

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

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

VDOVENKO, V. M.

"Separation of Uranium and Plutoonium From Fission Products by a Mixture of Dibutyl Ether and Carbon Tetrachloride,"

paper to be presented at 2nd UN Intl. Conference on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 1958.

VDOVENKO, V.

"Distribution of Fission Products in Ether Extraction Process."

paper to be presented at 2nd UN INtl. K Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13 Sep 58.

VDOVENKO, V.M.

78-1-27/43

AUTHOR: Vdovenko, V. M.

TITLE: The Extraction as a Method of Separation and Investigation of Radioactive Elements (Ekstraktsiya kak metod vydeleniya i izucheniya radioaktivnykh elementov)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 1, pp.145-154 (USSR)

ABSTRACT: The report gives a survey on the methods of extraction in radiochemistry; these methods are preferred on account of their selectivity and velocity especially for short-lived isotopes. For the purpose of extraction the elements must be converted into a form soluble in organic media, either in internal complexes with organic complex-formers, salts of organic acids, compounds of organic cations with anorganic anions, or in certain anorganic compounds, especially acid complexes. It is assumed that hereby the proton forms "oxonium"-cations in the organic solvent. The coefficient of distribution of the nitrates of a number of elements between water and diethyl-ether, water and methylethyl ketone is quoted from another

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The Extraction as a Method of Separation and Investigation of Radioactive Elements

report of the author (reference 29). The salting-out effect of uranyl nitrate by the addition of other nitrates is discussed by means of two diagrams (reference 31). The heat of solution of the various hydrates of uranyl nitrate in water and ether are given (references 33 and 34), an explanation of the differences is attempted. A table of all radioelements on the separation of which the extraction was used, concludes the report. There are 6 figures, 1 table, and 34 references, 12 of which are Slavic.

SUBMITTED: June 28, 1954

AVAILABLE: Library of Congress

VDOVENKO, V. M.

AUTHORS: Vdovenko, V. M., Lazarev, L. N. 78-1-28/43

TITLE: The Extraction of Uranium as Anilin-Uranyl-Triacetate (Ekstragirovaniye urana v vide anilinuraniltriatsetata).

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 1, pp. 155-159 (USSR).

ABSTRACT: After a brief survey of the methods of extraction of uranium, whereby especially amines are effective for uranyl-nitrate (references 1 to 3), the authors presume that not only compounds $RNH\left[UO_2(NO_3)_3\right]$ are capable of being extracted, but also analogous compounds in which the place of the nitrate-ions is occupied by any other anions. In this case the hexavalent uranium can be extracted by means of amines from solutions in which it forms anion-complexes. This assumption was examined by the authors with acetate-solutions in which, as is known, the complex $\left(UO_2(CH_3COO)_3\right)^-$ is formed (reference 4). Aniline was used both as complex-forming amine and simultaneously as organic solvent. The kind of dependence of the percentage of extraction of uranium on the relation $(CH_3COOH)/(UO_2^{2+})$ in the initial solution

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(figure 1) leads to the assumption that uranium is extracted as any type of acetate-compound. Various further facts indicate this, a. o. the spectroscopic difference of various concentrations of acetic acid (figure 2). The knowledge on the extraction of uranium with aniline furnishes no specific data on the form of the extracted compounds. The application of the method of continuous modifications (nepreryvnyye izmeneniya) show that a compound is formed in the acqueous solution in which 1 mol aniline corresponds to 1 mol uranium. The modifications of the spectra of acqueous solutions were investigated with a constant concentration of uranium (0,03 mol) - when various quantities of aniline were dissolved therein (figure 1) - for the purpose of determination of the composition of this complex compound. After various computations the authors found the formula $C_6H_5NH_3(UO_2(CH_3COO)_3)$. The data on the formation of aniline-uranyl-triacetate were confirmed in a preparatory way. The average results of analysis which agree satisfactorily with those for the aforesaid compound are given in table 2. The concerned compound is soluble both in aniline, as well as in several organic solvents (alcohols, ketones). It is insoluble in ether, chlorinated hydrocarbons and benzene. The solubility of aniline and the similarity of the spectrum of the acqueous solution (figure 2, IV) with that of the uranium extracted

The Extraction of Uranium as Anilin-Uranyl-Triacetate. 78-1-28/43

with aniline (figure 2, III) show that due to the formation of this compound, uranyl acetate in particular passes over into the organic phase during the extraction.
There are 4 figures, 2 tables, and 4 references, 1 of which is Slavic.

SUBMITTED: June 18, 1957.

AVAILABLE: Library of Congress.

Card 3/3

AUTHORS: Vdovenko, V. M., Suglobova, I. G. 78-3-6-19/30

TITLE: Investigations on the System of Uranyl Nitrate-Water-Dibutyl-Ether Solubility of the Isotherms at 25°C (Issledovaniye sistemy uranilnitrat-voda-dibutilovyy efir. Izoterma rastvorimosti pri 25°)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 6, pp. 1403-1409 (USSR)

ABSTRACT: The solubility of the isotherms in the uranyl-nitrate-water-n-dibutyl-ether-system was determined in the present report for the purpose of investigating the character of the interaction between uranyl nitrate with organic solvents and the function of water. The degree of hydration of uranyl hydrate in the organic phase of the solvent as well as the angle of the concentrations of the triangle with a low water-content were especially taken into account. The degree of hydration of uranyl nitrate in the ether-layer in the sphere a of the triangle is determined by the tangent-angle.
The high degree of solubility of uranyl nitrate by dibutyl-ether according to an increase in the water content may be

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explained by the possible entry of water into the coordination-sphere of uranyl.
The high degree of solubility of uranyl nitrate in ether in the presence of 2 mol water shows that the aquidation of uranyl exercises a positive effect on the extractability of uranyl in ether. The water molecules which enter the coordination-sphere of uranyl-nitrate are considerably deformed and show acid properties.
The low degree of solubility of anhydrous uranyl nitrate in ether indicates the positive action of the water molecule bound with respect to coordinates on the extraction.
There are 5 figures, 2 tables, and 15 references, 4 of which are Soviet.

SUBMITTED: April 4, 1957

AVAILABLE: Library of Congress

Card 2/2 1. Isotherms 2. Uranyl nitrate--Chemical reactions 3. Dibutyl ether--Chemical reactions 4. Uranyl nitrate--Solubility

AUTHORS: Vdovenko, V.M., Suglobova, I.G.

SOV/ 78-3-7-18/44

TITLE: Determination of the Heat of Solution of Uranyl Nitrate Hydrates in Diethyl- and Dibutyl-Ether (Opredeleniye teplot rastvoreniya gidratov uranilnitrata v dietilovom i dibutilovom efirakh)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 7, pp 1573-1577 (USSR)

ABSTRACT: The heat of solution of dihydrate and hexanitrate of uranyl nitrate in dibutyl- and diethyl-ether within the range of concentration 0.002-0.02 mol/mol solvent was calculated. A specially constructed microcalorimeter was used for these investigations. The accuracy of all calorimetric investigations is 1 - 1.5%. In diethyl ether the heat of solution is more exothermic than in dibutyl ether, which corresponds to the basic character of dibutyl ether. The heat of solution of uranyl nitrate dihydrate does not depend on the concentration of the salt in the interval of the investigated concentration, but the heat of solution of uranylnitrate hydrate, and especially of uranylnitrate hexahydrate, increases with an increase of the concentration of the salt.

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Determination of the Heat of Solution of Uranyl Nitrate Hydrates in Diethyl- and Dibutyl-Ether SOV/78-3-7-18/44

Variation of the heat of solution with the concentration of the salt of uranylnitratetrihydrate and uranylnitratehexahydrate is due to the degree of solvation of the dissolved salt. There are 3 figures, 3 tables, and 14 references, 7 of which are Soviet.

SUBMITTED: June 1, 1957

1. Uranyl nitrate hydrates--Heat of solution 2. Butyl ethers --Chemical reactions 3. Ethyl ethers--Chemical reactions 4. Calorimeters--Applications

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VDOVENKO, V.M.; KOVAL'SKAYA, M.P.; GERBANEVSKAYA, M.M.

Determining the solubility of the uranyl nitrate in diethyl ether. Report No.1. Trudy Radiev.inst.AN SSSR. 8:8-16 '58. (MIRA 12:2)

(Uranyl nitrate) (Ethyl ether)

VDOVENKO, V.M.; KOVALEVA, T.V.; MOSKAL'KOVA, E.A.

Determining the solubility of the uranyl nitrate in diethyl ether. Report No.2. Trudy Radiev.inst.AN SSSR. 8:17-21 '58. (MIRA 12:2)

(Uranyl nitrate) (Ethyl ether)

VDOVENKO, V.M.; KOVALEVA, T.V.

Determining the solubility of the uranyl nitrate in diethyl ether. Report No.3. Trudy Radiev.inst.AN SSSR. 8:22-24 '58. (MIRA 12:2)

(Uranyl nitrate) (Ethyl ether)

VDOVENKO, V.M.; MAL'TSEVA, L.A.

Heats of solution of uranyl nitrate hydrate crystals in water and in diethyl ether. Trudy Radiev.inst.AN SSSR. 8:25-29 '58. (MIRA 12:2)

(Uranyl nitrate) (Heat of solution) (Ethyl ether)

VDOVENKO, V.M.; ZEMLYANUKHIN, V.I.

Ratio of the quantitative distribution of uranyl nitrate and water in ether solutions saturated with water. Trudy Radiev. inst.AN SSSR. 8:30-37 '58. (MIRA 12:2)
(Uranyl nitrate) (Ethyl ether)

VDOVENKO, V.M.; KOVALEVA, T.V.; VERIGINA, I.G.

Electric conductivity of ether solutions of the uranyl nitrate.
Trudy Radiev.inst.AN SSSR. 8:38-46 '58. (MIRA 12:2)
(Uranyl nitrate) (Electric conductivity)

VDOVENKO, V.M.; KOVALEVA, T.V.

Study of binary systems of sulfuryl chloride with chlorine derivatives of hydrocarbons. Zhur. prikl. khim. 31 no.1:89-105 Ja '58. (MIRA 11:4)
(Chlorides) (Sulfur chloride) (Thermochemistry)

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. Mazel'.

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

COVERAGE: The book contains 26 separate studies concerning various aspects of the chemistry of certain radioactive elements and the processes of radiation effect on matter. These reports discuss present-day methods of reprocessing irradiated nuclear fuel, research in the chemistry of mercury, thorium, uranium, plutonium, and americium, problems related to the sorption and bury-

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Reports of Soviet (Cont.) SOV/5084

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. Contributors to individual investigations are mentioned in annotations to the Table of Contents.

TABLE OF CONTENTS:

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VDOVENKO, V.M.; SMIRNOVA, Ye.A.

Hydration of uranyl nitrate in a series of esters and ethers.
Radiokhimiia 1 no.1:36-42 '59. (MIRA 12:4)
(Hydration) (Uranyl nitrate)

VDOVENKO, V.M.; SMIRNOVA, Ye.A.

Distribution of uranyl nitrate between aqueous solutions and a series of ethers and esters. Radiokhimiia 1 no.1:43-51 '59.
(MIRA 12:4)

(Uranyl nitrate) (Systems (Chemistry))

VDOVENKO, V.M.; SOKOLOV, A.P.

Dissociation pressure of crystalline hydrates of uranyl nitrate.
Radiokhimiia 1 no.2:117-120 '59. (MIRA 12:8)
(Uranyl nitrate) (Dissociation)

VDOVENKO, V.M.; LAZAREV, L.N.; KHVOROSTIN, Ya.S.

Method of removing Nb^{95} from the radioactive indicator, Zr^{95}. Radiokhimiia 1 no.3:364 '59. (MIRA 12:10)
(Zirconium--Isotopes) (Niobium--Isotopes)

VDOVENKO, V.M.; BELOV, L.M.; CHAYKHORSKIY, A.A.

Complex formation in nonaqueous solutions. Radiokhimiia 1 no.4: 439-444 '59. (MIRA 13:1)
(Complex compounds)

VDOVENKO, V.M.; LAZAREV, L.N.; KHVOROSTIN, Ya.S.

Mechanism of zirconium extraction by amines from nitrate-oxalate solutions. Radiokhimiia 1 no.4:408-413 '59. (MIRA 13:1)
(Zirconium) (Amines)

VDOVENKO, V.M.; ALEKSEYEVA, N.A.

Partition of nitric acid between aqueous solutions and diethylene glycol dibutyl ether. Radiokhimiia 1 no.4:450-453 '59. (MIRA 13:1)

(Nitric acid) (ether)

VDOVENKO, V.M.; KRIVOKHATSKIY, A.S.

Extraction of nitric acid with dibutyl ether. Radiokhimiia 1 no.4:454-457 '59. (MIRA 13:1)
(Nitric acid) (Ether)

VDOVENKO, V.M.; SMIRNOVA, Ye.A.

Hydration of uranyl nitrate in solvent-extraction agent mixtures. (MIRA 13:2)
Radiokhimiia 1 no.5:521-529 '59.
(Uranyl nitrate) (Extraction (Chemistry))

VDOVENKO, V.M.; SUGLOBOVA, I.G.; SUGLOBOV, D.N.

Solubility of uranyl nitrate in organic solvents. Radiokhimiia 1 no.6:637-644 '59. (MIRA 13:4)
(Uranyl nitrate)

5(0) SOV/63-4-2-14/39

AUTHORS: Vdovenko, V.M., Corresponding Member of the AS USSR, Lazarev, L.N.

TITLE: The Extraction Method of Element Separation in Analytic Chemistry

PERIODICAL: Khimicheskaya nauka i promyshlennost', 1959, Vol 4, Nr 2, pp 230-234 (USSR)

ABSTRACT: Extraction permits the separation of any element from mixtures. The extracted elements are soluble in organic reagents, like cupferon [Ref 8, 9], 8-oxyquinoline [Ref 12-13], etc, but not in water. The salts of complex cations with organic additions can be extracted as well as inorganic cations in the form of salts of organic acids with a large hydrocarbon part in the molecule. A special group are acidocomplex compounds which are soluble in organic media. The high selectivity of the extraction method is based on a proper acidity of the aqueous solution. Acidocomplex compounds need a high concentration of acid. The acid employed is also very important. Ga is well extracted from HCl, but not from HI; In is well extracted from HI, but not from HCl. Coextraction is the extraction of more than one element by a single process. This is a drawback in many cases, e.g. in the extraction of uranium in the form of a trinitrate complex.

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Coextraction may be used, however, for extracting small quantities which would not be extracted without the presence of another element, e.g. the extraction of ruthenium in the presence of copper by a mixture of benzene and butyric acid [Ref 30]. Metals are extracted by means of alkylamines, e.g. niobium and tantalum by methyldioctylamines [Ref 34]. Uranium is separated from thorium, rare earths, etc, by extraction from sulfuric acid solution using organic solutions of tertiary amines as extraction agents [Ref 36]. Separation of thorium, uranium and transuranium elements is obtained by extraction from nitric acid solutions with tributylphosphate [Ref 38]. The oxides of trialkylphosphines have the best extraction properties among phosphorus-organic compounds [Ref 43, 44]. Alkali metals are extracted by nitromethane, -benzene and diethylether [Ref 45]. Many colored compounds may be concentrated by extraction, e.g. iron by rhodanide [Ref 47]. Radiometric titration, i.e. the use of labeled atoms, is also possible

The Extraction Method of Element Separation in Analytic Chemistry

with the help of extraction [Ref 50]. Sendel, Babko and Pilipenko investigated extraction in photometry [Ref 11, 57].
There are 4 graphs, 1 table and 57 references, 27 of which are Soviet, 23 English, 5 German, 1 American and 1 Swedish.

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SOV/78-4-4-25/44

5(2), 21(7)

AUTHORS: Vdovenko, V. M., Lipovskiy, A. A., Nikitina, S. A.

TITLE: On the Formation of Chloride Complex Uranyl Compounds in Acetone (Ob obrazovanii khloridnykh kompleksnykh soyedineniy uranila v atsetone)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 4, pp 862-865 (USSR)

ABSTRACT: The formation of complex compounds of the uranyl ion in acetone with hydrochloric pyridine and hydroxylamine as Cl^- donors was investigated by the spectrophotometric method. The authors plotted the absorption spectra of the solutions and the dependence of the molar extinction coefficient on the concentration of the complex-forming substance for various wavelengths (Fig 1). Uranyl perchlorate hexahydrate was applied as an initial compound. With a ratio of the components $UO_2(ClO_4)_2 : C_5H_5N.HCl = 1$ the complex UO_2Cl_2 is formed. With increasing concentration of hydrochloric pyridine or, more precisely, hydroxylamine also the complex formation is intensified. The complex $UO_2Cl_3^-$ is herein formed with hydrochloric

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On the Formation of Chloride Comple. Uranyl Compounds in Acetone

hydroxylamine. The absorption spectra of $UO_2(ClO_4)_2 \cdot 6H_2O$ and those of the chloride complex compounds of the uranyl ion in acetone are represented in figure 4. With the action of the uranyl chloride complex UO_2Cl_2 on hydrochloric pyridine a new compound is produced: $(C_5H_5NH)_2UO_2Cl_4$. The compound is insoluble in diethyl ether, cyclohexanone, tributyl phosphate, pyridine, benzene, and carbon tetrachloride. There are 4 figures and 7 references, 2 of which are Soviet.

SUBMITTED: January 17, 1958

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5(2) SOV/78-4-10-31/40

AUTHORS: Vdovenko, V. M., Suglobov, D. N., Skoblo, A. I.

TITLE: Mutual Solubility in the System HNO_3 - H_2O - n.Dibutyl Ether at 25°

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 10, pp 2376 - 2379 (USSR)

ABSTRACT: The papers hitherto available on the distribution of nitric acid between water and organic solvents (Refs 1-4) contain no data on the question, how much water passes over into the organic solvent together with the acid. In order to clarify whether such solvents extract not only the acid but also acid hydrates, the system mentioned in the title was investigated. The results are summarized in table 1 and figure 1. With increasing concentration of the acid in the aqueous phase both its concentration and that of water increases in the organic phase. As figure 2 shows, each acid molecule takes along 0.6 up to 0.15 molecules water of hydration according to the concentration. At acid concentrations in the ether above 35% a distinct oxydation of the ether occurs so that the isotherms for such high concentrations were not recorded. The distribution of

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Mutual Solubility in the System HNO_3 - H_2O - n.Dibutyl SOV/78-4-1o-31/4o
Ether at 25°

nitric acid between water and ether is illustrated in figure 3 in the coordinate system

log $m\gamma_0^{\frac{1}{2}}a_w$, log m_E (m = concentration of the acid in water, m_E= concentration of the acid in ether, γ_0 = activity coefficient of the ions H^+ and NO_3^-, a_w= activity of water in the aqueous solution, h= hydration of the acid in ether). At an acid concentration of more than 0.5% in the ether a deviation from Raoult's law can be observed. The negative deviation as it is characteristic of uranyl nitrate solutions in organic solvent, is preceded by a short period of positive deviation which is due to considerable interaction of the acid dipoles in the ethereal solution and indicates an association of acid molecules with the ether. There are 3 figures, 1 table, and 12 references, 3 of which are Soviet.

SUBMITTED: June 2, 1958

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05864

5(2) SOV/78-4-11-17/50

AUTHORS: Vdovenko, V.M., Lipovskiy, A.A. Kuzina, M.G.

TITLE: The Distribution of Cs, Ca, Sr and La Among Aqueous Solution and Methyl-butyl Ketone in the Presence of Uranium

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 11, pp. 2502-2504 (USSR)

ABSTRACT: Uranium may be easily separated from elements of group I, II and III of the periodic system by means of the methyl-butyl ketone (MBK) in which the nitrates of these elements are unsoluble. As uranium is, under certain conditions, extracted also as $HUO_2(NO_3)_3$ (Ref 3), it is possible that Cs, Ca, Sr and La are included in the extraction in the form of the corresponding salts. The authors therefore investigated the distribution of Cs^{137}, Ca^{45}, Sr^{89}, Sr^{90} and La^{140} among the aqueous solution of nitrates and MBK in dependence on the uranyl-nitrate concentration. The latter was varied from 0.1 - 0.5 mole, the concentration of the nitrate ions was kept stable by a corresponding addition of $Ca(NO_3)_2$, and hydrolysis of the uranium salt could be prevented by the

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addition of 0.1n HNO_3. Table 1 demonstrates the influence exercised by the uranyl nitrate upon the distribution of Cs, Sr and La. Table 2 shows the same for Ca, the latter being determined radiometrically and gravimetrically. With rising concentration of $UO_2(NO_3)_2$ an increasing amount of Cs, Ca, Sr and La is carried away by MBK in the form of the salts $MUO_2(NO_3)_3$, the existence of which was proved by the absorption spectrum (Fig 1). There are 1 figure, 2 tables, and 5 references, 2 of which are Soviet.

SUBMITTED: July 2, 1958

VDovenko, V.M.

Ginzburg, F.L.

21 (0), 5 (0)

AUTHOR: Shchebetkovskiy, V. N. SOV/89-7-2-17/24

TITLE: All-Union Symposium on Radiochemistry (Vsesoyuznyy simpozium po radiokhimii)

PERIODICAL: Atomnaya energiya, 1959, Vol 7, Nr 2, pp 175-176 (USSR)

ABSTRACT: A symposium was held in Leningrad from 3 to 5 March 1959. More than 200 participants from different institutes in Moscow, Leningrad, Kiyev, Novosibirsk, Tbilisi and Gor'kiy attended it. Twentyeight papers were read. The following are mentioned: I. Ye. Starik: On the problem of the molecular state of micromasses of radioactive elements in solutions: I. Ye. Starik, N. I. Ampelogova, F. L. Ginzburg, L. I. Il'menkova, I. A. Skul'skiy, L. D. Sheydin: Condition of radioactive elements occurring in microconcentrations of solutions (Zr, Am, Pa, Po). M. N. Yakovleva, M. A. Shurshalina: Application of the dialysis method for examination of uranium carriers in natural bodies of water: V. I. Paramonova, Ye. F. Latysheva, Complex formation of the multivalent ruthenium with chlorine ions. K. B. Zaborenko, A. Y. Zaval'skaya, V. V. Fomin: Determination of the composition and the instability constants by ion exchange of the cerium oxalate complexes. A. I. Loskvin: Complex formation of plutonium and americium with the anions of

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ethylene diamine tetra acetic acid (EDTA) and oxalic and phosphoric acid. A. M. Trofimov, L. N. Stepanova: A new method for the determination of ion charges of radioactive elements in solutions by application of ion exchanging resins of different swelling capacities. N. B. Vysokoostrovskaya, A. M. Trofimov, B. N. Nikol'skiy: Confirmation of the non-existence of complex formation between potassium and EDTA by application of the ion exchange and the potentiometric methods. V. M. Vdovenko, Ye. A. Smirnova: Determination of the conditions of compounds to be extracted in the organic phase (hydration of uranyl nitrate with ester). V. M. Vdovenko, N. P. Aleksayeva: Degree of hydration of nitric acid in dibutyl ether of the diethylene glycol. V. M. Vdovenko, A. S. Krivokhatskiy: Degree of solvation of the nitric acid in the dibutyl ether of the diethylene glycol. A. K. Lavrukhina: Determination of the dependency of the distribution coefficients between the organic and the watery phases in order to determine the condition of the substance in the solution and to fixate the concentration range at which complex formation starts. V. I. Kuznetsov, P. D. ...ov lectured on extraction of hexavalent tungsten with aniline from hydrochloric media. An. N. Nesmeyanov on substitution of hydrogen in benzol by the recoil

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atoms P^{32}, As^{76} and Sb^{124}. B. G. Dzantiyev lectured on the recoil atoms from the reactions of $Li^6(n,\alpha)T$, $N^{14}(n,p)C^{14}$ in a medium of cyclic hydrocarbons. ... lectured on the influence of the NO_3 and H^+ ions on the reduction velocity of hexavalent plutonium under the influence of its own α-radiation. In the course of thorough discussions it was established that the comprehension of the condition of radioactive elements in solution are of eminent importance for the whole range of radio chemistry. More studies have to be made in this field as were made before. A better coordination of all the institutes which are occupied with this problem will yield good results in the future.

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5(4),24(3)

AUTHORS: Vdovenko, V. M., Corresponding Member AS USSR, Shcherbakov, V. A.

SOV/20-127-1-34/65

TITLE: Paramagnetism of Radioactive Solutions (Paramagnetizm radioaktivnykh rastvorov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 127, Nr 1, pp 127-130 (USSR)

ABSTRACT: The present investigation deals with the magnetic properties of aqueous solutions that were either irradiated by radioactive isotopes dissolved therein or from outside by a β,γ-radiation source; furthermore, an investigation was made of the influence exerted by these magnetic properties on the time T_1, the spin lattice relaxation of the water protons. The time T_1 which is required to bring about the thermodynamic equilibrium between the spin system of the protons and the "lattice" - represented by the solution in the present case - may serve as a measuring value for the signal intensity of the magnetic nuclear resonance (Ref 2). Provisional results obtained are given. The relaxation was measured with a somewhat modified spectrometer devised by

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R. V. Pound and W. D. Knight (Ref 3); the signals were recorded by an oscillograph. The magnetic field was generated by a permanent magnet. The measuring method applied was the same as the one described by A. I. Rivkind (Refs 5, 6). The outer radiation source was given by $Eu^{152, 154}$. The following was investigated: $Na^{24}Cl$ in 10% H_2SO_4, 1-n $H_2S^{35}O_4$, $Sr^{89}(NO_3)_2$ in 1-n H_2SO_4, $Zr^{95}(C_2O_4)_2$ in 1% $H_2C_2O_4$, $Cd^{115}Cl_2$ in 0.2-n HCl and 0.5-n $HClO_4$ irradiated with $Eu^{152,154}$. Experimental results are summarized in table 1. The measure of the decrease of T_1 was given by the ratio of the signals A of the radioactive solution to the signals A_{st} of a non-radioactive standard solution of equal composition and concentration. An increase of A/A_{st} in the presence of radioactive substances may be observed from table 1. Figure 1 shows an oscillogram,

figure 2 the dependence A/A_{st} on the time and on the dosage, as well as the dosage increase in dependence of time. In each case involving solved isotopes, a slow dropping was observed after a marked rise of A/A_{st}, in spite of a persisting action of the dosage. Dilution caused at first a corresponding drop, later on, however, a rise of A/A_{st} up to the value that had been measured before dilution. In the case of solutions irradiated from outside, on the other hand, A/A_{st} remained constant (Fig 3). On the strength of the relation derived by Kozyrev and Rivkind (Ref 5), the paramagnetic concentration was measured, and it was found for solutions with S^{35} and Zr^{95} to be in the range of from 10^{-4} to 10^{-2} mol, and for solutions irradiated with europium in the range of 10^{-6}. The decrease of T_1 may be caused partly by stable paramagnetic particles, and partly by radicals formed in consequence of radiolysis of water and the solution components. On the basis of

J. L. Magee's work (Ref 11) the concentration of HO and HO_2 was found to be of $6.4.10^{-4}$ mol and $1.5.10^{-3}$ mol respectively. There are 3 figures, 1 table, and 11 references, 5 of which are Soviet.

ASSOCIATION: Radiyevyy institut im. V. G. Khlopina Akademii nauk SSSR (Radium Institute imeni V. G. Khlopin of the Academy of Sciences, USSR)

SUBMITTED: January 21, 1959

VDOVENKO, V.M

PHASE I BOOK EXPLOITATION SOV/5151

Leningrad. Universitet

Molekulyarnaya spektroskopiya (Molecular Spectroscopy) [Leningrad] Izd-vo Leningr. univ., 1960. 198 p. 4,700 copies printed.

Resp. Ed.: P. I. Skripov; Eds.: Ye. V. Shchemeleva and V. D. Piastro; Tech. Ed.: S. D. Vodolagina.

PURPOSE: This collection of articles is intended for scientific workers, instructors and students of physics and chemistry. It may also be used by engineers and technicians employing molecular spectroscopy.

COVERAGE: The collection of articles describes spectroscopic studies of liquids and solutions, and includes data on applied molecular spectroscopy. Individual articles deal with the molecular interaction in solutions, and specifically with the hydrogen bond problem. Works on the optimum utilization of spectral apparatus and on the analytical application of molecular spectroscopy are also included.

Aspects of the structure of high and low molecular compounds and of molecular complexes are also covered. The collection was published in honor of the 70th birthday of Professor Vladimir Mikhaylovich Chulanovskiy, Soviet specialist in molecular spectroscopy and spectral analysis. There are no references.

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PHASE I BOOK EXPLOITATION SOV/4635

Vdovenko, Viktor Mikhaylovich

Khimiya urana i transuranovykh elementov (The Chemistry of Uranium and Transuranium Elements) Moscow, Izd-vo AN SSSR, 1960. 700 p. Errata slip inserted. 5,000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Radiyevyy institut.

Ed. of Publishing House: S.S. Tolkachev; Tech. Ed.: R.A. Zamarayeva.

PURPOSE: This book is intended for research chemists and industrial engineers, and may be used as a textbook by teachers, aspirants, and students.

COVERAGE: The textbook gives basic information on the chemical and physicochemical properties of uranium and transuranium elements, and discusses the preparation and properties of the more important compounds of these elements. The underlying principles of the chemistry of nuclear fuels and problems in the radiochemical separation and purification of transuranium elements from fission products are discussed. Typical flow sheets of irradiated nuclear fuel purification processes based on precipitation, extraction and ion-exchange are given. Prospects in anhydrous purification are also reviewed. Section 7 of Chapter

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S/081/61/000/016/001/040
B118/B101

5 3610

AUTHORS: Vdovenko, V. M., Suglobov, D. N.

TITLE: Study of the complex formation of uranyl nitrate in organic solutions with the aid of infrared absorption spectra

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 16, 1961, 16-17, abstract 16Б89 (Sb. "Molekulyarn. spektroskopiya". L., Leningr. un-t, 1960, 145-152)

TEXT: The authors studied the infrared absorption spectra of the solutions $UO_2(NO_3)_2 \cdot 2H_2O$ and $UO_2(NO_3)_2 \cdot 2HDO$ in organic solvents (ethyl ether, β,β'-dichloroethyl ether, di-n-propyl sulfide, acetonitrile, nitromethane, diisoamyl ether, di-n-butyl ether, diethyl carbonate, methylethyl ketone, hexamethyl acetone, ethyl ester of butyric acid) at different water contents of the solutions. The following conclusions were made on the basis of a reduction of stretching and deformation frequencies of H_2O in coordination with UO_2^{2+} and on the basis of the intensity increase of the

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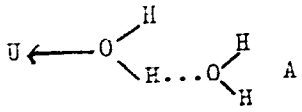
corresponding absorption bands and the dependence of the frequencies on the basicity of the solvent: (1) the coordinated H_2O is strongly polarized in the field of the uranium ion (2) A hydrogen bond is formed between the polarized water and the molecules of an organic basic solvent, which is more stable than the bond between the molecules of the solvent and the free water. (3) In the solutions of $UO_2(NO_3)_2$ in organic solvents only 2 H_2O molecules may add to UO_2^{2+}. With excess water a second hydrate layer is formed in the solutions whith the water molecules of the second hydrate layer being apparently bound to the water of the first hydrate layer according to A:



A

In the coordination of the ketones with UO_2^{2+} the frequency of the stretching vibrations of CO decreases by ~40-50 cm^{-1}. In the coordination

Study of the complex formation of ...

of the esters, the frequencies of CO analogously decrease to ~90-100cm^{-1}. This decrease indicates that the ester molecules add to UO_2^{2+} via the carbonyl atom O. In the anhydrous organic solvents the nitrate groups are connected with UO_2^{2+} so that $UO_2(NO_3)_2 \cdot 2L$ is neutral. L = the molecule of the ligand. When adding water the nitrate groups are displaced into the outer sphere by the water molecules. Complete ionization takes place at a water concentration of ~60 mole%. On the basis of the data obtained and the coordination number 8 of the U atom, the authors conclude that the nitrate groups appear as bidentate ligands with both nitrate groups being apparently in trans-position (absence of resonance splitting of ν_4 of the nitrate group). [Abstracter's note: Complete translation.]

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VDOVENKO, V.M.; SHCHERBAKOV, V.A.

Proton relaxation in aqueous solutions of diamagnetic salts. Part 1: Solutions of nitrates of elements in group II of the periodic table. Zhur. strukt. khim. 1 no.1:28-35 My-Je '60. (MIRA 13:8)

1. Radiyevyy institut imeni V.G. Khlopina AN SSSR, Leningrad.
(Nitrates) (Diamagnetism) (Protons)

VDOVENKO, V.M.; SHCHEBAKOV, V.A.

Proton relaxation in aqueous solutions of diamagnetic salts. Part 2: Cations of alkali metals and halide anions. Zhur. strukt. khim. 1 no.1:122-124 My-Je '60. (MIRA 13:8)

1. Radiyevyy institut imeni V.G. Khlopina AN SSSR, Leningrad.
(Protons) (Alkali metals) (Halides)

VDOVENKO, V.M.; SHCHERVAKOV, V.A.

Proton relaxation in aqueous solutions of diamagnetic salts. Effect of polarization paramagnetism. Zhur. struk. khim. 1 no.2:268-269 Jl-Ag '60. (MIRA 13:9)

1. Radiyevyy institut im. V.G. Khlopina AN SSSR, Leningrad.
(Protons) (Diamagnetism)
(Uranyl compounds—Magnetic properties)

VDOVENKO, V.M.; SHCHERBAKOV, V.A.

Proton relaxation in aqueous solutions of diamagnetic salts. Part 4: Role of the ionic structure. Zhur. strukt. khim. 1 no. 4:500-501 N-D '60. (MIRA 14:2)

1. Radiyevyy institut AN SSSR imeni V.G. Khlopina, Leningrad.
(Complex ions) (Protons)

22455
S/186/60/002/001/005/022
A057/A129

21.3100

AUTHORS: Vdovenko, V.M.; Stroganov, Ye.V.; Sokolov, A.P.; Zandin, V.N.
Deceased

TITLE: The structure of the hexahydrate of uranyl nitrate

PERIODICAL: Radiokhimiya, v. 2, no. 1, 1960, 24 - 31

TEXT: Using the method of Fourier series the authors determined the position of the uranium particles in the crystal of uranyl nitrate hexahydrate from x-ray data and suggest a model of the crystal structure. This structure is important for extraction of uranyl complexes, because crystal solvates are very similar to solvated ions [Ref. 1: Ye. V. Stroganov, S.N. Andreyev, N.I. Kozhina, Vest. LGU, 10, 2, 109 (1958)]. On the other hand structural data are of interest for the classification of this important group of complexes, and until the beginning of the present investigations the structure of uranyl nitrate hexahydrate was not determined. L. Pauling and R.G. Dickinson [Ref. 4: J. Am. Chem. Soc., 46, 1615 (1924)] assumed space-group symmetry D_{2h}^{17} - Cmcm with uranium in position (c), and y = 0.130. Making allowance for the principle developed by R. Kern et al. [Ref. 6: Bull. Soc. fr. min. et crist., 81, 4, 103 (1958)] the present au-

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The structure of the hexahydrate of uranyl nitrate

thors determined a space-group C_{2v}^{12} - Cmc (y = 0.130, z = 0) with a quadruple regulated system of positions (a) for the uranium particles. The same space-group was discovered already in 1957 by K. Sasvári [Ref. 7: Acta Geologica Acad. Sci. Hung., 4, 3, 467 (1957)] by means of a piezoelectric effect. In the present experiments yellow-green uranyl nitrate hexahydrate crystals were used with the crystal form presented in Figure 1. The x-ray diffraction data were obtained from Laue or Weissenburg diffraction patterns and oscillation photographs. The structural data correspond to those obtained by Sasvári (see Table 1). By preparing the diffraction patterns using Fourier series and calculating the electron density, coordinates for all particles were determined. From the obtained values a projection of electron-density in the planes XY and XZ was plotted (Fig. 4). Uranium particles have a 7,000 maximum (see Fig. 4), while the 1,500 maxima correspond to the water molecules, and the 1,800 maxima (in XZ plane) are due to oxygen of the uranyl group. From the difference between the Fourier series and electron density projections (Fig. 4c) the accurate distance between the uranium particle and oxygen (in the uranyl group) was determined as 1.90 ± 0.13 Å. The maxima ~500 (Fig. 4c) and ~1,000 (Fig. 4a) correspond to the oxygen of the NO_3^- groups. The approximate coordinates are given in Table 2. The present results indicate that the hexahydrate of uranyl nitrate represents an ion compound compos-

The structure of the hexahydrate of uranyl nitrate

ed of aqua-complex cations $[UO_2(H_2O)_6]^{2+}$ and NO_3^- anions. Thus the chemical formula should read $[UO_2(H_2O)_6](NO_3)_2$. The oxygen atoms of the nitrate group are in the vertex of an equilateral triangle (side length 2.66 Å). In the basis of the complex $[UO_2(H_2O)_6]^{2+}$ ions there is a linear uranyl group. The distance uranium - oxygen is here 1.90 Å. Two possibilities for the distribution of the water molecules are studied by the present authors. First variant: According to the data of Fourier series and table 2 the maxima of the electron density indicate that the water molecules 2, 3, 5 and 6 (Fig. 5) lie in a plane parallel to the equatorial plane at a distance of 0.3 Å, while the water molecules 1 and 4 are in an equal plane on the opposite side of the equator. The distance between 2 - 3 and 5 - 6 is 2.82 Å and between 1 - 2, 3 - 4, 4 - 5, and 6 - 1 it is 1.90 Å. The second, idealized, variant: This distribution is represented by the rotation of the water molecules 2, 3, 5 and 6 around the uranyl axis, assuming an equal distance of 2.30 Å between the water molecules. The fact that this distance is smaller than the radii of two water molecules (= 2.66 Å) can be explained by the strong deformation of the water molecule caused by the uranium field and formation of bonds between the molecules. Both proposed distribution variants are similar to the structure of uranyl aqua-complexes presented by I.I. Lipilina and O.Ya. Samoylov [Ref. 10: DAN SSSR, 98, 1, 99 (1954); Ref. 12: DAN SSSR, 122, 2,

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238 (1958)]. Equatorial distribution of particles around the uranyl ion was observed in other uranyl complexes by W.H. Zachariasen [Ref. 8: Acta Cristallogr., 7, 795 (1954)]. The NO_3^- ions form a reticulated layer parallel to the XY plane, while the $[UO_2(H_2O)_6]^{2+}$ cations form linear chains parallel to the Z axis. The axial directions of the uranyl groups are in a plane parallel to YZ under an angle of ~37° to the Y axis. Each $[UO_2(H_2O)_6]^{2+}$ cation is surrounded by 12 NO_3^- ions and 6 cations have one anion in common. The distance between the uranium atom and the water molecule in the aqua-complex cation was determined as 2.2 Å. Calculations of the spherical volume give a value for the packing coefficient of $K_{spherical} = 46.5\%$. Thus it is very likely that heating of the crystal causes rotation of the NO_3^- groups, and the following revolution around the axis vertical to the triangle (formed by this group). There are 5 figures, 2 tables and 12 references: 4 Soviet-bloc and 8 non-Soviet-bloc.

SUBMITTED: July 2, 1959

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VDOVENKO, V.M.; SMIRNOVA, Ye.A.

Hydration of uranyl nitrate in organic solvents during extraction from salt solutions. Radiokhimiia 2 no.3:291-295 '60. (MIRA 13:10)

(Uranyl nitrate)

VDOVENKO, V.M.; SUGLOBOV, D.N.; SMIRNOVA, Ye.A.

Infrared spectra of organic solutions of uranyl nitrate hydrates in the deformation band of the vibrational frequencies of water. Radiokhimiia 2 no.3:296-300 '60. (MIRA 13:10)
(Uranyl nitrate--Spectra)

VDOVENKO, V.M.; LIPOVSKIY, A.A.; KUZINA, M.G.

Spectrophotometric investigation of the formation of complex nitrate compounds of plutonyl in acetone. Radiokhimiia 2 no.3:301-306 '60. (MIRA 13:10)

(Plutonyl compounds--Spectra)

VDOVENKO, V.M.; LIPOVSKIY, A.A.; KUZINA, M.G.

Spectrophotometric investigation of the formation of complex nitrate compounds of plutonyl in aqueous solutions, and extraction of Pu(VI) with dibutyl ether. Radiokhimiia 2 no.3:307-311 '60. (MIRA 13:10)
(Plutonyl compounds--Spectra) (Extraction (Chemistry))