

100

The first stages of seed germination in oleiferous plants. A. I. FERMAKOV. *Soll. Applied Botany, Genetics and Plant Breeding* (Leningrad) 25, 133-62 (1931) (Russian); 163-73 in English; cf. C. A. 25, 2459.—The respiratory quotient of seeds of flax, castor bean and almond during the germination process is in the early stages approx. 1.0, indicating a carbohydrate metabolism. Later on it falls to about 0.6, indicating the oxidation of unsatd. acids. During the first stages of germination the oil content of flax is unchanged quantitatively as well as qualitatively. There is no increase in a dry wt. but only a change from polysaccharides to sugars. In later stages there is a decrease in oil content and the I no. falls. The oil content is higher in plants sown early.

K. V. THIMANN



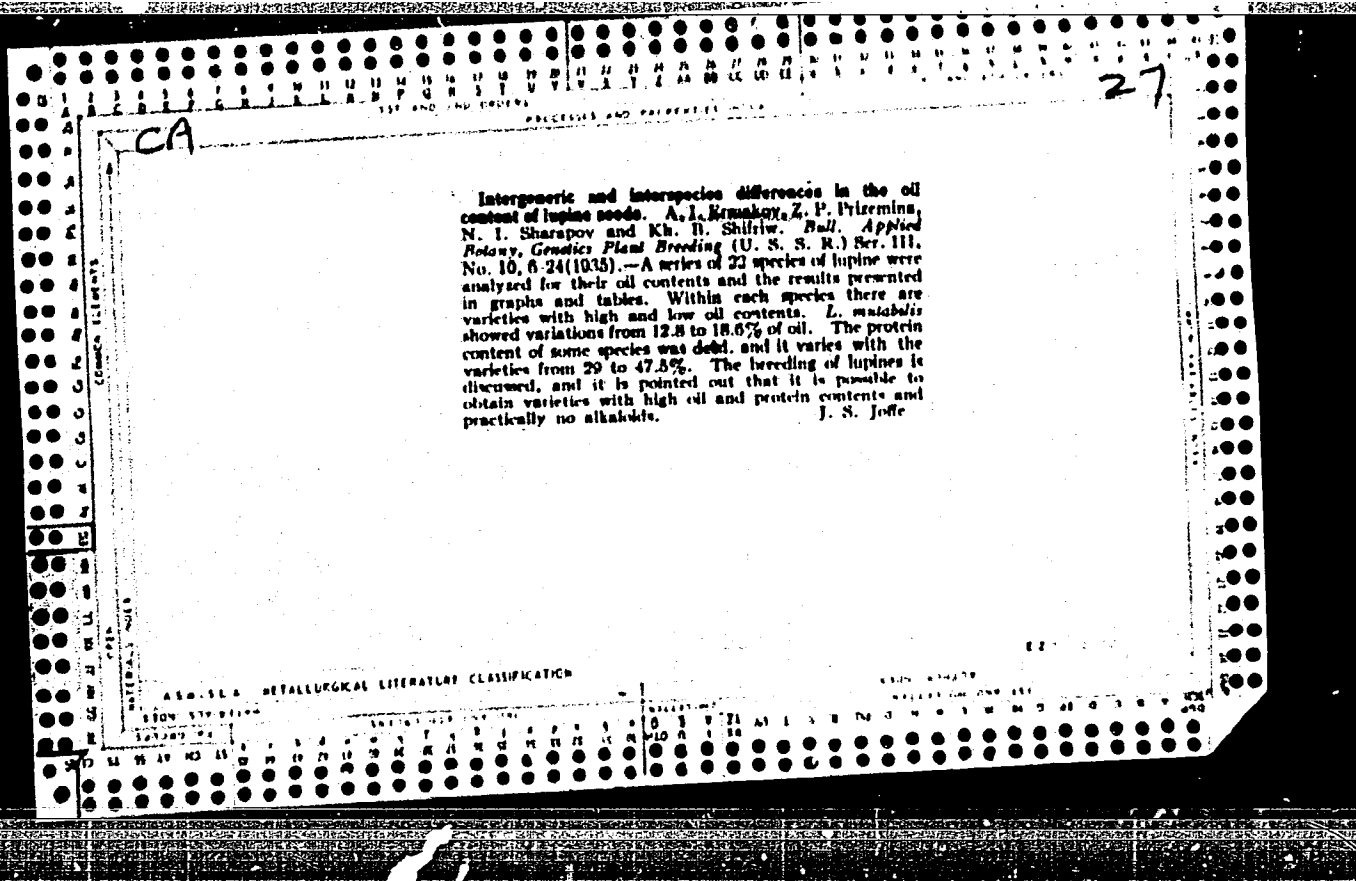
27

CA

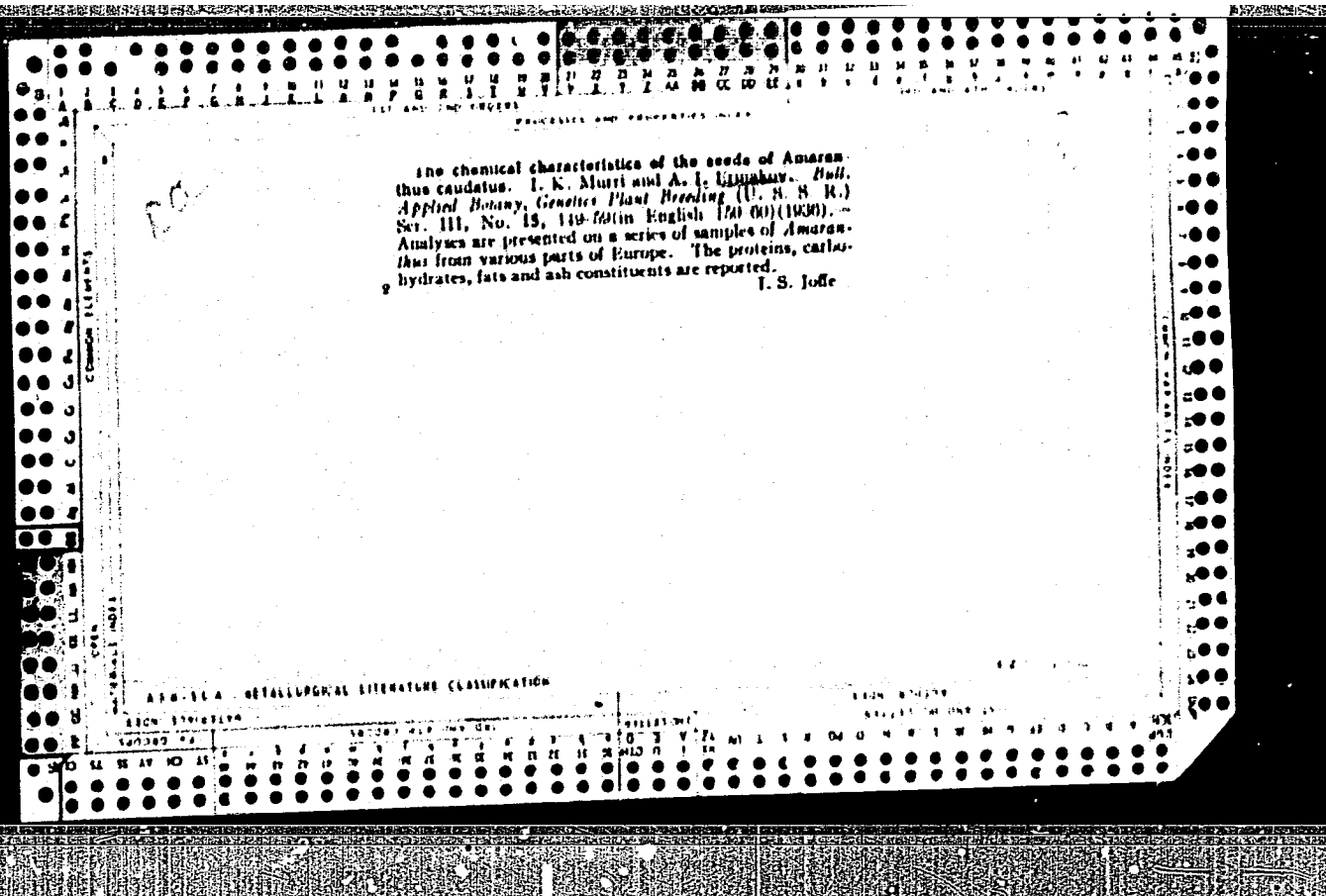
A new rapid method for determining the oil in a part of the seed. A. I. Krushov. *Bull. Applied Botany, Genetics, Plant Breeding* (U. S. S. R.) Ser. A, 7, 61-8 (1933).—The method is based upon the difference in wt. of the seed before and after extrn. of oil from the seed by either in a special app. The construction of the app. and comparative tables of results of this method and previous ones are given. V. D. Karpenko

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS										3RD AND 4TH ORDERS									
PROCESSES AND PROPERTIES INDEX																			
<p>ca</p> <p>27</p> <p>The methods of breeding oil-bearing plants for quality.  A. I. Remskov. <i>Bull. Applied Botany, Genetics, Plant  Breeding</i> (U. S. S. R.) Ser. 3, No. 3, 53-70 (in English  70-1) (1954).—A method was perfected for detg. the oil in  small samples of seeds—2 to 25 mg.—without titrimetry.  The reagent used is that of a Nickols mist. and a soln. of  <math>K_2Cr_2O_7</math>.</p>																			
<p>ASB-51A METALLURGICAL LITERATURE CLASSIFICATION</p>																			







11d

*Ch*

Biochemistry of Sorghum Pers. A. I. Pimakov.  
*Biokhimiya Kulturnyykh Rastenii* 2, 1965-1971 (1967);  
*Khim. Referat. Zhur.* 2, No. 1, 55(1930).—Botanical  
 classification and geographical distribution are given, as  
 well as the chem. compn. of Sorghum Pers. (proteins,  
 prolamines, globulins, albumins, glutelins; oils of the  
 seeds, P-contg. substances—phytin, lipoid P, inorg. P;  
 carbohydrates, ash substances, pigments, glucosides and  
 substances contg. HCN) which depend on the conditions  
 of growth, phases of development, agricultural technique  
 and fertilizers. The plant can be used as forage, as a source  
 of sugar, for the prepn. of bread, as a pigment, etc. By  
 means of selection types of Sorghum Pers. can be obtained  
 which do not contain HCN, and which are rich in sugar,  
 especially rich in sucrose. W. R. Henn

ASH-51A METALLURGICAL LITERATURE CLASSIFICATION



112

*Co*

**Biochemistry of flax.** A. I. Rimakova. *Biokhimiya Kul'turnykh Rastenii* 3, 67-132 (1934); *Khim. Referat. Zhur.* 1, No. 11-12, 58 (1934).—Numerical data are given for the content in flax seeds of oils, proteins, carbohydrates, water, org. acids, enzymes and ash substances, and for the chem. compn. of stems in relation to their content of oil substances, pectins, cellulose, lignin and ash substances. The influence of the place and the conditions of growth of flax on the chem. compn. are also given. Different grades of flax are analyzed for oil in the seeds. Values for oil constn. are given. The utilization of flax stems and of flaxseeds according to their chem. compn. is proposed. W. R. Henn

**ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION**

**SECTION ONE**

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**SECTION HUNDRED**

PROCESSING AND PROPERTIES INDEX																									
1ST AND 2ND INDEX													3RD AND 4TH INDEX												
<p><i>CA</i></p> <p>Biochemical changes in grafted plants. A. I. Ermakov. <i>Soviet Plant Ind. Record</i> 1940, No. 2, 57-67 (in English, 67). -- Jerusalem artichoke (I) tip, with 3-4 leaflets, cleft-grafted on a mature sunflower plant (II), flowered 20 days earlier; there was an increase of sugars in the stem and leaves of the stock, to 8.40%, from 5.80 in II, and a decrease of those of the scion, to 15.21%, from 31.17. The protein in the graft was 14.38%, on the dry wt., in the stem, and 20.34% in the leaves, against 5.60 and 14.25%, resp., in II, and 3.13, and 0.09, resp., in I. The influence of II is due to its powerful assimilatory system and greater adaptability to environmental conditions. The grafted plants are biochemically and biologically quite different from their parents, and it is hoped that the characteristics may be fixed by repeated graftings. References: 11. Gritoll</p>																									
<p>ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION</p>																									

YERMAKOV, A. I.

Yermakov, A. I. "The problem of vegetable oils," In symposium: Biokhimiya kul't. rasteniy, Vol. VIII, Moscow-Leningrad, 1948, p. 118-92 - Bibliog: p. 189-92

SO: U-3264, 10 April 1953, (Letopis 'Zhurnal 'nykh Statey, No.3, 1949)

YERMACK 111

YERMACK 111

$\text{H}_2\text{SO}_4$  0.13; Congo red soln: 0.07 ml. Grind 5 g. of potato  
and place on the bottom of a 100 ml. Florence flask. Fill  
the glass tube with the Congo red indicator. suspend test

YERMAKOV A I

AD ✓ A rapid method for the determination of "crude" protein in potatoes and cabbage. A. I. Ermakov and G. A. Lukovnikova. *Trudy Priklad. Biol., Genet. i Selektii* 31, No. 1, 263-9 (1964); *Referat. Zhur. Khim., Biol. Khim.* 1953, No. 12560.—A rapid method was developed for the approx. detn. of crude protein (total of proteins and N compounds) in potato tubers, heads of cabbage, and fodder beets. The method is based on the hydrolysis of the proteins by strong alkali and the liberation of  $\text{NH}_3$ . The concn. of the latter is detd. with the aid of indicator tubes filled with  $\text{H}_2\text{SO}_4$  and Congo red. The color end points of these are calibrated and standardized and are converted into percentage of "crude" protein on the fresh wt. basis. Max. deviation of results by this method from results with Kjeldahl method did not exceed 0.5%.  
B. S. Levine

SEKHONIEV, Pavel Sergeyevich; YERMAKOV, A.I., redaktor; MISHKEVICH, G.I.,  
redaktor; KAMOLOVA, V.M., tekhnicheskiy redaktor.

[Founding work in ship building] Fermevechnoe dele v sudostreemii.  
Leningrad, Gos.soiuznoe izd-vo sudostreitel'nei promysh., 1955.  
167 p. (MLRA 9:4)

(Molding (Founding)) (Shipbuilding)

YERMAKOV, D. I.

RUSHKOVSKIY, Sergey Vladimirovich; YERMAKOV, A.I., kandidat biologicheskikh nauk, spetsredaktor; ~~PRIVIKINA, L.A.~~, redaktor; MUSTAYIN, A.M., tekhnicheskii redaktor.

[Research methods in the breeding of oilseed plants for oil content and oil quality] Metody issledovaniia pri selektsii maslichnykh rastenii na sodershanie masla i ego kachestvo. Moskva, Pishchepromizda', 1957. 117 p. (MIRA 10:6)

(Oilseed plants) (Oil analysis)



YERMAKOV, A.I., red.; KNYAGINICHEV, M.I., red.; MURRI, I.K., red.; NILOV,  
S.N., red.; CHUNAYEVA, Z.V., tekhn. red.

[Biochemistry of cultivated plants] Biokhimiia kul'turnykh rastenii.  
Izd. 2., perer. i dop. Moskva, Gos. izd-vo sel'khoz. lit-ry,  
Vol. 1. [Cereal and groat grains] Khlebye i krupiane kul'tury.  
1958. 700 p. (MIRA 11:12)

(Grain)

YERMAKOV, A.I.; LUKOVNIKOVA, G.A.

Influence of natural conditions and methods of cultivation on  
the ascorbic acid and carotene content of fruits and vegetables.  
Vitaminy no.4:209-217 '59. (MIRA 12:9)

1. Vsesoyuznyy institut rasteniyevodstva, Leningrad.  
(ASCORBIC ACID) (CAROTENE)

YERMAKOV, A.I.; LUKOVNIKOVA, G.A.

Variations in the chemical composition of strawberries, apples  
and other fruits and berries in different growing regions.  
Biokhim.pl. i ovoshch. no.5:221-242 '59. (MIRA 13:1)

1. Vsesoyuznyy institut rasteniyevodstva (otdel biokhimii)  
Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk imeni  
V.I.Lenina.

(Fruit--Chemical composition)

YERMAKOV, A.I.

Formation and quantitative variation of cyanogenic glucosides during germination and ripening in flax. *Fiziol. rast.* 7 no.4:447-452 '60.  
(MIRA 13:9)

1. All-Union Institute of Plant Growing, Leningrad.  
(Linamarin) (Flax)

YERMAKOV, A.I., red.; ARASIMOVICH, V.V., red.; ALEKSEYEV, Yu.V., red.;  
BARANOVA, L.G., tekhn. red.

[Biochemistry of vegetable crops] Biokhimiia ovoshchnykh kul'tur.  
Leningrad, Izd-vo sel'khoz. lit-ry, zhurnalov i plakatov, 1961.  
543 p.

(Vegetables)

(Biochemistry)

(MIRA 14:11)

YERMAKOV, A.I., doktor biol. nauk; YAROSH, N.P.; GORBACHEVA, R.G.

Method of determining proteins in seeds. Trudy po prikl. bot. ,  
gen.1 ser. 37 no. 1:156-163 '65 (MIRA 19:1)

09100

S/057/61/031/002/014/015  
B124/B202

26.2311

AUTHORS: Nazarov, N. I., Yermakov, A. I., Tolok, V. T., and  
Sinel'nikov, K. D.

TITLE: Propagation of ion cyclotron waves in a plasma

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 31, no. 2, 1961, 254-255

TEXT: The experiments were made by means of a device similar to that described in Ref. 1. Gas discharge took place in a 1.6 m long glass tube with a diameter of 60 mm, in an axially magnetic field with a field intensity of up to 15 kilooersteds. The magnetic field attained its maximum value within  $10^{-2}$  sec, it dropped by 2.7 times within  $8 \cdot 10^{-2}$  sec. Hydrogen in the pressure range from  $10^{-4}$  to  $10^{-2}$  mm Hg served as working gas. The high-frequency energy was fed into the plasma by means of an induction coil usually used in cyclotron heating. It consisted of six parts connected in phase opposition. The axial periodicity of the h.f. magnetic field in the coil was 16 cm. The load current circuit consisting of this coil and vacuum condensers had the quality factor 310. The current circuit

Card 1/4

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B124/B202

Propagation of ion cyclotron...

was fed by an h.f. generator with quartz stabilization and a power of 80 kw. The duration of pulses varied between  $10^{-5}$  and  $10^{-2}$  sec, the working frequency of the generator varied from 3 to 30 Mops. The absorption of the h.f. power by the plasma in the region of ion-cyclotron resonance was determined by measuring the voltage in the current circuit as well as from the change of the electron density during discharge, and from the intensity of the hydrogen spectral line  $H\beta$ . With given parameters of the h.f. current circuit about 5 kw were introduced into the plasma in the region of ion-cyclotron resonance. Owing to the resulting high degree of ionization of the gas no plasma formation by direct electrode discharge was necessary. In this case, experiments could be made also at low hydrogen pressures (up to  $2 \cdot 10^{-4}$  mm Hg). The upper curve in Fig. 1 shows the change of load of the h.f. current circuit in the region of ion-cyclotron resonance, the lower curve shows the intensity of the  $H\beta$  line. The duration of pulses of the h.f. generator is about 3 msec. After 0.5 msec hydrogen is intensively ionized. The upper curve of Fig. 2 shows a curve analogous to that in Table 1, the lower one shows the curve of the amplitude change of the h.f. (wave) signal at the electrode. The signal occurred only when the h.f. current circuit was loaded in the region of

Card 2/4



• Propagation of ion cyclotron...

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B124/B202

ion-cyclotron waves. Both figures show that the amplitude of the wave signal at the probe mainly depends on the degree of plasma ionization. The results obtained prove the penetration of h.f. energy into the plasma in the form of ion-cyclotron waves. The mentioned data also prove the results of the experiments of T. Stiks et al. in the stellarators B-65 (V-65) and B-66 (V-66) (Refs. 2, 3). Besides, also waves shorter than the cyclotron waves were observed in the magnetic fields. The working pressure in this case was  $10^{-3}$  mm Hg. Under the experimental conditions of the authors such waves were observed only at pressures exceeding  $8 \cdot 10^{-3}$  mm Hg. Their occurrence has hitherto not been explained. There are 2 figures and 3 Soviet-bloc references.

ASSOCIATION: Fiziko-tekhnicheskii institut AN USSR, Khar'kov (Institute of Physics and Technology of the AS UkrSSR, Khar'kov)

SUBMITTED: September 10, 1960

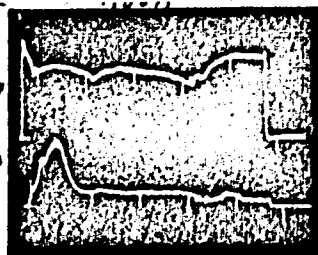
Card 3/4

89168

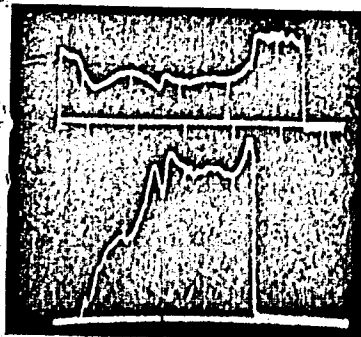
Propagation of ion cyclotron...

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B124/B202

Legend to Fig. 1: Voltage in the current circuit and intensity of the  $H_\beta$  line in the region of ion-cyclotron resonance. Hydrogen pressure  $1 \cdot 10^{-3}$  mm Hg, generator frequency 10.8 Mc/sec.



Legend to Fig. 2: voltage in the current circuit and h.f. signal of the probe.



Card 4/4

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37255  
S/057/62/032/005/C03/022  
B102/B104

24.6740  
AUTHORS:

Nazarov, N. I., Yermakov, A. I., Lobko, A. S., Bondarev, V. A., Tolok, V. T., and Sinel'nikov, K. D.

TITLE: Examination of ionic cyclotron waves

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 5, 1962, 536-540

TEXT: The authors continued previous experiments (ZhTF, 31, 254, 1961) on the excitation and propagation of ionic cyclotron waves. In an apparatus schematically shown in Fig. 1, a powerful h-f discharge in hydrogen and deuterium was studied in a range near ionic cyclotron resonance, and the conditions of forced resonance excitation of ionic cyclotron waves and of their propagation along the magnetic field were determined. Polarization and attenuation of these waves was also measured. The discharge took place in a tube of molybdenum glass (2 m long, 60 mm thick) arranged in a solenoid which created a quasi-constant magnetic field. The arrangement was such that two field regions were present: one for resonance excitation and another for the damping of the ionic cyclotron waves. The overall length of the coil was

Card 1/3

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B102/B104

Examination of ionic cyclotron waves

1.5 m. The field was created by discharging a capacitor bank with a total capacity of  $2.25 \cdot 10^{-2}$  f, which could be charged up to 5 kv. The field reached 20-25 kilogauss within 5 msec. The exciting electromagnetic field had a wavelength of 16 cm. The resonance circuit had a quality factor of 400 with an 80-kw generator (3-30 Mc/sec), and the maximum voltage in the circuit was 30 kv. Hydrogen of  $10^{-2}$ - $10^{-4}$  mm Hg was blown through the evacuated ( $1 \cdot 10^{-6}$  mm Hg) discharge tube, and after a long-time aging of the system with h-f discharges, voltage and probe-signal oscillograms were recorded. At the moment of resonance load, the generated wave starts traveling along the constant magnetic field. Its magnetic-field distribution and phase variation along the field were measured (Figs. 5, 6). The wave was found to be circularly polarized; the polarization vector rotated in the same sense as did the free ion in the magnetic field. The damping process was studied with waves traveling in a region of magnetic fields equal to that of the cyclotron waves. Damping was found to set in only at a certain distance with various field geometries, which cannot be attributed to collision damping only. At  $H \approx H_{\text{cyclotron}}$ , cyclotron damping becomes more effective. There are

Card 2/5

Examination of ionic cyclotron waves

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B102/B104

8 figures.

ASSOCIATION: Fiziko-tehnicheskiy institut AN USSR (Physicotechnical  
Institute AS UkrSSR) Khar'kov

SUBMITTED: June 3, 1961

Card 3/5

ACCESSION NR: AT4036054

S/2781/63/000/003/0164/0168

AUTHORS: Nazarov, N. I.; Yermakov, A. I.; Tolok, V. T.; Sinel'nikov, K. D.

TITLE: Investigation of instability in the cyclotron method of plasma heating

SOURCE: Konferentsiya po fizike plazmy\* i problemam upravlyayemogo termoyadernogo sinteza. 3d, Kharkov, 1962. Fizika plazmy\* i problemy\* upravlyayemogo termoyadernogo sinteza. (Plasma physics and problems of controlled thermonuclear synthesis); doklady\* konferentsii, no. 3, Kiev, Izd-vo AN UkrSSR, 1963, 164-168

TOPIC TAGS: cyclotron resonance phenomena, plasma instability, plasma heating, plasma ion oscillation, plasma decay, microwave plasma, gyromagnetic resonance

ABSTRACT: To clarify the question of the effectiveness of plasma heating by ion cyclotron waves and to study the influence of the

Crd 1/5

ACCESSION NR: AT4036054

level of the high-frequency power on the plasma heating in the ion gyroresonance region, an experiment was performed with a setup described in detail elsewhere (ZhTF v. 32, No. 5, 1962). The results of the tests indicate that there exist two distinctly different modes of plasma behavior, one in which the plasma exists for a relatively long time, and one in which the plasma begins to decay even before the termination of the high-frequency power pulse. A radical decrease in the lifetime of the plasma occurs at a definite critical power level supplied to the plasma, and the smaller the pressure the smaller the critical power. The critical power depends on the cleanliness of the system and increases for a poorly preconditioned system. This dependence on the pressure and on the purity of the system suggests that the observed instability is due to the appearance of ion currents with large directional velocities. At the present time the nature of the observed instability cannot be reconciled with the existing theory. "In conclusion the authors thank Ya. B. Faynberg and V. I. Kurilko for interest in the work and for a

Card 2/5

ACCESSION NR: AT4036054

discussion of the results, and also A. L. Lobko, V. A. Bondarev,  
and Ye. S. Khokhlov for help with the experiment. Orig. art. has:  
5 figures.

ASSOCIATION: None

SUBMITTED: 00

DATE ACQ: ° 21May64

ENCL: 02

SUB CODE: ME

NR REF SOV: 003

OTHER: 002

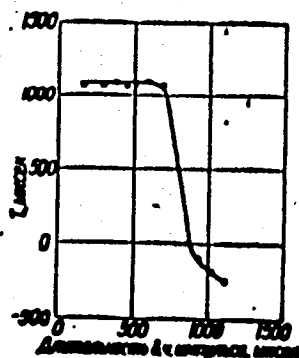
Card 3/5





ACCESSION NR: AT4036054

ENCLOSURE: 02



Duration of hf pulse,  $\mu$ sec

Dependence of  $\tau$  on the duration of the high-frequency pulse

Card 5/5

L 26720-66 F88-2/EWT(1) NR

ACC NR: AP6013174

SOURCE CODE: UR/0256/66/000/004/0041/0042 50

AUTHOR: Zhabenok, G. N. (Lieutenant Colonel); Yermakov, A. I. (Engineer, Lieutenant Colonel)

ORG: none

TITLE: Disassembling defense radar 21

SOURCE: Vestnik protivovozdushnoy oborony, no. 4, 1966, 41-42

TOPIC TAGS: defense radar, radar component, radar antenna

ABSTRACT: The article deals with disassembling defense radar for a march and reassembling it under modern combat conditions. Radar subunits have worked out several variants for this purpose. Lowering and lifting the radar antenna is accomplished with a hard jack or with the aid of a triphase motor. The procedure is described for assembling and disassembling radar equipped with a receiving and transmitting cabin. Orig. art. has: 4 figures. [NT]

SUB CODE: 17,15/ SUBM DATE: none

Card 1/1 FV

DOLGOPOLOV, V.V.; YERMAKOV, A.I.; HAZAROV, H.I.; STEPANOV, K.N.; TOLOK,  
V.T.

Experimental observation of Landau damping in a plasma. Zhur.  
eksp. i teor. fiz. 45 no.4:1260-1261 0 '63. (MIRA 16:11)

1. Fiziko-tekhnicheskiy institut AN UkrSSR.

YERMAKOV, A.I., doktor biol. nauk

Group, varietal and individual characteristics of the oil  
content of flaxseed. Trudy po prikl. bot., gen. 1 ser. 27  
no.1:5-26 '65 (MIRA 19:1)

YERMAKOV, A.I., doktor biol. nauk; YAROSH, N.P., kand. biol. nauk

Formation and movement of substances in flax plants in relation to the phosphate and sulfate nutrition. Trudy po prikl. bot., gen. i sel. 37 no. 1:39-49 '65 (MIRA 19:1)

YERMAKOV, A.I., doktor biol. nauk; SAMORODOVA-BIANKI, G.B., kand. biol. nauk

Variability of the chemical composition of black currant berries. Trudy po prikl. bot., gen. 1 vol. 37 no. 1:105-118 '65. (MIRA 19:1)

YERMAKOV, A.I., doktor biol. nauk; MEGORSKAYA, O.M.

Method of selecting oil-rich seeds. Trudy po prikl. bot.,  
gen. 1 ser. 37 no. 1:164-168 '65 (MIRA 19:1)



I. 40920-66 ENT(1) IJP(n) AT (IV) SOURCE CODE: UR/0000/65/000/000/0010/0014  
ACC NR: AT6020562

AUTHOR: Nazarov, N. I.; Yermakov, A. I.; Tolok, V. T.

ORG: none

TITLE: Measurement of the perpendicular component of energy and the time of plasma breakup in high frequency heating

SOURCE: AN UkrSSR. Vysokochastotnyye svoystva plazmy (High frequency properties of plasma). Kiev, Naukovo dumka, 1965, 10-14

TOPIC TAGS: plasma decay, plasma heating, diamagnetism, plasma magnetic field, external magnetic field, electron density, plasma charged particle, pulsed magnetic field

ABSTRACT: The heating by high frequency generators and the breakup of plasma is studied by making use of the dependence of the plasma diamagnetism on the perpendicular component of particle energy. The method of measuring the diamagnetism consists of determining the magnetic field in the plasma and comparing it with the external field. The measurements were made on an experimental apparatus which used either a strong ion cyclotron wave or fast magnetosonic wave for plasma heating. The results showing the ion temperature as a function of a ratio of the external magnetic field to the plasma field (at which the gyrofrequency is 10 MHz) indicate the maximum temperature of 10 keV during the resonant excitation of the ion cyclotron wave. The density was  $10^{13}$

Card 1/2

L 46296-66 EWT(1) IJP(c) AT/GD  
ACC NR: AT6020561 (N)

SOURCE CODE: UR/0000/65/000/000/0005/0009

AUTHOR: Nazarov, N. I.; Yermakov, A. I.; Tolok, V. T.

ORG: none

TITLE: Investigation of the energy of charged particles leaving magnetic traps after high frequency heating

SOURCE: AN UkrSSR. Vysokochastotnyye svoystva plazmy (High frequency properties of plasma). Kiev, Naukovo dumka, 1965, 5-9

TOPIC TAGS: plasma heating, HF, ~~plasma heating~~, plasma magnetic field, plasma temperature

ABSTRACT: This work describes the results of measurements of the energy of ions and electrons which are moving along the magnetic field. The heating mechanisms used in the experiments were collective excitations by ion cyclotron and fast magnetosonic waves. The characteristic waves in the plasma were excited by the spatially periodic electromagnetic fields with 10 MHz frequency. The generator power used was at the 300 kw level. The particle energy and composition was measured by the electrostatic analyzer and multigrid probes. The plasma temperature was determined by spectroscopic methods. Plasma density was determined by a microwave interferometer. It was found that three types of ions flowed out, namely,  $H_1^+$ ,  $H_2^+$ ,  $H_3^+$ , all of which had the same

Cord 1/2

L 46296-66

ACC NR: AT6020561

energy even though the resonant acceleration condition is satisfied for  $H_1^+$  only. The ion temperature of 2 kev was reached, while the electron energy was only 30 ev. This also indicates the presence of three types of ions. In magnetosonic wave heating, both ions and electrons were found to reach a temperature of 150 ev. The various measuring methods gave consistent results. Orig. art. has: 5 figures.

SUB CODE: 20/

SUBM DATE: 19Nov65/

ORIG REF: 004

Card 2/2 afs

L 28490-66 EPF(n)-2/EWT(1)/ETC(f)/EWG(m) IJP(c) AT

ACC NR: AP6013115

SOURCE CODE: UR/0057/66/036/004/0612/0619

AUTHOR: Hazarov, N. I.; Yermakov, A. I.; Tolok, V. T.

ORG: none

TITLE: High frequency heating of a high density plasma

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 36, no. 4, 1968, 612-619

TOPIC TAGS: plasma heating, hydrogen plasma, ion temperature, electron temperature, plasma magnetic field, plasma oscillation, plasma resonance, cyclotron resonance, acoustic resonance,

ABSTRACT: The authors have investigated heating of hydrogen plasmas at pressures between 0.001 and 0.004 mm Hg by ionic cyclotron and fast magnetic sound waves. The plasmas were produced in the "Sneg" machine, which has been described elsewhere by the authors and collaborators (ZhTF, 32, No.5, 536, 1962). Heating was accomplished by up to 100 kW pulses of rf power at 10 MHz; resonance with the ionic cyclotron or fast magnetic sound waves was achieved by adjusting the strength of the external (pulsed) magnetic field. Double pulses of rf power were employed; the first pulse of a pair served to produce the plasma, and the second, to heat it. The longitudinal energies of the plasma particles were determined with a multigrid probe and with the electrostatic analyzer described by A.A.Kalmykov and collaborators (PTE, 5, 142, 1963). Ion masses were determined by measuring flight times in a 56 cm long drift tube. The

Card 1/2

UDC: 533.9

L 28490-66

ACC NR: AP6013115

technique employed by W.H.Hooke, M.A.Rothman, and J. Adam (Bull. Am. Phys.Soc., ser 2, 8, 174, 1963) was used to determine the transverse energies of the plasma particles from measurements of the diamagnetic properties of the plasma. Electron temperatures were also measured spectroscopically. Plasma densities were measured with a microwave interferometer operating at wavelengths of 8.2 and 4 mm. Mean longitudinal ion energies up to 2000 eV were observed in plasmas heated at the ionic cyclotron resonance. The transverse ion energies were slightly lower; this difference is ascribed to a systematic error in the measurement of the transverse energies. The mean ion energy was proportional to the square of the rf potential applied to the exciting coil.  $H^+$ ,  $H_2^+$ , and  $H_3^+$  ions were present; these ions all had the same energy. The mean ion energy remained constant throughout practically the full 300  $\mu$ sec duration of the heating pulse, indicating that the losses were high. The electron temperatures in these plasmas was only 20-30 eV. The ions cooled very rapidly after cessation of the pulse, with a time constant of some 10  $\mu$ sec. This rapid cooling is ascribed to charge exchange collisions with the cool neutral gas surrounding the hot plasma column. In the plasmas heated at the fast ionic sound resonance, the ion and electron temperatures were approximately the same, and equal to about 150 eV. The densities of the plasmas were not less than  $10^{13} \text{ cm}^{-3}$  in both cases. The authors thank A.A.Kalmykov for lending the electrostatic analyzer, and Academician K.D.Sinelnikov for his support and interest in the work. Orig. art. has: 2 formulas and 15 figures.

SUB CODE: 20

SUBM DATE: 22Feb65

ORIG. REF: 004

OTH REF: 001

Card 2/2 16

YERMAKOV, A.K.

Calculating rectangular beam walls. Trudy TISI 11:50-58 '64.

Calculation of a reinforced concrete element with an initial  
curvature based on the formation and opening of cracks. Ibid.:  
59-70 (MIRA 19:1)

YERMAKOV, A.K., assistant

Precast test tables without foundations for manufacturing prestressed concrete elements, and their strength. Sbor. nauch. trud. TISI 8: 62-68 '61. (MIRA 15:1)

(Prestressed concrete)

KHAYDUKOV, G.K., kand.tekhn.nauk; YERMAKOV, A.K., inzh.

Study of and calculations for beam-walls with openings  
according to the limiting equilibrium method. Bet. 1  
zhel.-bet. 8 no.8:371-377 Ag '62. (MIRA 15:9)  
(Concrete walls--Testing)



BOGDASHIN, A.S.; BOGORODSKIY, A.A.; VINGARIT, M.B.; GORBUNOV, V.I.;  
GORBUNOV, V.R.; DUHOV, V.K.; YERMAKOV, A.L.; IVANOV, A.A.;  
KARAKOVA, M.I.; KOBILYAKOV, L.M.; KOZLOVSKIY, M.I.; MARAKHTANOV,  
K.P.; MIRUMYAN, G.N.; NECHETOV, G.P.; NOVIKOV, A.G.; OL'KHOVSKIY,  
K.I.; PESTRYAKOV, A.I.; POLAPANOV, A.V.; SKLYAREVSKAYA, Ye.Kh.;  
SOLDATANKOV, S.I.; SOROKIN, Ye.M.; TRUSHINA, Z.V.; PEDOROV, P.F.;  
PEDOSHIYEV, A.M.; FROG, M.P.; SHAMAYEV, G.P.; YANOVSKIY, V.Ye.;  
ORZKHOV, A.D., spetsred.; DEYEVA, V.M., tekhn.red.

[Handbook on new agricultural machinery] Spravochnik po novoi  
tekhnike v sel'skom khoziaistve. Moskva, Gos.izd-vo sel'khoz.  
lit-ry, 1959. 364 p. (MIRA 13:2)  
(Agricultural machinery)

GORBUNOV, V.I., inzh.; MIRUMYAN, G.N., inzh.; YANOVSKIY, V.Ya.,  
inzh.; IVANOV, A.A., inzh.; ~~YERMAKOV, A.L., inzh.~~; FEDOROV,  
P.F., inzh.; LARYUKHINA, G.G., inzh.; NECHETOV, G.P., inzh.;  
NOVIKOV, A.G., inzh.; DUROV, V.K., inzh.; BARSUKOV, A.F.,  
red.; PECHENKIN, I.V., tekhn. red.

[New tractors and agricultural machines; test results of 1957]  
Novye traktory i sel'skokhoziaistvennye mashiny; rezul'taty  
ispytaniy 1957 goda. Moskva, M-vo sel'.khov.SSSR. No.3. 1959.  
350 p. (MIRA 15:10)

1. Russia (1923- U.S.S.R.) Glavnoye upravleniye mekhanizatsii  
i elektrifikatsii sel'skogo khozyaystva.  
(Agricultural machinery)

MOROZOV, V.I.; YERMAKOV, A.M.

Classification of rock based on resistance to drilling. Razved.i  
okh.nedr 22 no.1:32-35 Ja '56. (MLRA 9:5)  
(Boring)

YERMAKOV, A. M., BELYAYEVA, V. K., and MAROV, I. N.

"Possibilities of using anionites for the calculation of the constants  
of the stability of charged ions."

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

S/735/61/000/000/012/014

AUTHOR: Yermakov, A.N.

TITLE: Instrument for the evaluation of the stampability of Type ЭИ-636 (EI-636) steel from its magnetic parameters.

SOURCE: Akademiya nauk Ukrainskoy SSR. Institut mashinovedeniya i avtomatiki. Mashiny i pribory dlya ispytaniy metallov. Kiyev, 1961, 103-110.

TEXT: An instrument was developed by the Physical-Engineering Laboratory of the Institute of Mechanical Engineering and Automatics, AS UkrSSR, to clarify the suitability of ЭИ-636 (EI-636) steel for deep cold drawing; the method employs the measurement of the magnetic properties of the steel, which characterize its suitability for stamping. The Laboratory investigated the interrelation between the ductility of the steel and the values of the residual induction and the coercive force obtained upon magnetization of the steel by a variable magnetic field. The examination was stimulated by brittle failures of that steel in the deep cold drawing of kinoscope cones; previous mechanical, X-ray, and metallographic tests at the Physics Laboratory of the L'vov Incandescent-Lamp Plant and at the VNICherMet (All-Union Scientific Research Institute for Ferrous Metals) had not discovered any distinguishing parametric characteristics that would correlated with "stampability." Chemical analysis also had failed. Magnetometry alone had successfully correlated

Card 1/3

Instrument for the evaluation of the stampability...

S/735/61/000/000/012/014

"suitability for stamping" (less than 0.1% failures under cold deep drawing) and "unsuitability" (25-30% failures) with measurable parameters, namely, the values of the magnetic permeability, the residual induction, the magnetic field strength for inductive saturation, the coercive force (i.e., the H required to reduce the residual magnetism to zero), the amplitude (peak) or total magnetic permeability, the elastic magnetic permeability, the loss angle, the viscous magnetic permeability, the shape and area of the magnetization curve, and the work expended in altering the magnetization of a unit volume of a ferromagnetic, all in a commercial-frequency variable magnetic field. The device developed is applicable to other ferromagnetic materials. The specimens adopted are of annular shape, 50 mm OD, 40 mm ID, 3 mm thick. The feature distinguishing the present device from conventional ring-type permeameters is the elimination of the need for the winding of a magnetizing and a detector coil onto the annular specimen. The ring specimen here is laid into an annular, semi-circular-cross-section, groove in a support block and is completely embraced by another annular, semi-circular-cross-section, groove in a cover plate which thus completes a toroidal magnetizing coil around the ring specimen through which the magnetizing current is made to flow. A similar arrangement contains and completes the detector-coil circuit, when the cover plate is pressed into place by the center-screw wing nut. Cross-sections of the parts and a general-view photograph of the assembly are shown. The instantaneous value of the detector-coil emf at the moment of zero current is measured in a slave key volt-

Card 2/3

Instrument for the evaluation of the stampability...

S/735/61/000/000/012/014

meter. A 100- $\mu$ sec rectangular impulse, timed by a phase-shifter, serves as a commutating impulse with the aid of a three-stage amplifier-limiter which produces a constant output voltage in a balanced key cathode detector; the latter voltage is proportional to the instantaneous value of the measured quantity and can be measured by a balanced vacuum-type voltmeter. The shortness of the impulse spreads the detector-coil emf measurement over only 0.5% of one a.c. period. The scope of measurable magnetic characteristics, for the three ranges available on the present instrument, comprises flux densities from 0 to 5,000 gauss, 0 to 15,000 gauss, and zero to 50,000 gauss, with a magnetic field strength ranging in analogous steps from 0 to 10 oe. The range of phase of the reference voltage is 360°, with an error not greater than 0.5°. The magnetizing current may range from 0 to 40 a. The input current is 220 v, 50 $\pm$ 5 cps, the power consumption is 150 va. Over-all dimensions are 320x490x250 mm; the gross weight is 20 kg. There are 4 figures and 3 references, all Russian-language; 2 are Soviet publications, the third, entitled "Tochnyye elektricheskiye izmereniya. Materialy konferentsii po tochnym elektricheskim izmereniyam (Precise electric measurements. Transactions of the conference on precise electric measurements)". Moscow. Foreign Literature Publishing House, 1959, appears to be of non-Soviet origin. ✓

ASSOCIATION: None given.

Card 3/3

S/735/61/000/000/014/014

**AUTHORS:** Yermakov, A.N., Panasyuk, V.V., Teterko, A.Ya.

**TITLE:** A device for the detection of near-surficial defects in a nonmagnetic metal.

**SOURCE:** Akademiya nauk Ukrainskoy SSR. Institut mashinovedeniya i avtomatiki. Mashiny i pribory dlya ispytaniy metallov. Kiyev, 1961, 116-127.

**TEXT:** The device described serves to detect micrononuniformities or discontinuities, such as surficial and near-surficial fissures, cavities, nonmetallic inclusions, etc., in nonmagnetic metals. The device can also determine the intensity of the cold hardening of a nonmagnetic metal. The method is based on the measurement of the anisotropy of the electric resistance in two mutually perpendicular directions at a given point of the metal. The method is nondestructive and, hence, can be used on all production items (and not just on a few random samples); this is of value in structural parts with a small margin of safety. The device employs basically an eddy-current method (cf. Rabinovich, A.N. Avtomaticheskly kontrol' tverdosti stali - Automatic control of the hardness of steel, Gostekhizdat UkrSSR, 1957; Mattaes, K. Aluminium, v.25, no.3, 1943, 106; Dorofeyev, A.L., Zavodskaya laboratoriya, no.7, 1959). The principal difficulty is the overwhelming

Card 1/3



▲ device for the detection of near-surficial defects... S/735/61/000/000/014/014

effect of variations in the gap between the eddy-current sensor and the metal surface. Some other developments (incl. McGonnagle, W.I., et al., *Electronics*, v.32, no.35, year not given) have minimized the gap effect, but at a loss in sensitivity. The simultaneous determination of the anisotropy of electric conductivity in two mutually perpendicular directions in nonmagnetic metals and of the magnetic anisotropy in ferromagnetic metals appears to be most effective in by-passing the gap effect. The sensor of the new device is a quadrupole magnetic bridge, consisting of two mutually perpendicular crossed metal horseshoes, with a coil on each of the four legs a, b, c, and d. An a.c. circulating in the exciter coils of two opposite legs, a and c, produces in them fluxes (assumed equal and having the same sense) which close within the metal being tested. If the metal is isotropically conductive, the energy of the magnetic field will be expended on eddy currents therein, and, since the flux from each of the exciter legs to each of the other two (detector or measuring) legs will be equal, the net resultant flux in the cross legs (and, hence, the emf induced in the measuring coils wound thereon) will be zero. The exact magnitude of a plane-parallel gap between the sensor and the metal surface is of no consequence. An anisotropy of electric conductivity leads to the appearance of an emf proportional to the anisotropy in the measuring coils of the cross legs. An a.c. generator feeds the magnetic-bridge sensor with a current, the frequency  $f$  of which depends on the desired depth of penetration of the magnetic flux into the metal (the reference cited in the test is not enumerated in the numbered list of references). The emf

Card 2/3

A device for the detection of near-surficial defects... S/735/61/000/006/014/014  
emanating from the measuring coils is amplified; a voltage divider permits the use of a convenient scale. A complete circuit diagram is provided. Semiconductor triodes are employed throughout. Detailed descriptions of the generator, the power amplifier, the sensor, the voltage divider, and the circuitry for determining the active and the reactive component of the resistance are described in detail. The device is portable; outside dimensions are 250x190x150 mm; the gross weight is 4.5 kg. Detail data on the transformers and the sensor are provided. Experimental results are summarized. On a 4-mm thick Dural sheet, a circular groove was scribed, 200 mm in dia, and an artificial cavity, 2 mm dia and 1 mm deep, was located within it off center. The sensor detected each of these flaws regardless of the direction and sense of approach. A plane-parallel gap 1 mm high was simulated by an overlay sheet of "getinaks" (micarta); a subsurface location of the flaws was simulated by a 0.5-mm thick overlay sheet of Dural. Errors in the determination of the location and contour of the annular groove did not exceed  $\pm 1\%$ . Curves of the active and reactive components and the modulus of the total resistance of the sensor vs. the magnitude of a plane-parallel gap are plotted, as are also curves of the change in sensitivity of the device vs. gap. Thanks are expressed to O.V. Tolstosheyev and B.M. Zaydel' for help in constructing the instrument. There are 5 figures and 11 listed (12 cited) references, of which 8 are Russian-language, 2 German-language, and 1 English-language (the cited paper by McGonnagle et al.)  
ASSOCIATION: None given.  
Card 3/3

YERMAKOV, A.N.; KLEPIKOVA, A.N.; YUDINA, L.D.

Amplification of small changes in the phase shift between two  
electrical signals. Izv.vys.ucheb.zav.; radiotekh. 5 no.5:591-  
595 S-0 '62. (MIRA 15:11)

1. Rekomendovana Institutom mashinovedeniya i avtomatiki AN  
UkrSSR.

(Electronic measurements)

YERMAKOV, A.N.

✓ Production of Iodine-131 without carrier in radiochemically pure state. D. I. Ryabchikov, A. N. Ermakov, L. S. Koryeva, and V. E. Vechko. *Prikladnaya Khimiya*, 1955, 179-88. — <sup>131</sup>I was obtained from irradiated  $\text{TeO}_2$ . To obtain  $\text{TeO}_2$ , 10-12 g. Te was added in small portions to 20 ml. boiling  $\text{HNO}_3$ , sp. gr. 1.12. The soln. was filtered and evapd. almost to dryness. This caused  $2\text{TeO}_3 \cdot \text{HNO}_3$  to crystallize. Heating the crystals at  $400-30^\circ$  gave  $\text{TeO}_2$ ; the yield was 98%. Irradiated  $\text{TeO}_2$  was dissolved in 10% NaOH by using 6-8 ml. for 1 g.  $\text{TeO}_2$ . The soln. was filtered and to it added slowly 6-7 ml.  $\text{H}_2\text{SO}_4$  (1:1) for 1 g.  $\text{TeO}_2$ . To the acid soln. was added 10-30 ml. of 1.5%  $\text{Fe}(\text{SO}_4)_3$  soln. and the mixt. was distd.; <sup>131</sup>I was collected in a receiver contg. 30 ml.  $\text{H}_2\text{O}$ , 1 mg. NaOH, and if desired, 1 mg.  $\text{Na}_2\text{SO}_4$ . At least 90-100 ml. distillate was collected for each 10 g.  $\text{TeO}_2$  used. — By this method 10-25 g.  $\text{TeO}_2$  yielded an I prepn. with an activity of 1-6 mc./ml.; the yield of <sup>131</sup>I was approx. 90%. M. Hersh

Rm  
Pm

IRML

YERMAKOV, A. N.

✓ Production of bromine-82 radioactive preparations.  
D. I. Ryabchikov, A. N. Ermakov, L. S. Kozyreva, and  
M. S. Petrova. *Primenenie Mechenykh Atomov v Anal.  
Khim., Akad. Nauk S.S.S.R., Inst. Geokhim. i Anal. Khim.*  
1953, 187-91. For the production of Na, K, and NH<sub>4</sub>  
bromides tagged with Br<sup>82</sup>, the starting material was  
BaBr<sub>2</sub> rather than the usually employed org. Br compds.  
The use of the latter is inconvenient and the yield of radio-  
active Br small. BaBr<sub>2</sub> was chosen as target because neu-  
tron bombarded Ba does not form long-life isotopes, it is  
readily available in state of high purity, and Ba is readily  
adsorbed by base exchangers. BaBr<sub>2</sub> (10 g.) irradiated for  
30 hrs. was dissolved in 30 ml. H<sub>2</sub>O and the soln. passed  
through a chromatographic column contg. 90 ml. of swelled  
cationite at a rate of 0.8-1.0 ml./min./sq. cm. The  
column was then washed with 200 ml. H<sub>2</sub>O, thus removing  
all of the Br<sup>82</sup>. As cationite Amberlite IRC-60 was used  
as well as domestic (Russian) cationite KB-4. The cationite  
was treated with N HCl to complete removal of Fe, then  
transformed to a Na, K, or NH<sub>4</sub> form by treating with an  
alk. 10% soln. of NaCl, KCl, or NH<sub>4</sub>Cl, and finally washed  
with H<sub>2</sub>O to complete removal of Cl<sup>-</sup>. By this method  
95% of Br<sup>82</sup> was recovered.

M. Hosh

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Distr: 4843

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J. Rostor Leach

11

cherry red to light brick red depending upon diln.

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

**Overview:** The book is a collection of the principal papers presented in Moscow at the Second Conference on the Use of Inertive Isotopes. The problems discussed at the conference included reprecipitation, aging, and solubility of precipitates, determination of the instability constants

**Sho**

of complex compounds, separation of rare earth metals, and ion-exchange chromatography. No personalities are mentioned. There are 35 references, 15 of which are Soviet, 13 German, 10 French, 6 Swedish, 2 Hungarian, and 2 Czech.

## TABLE OF CONTENTS

Use of Radiative Telescopes (Cont.).	287/900
Ylvisaker, Th. J., B. P. Kibalyak, and A. M. Trofimenko. Studies of the Absorption of Bismuthum on Ion-exchanging Resins from Aqueous Solutions	118
Federstein, I. A., and A. K. Kervruthine. Use of Radio- active Isotopes for Developing Methods for the Separation of Elements with the Aid of Anionites	161
Yurkova, A. N., V. K. Melnyova, and I. I. Murav. Studies of the Anion-exchange in the Complex Per- mittivity of Strontium and Barium with the Omnitro-	170
Lavrenko, A. I., K. Tung-Ping, and V. Koshlokh. Use of Triethylglutaric Acid as a Buffering Solution for the Chromatographic Separation of Ions with Electric	179

# 13

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09/16/2001 11:54 AM 86100513R001962730003-0



AUTHOR: Yermakov, A.M. 75-13-2-25/27

TITLE: Conference on the Use of Radioactive Isotopes in Analytical Chemistry (Konferentsiya po ispol'zovaniyu radioaktivnykh izotopov v analiticheskoy khimii)

PERIODICAL: Zhurnal Analiticheskoy Khimii, 1958, Vol. 13, Nr 2 pp. 262-263 (USSR)

ABSTRACT: An All-Union Conference organized by the Department for Chemical Sciences AS USSR (Otdeleniye khimicheskikh nauk AN SSSR) and by the Commission for Analytical Chemistry at the Institute for Geochemistry and Analytical Chemistry AS USSR imeni V.I. Vernadskiy (Komissiya po analiticheskoy khimii pri Institute geokhimii i analiticheskoy khimii im. V.I. Vernadskogo AN SSSR) took place in Moscow from December 2 to December 4, 1957. Problems of the use of radioactive isotopes in analytical chemistry were discussed at this conference. More than 450 scientific collaborators and representatives of works, amongst whom were besides the Soviet researchers also scientists from foreign countries (England, Bulgaria, Hungary, China, Poland, Romania, USA, Czechoslovakia, Yugoslavia) attended

Card 1/5

75-13-2-25/27

Conference on the Use of Radioactive Isotopes in Analytical Chemistry

this conference. Approximately 50 reports were submitted to the conference, 26 of which were dealt with by the participators. The Plenary Meeting was opened by the Member of Academy A.P. Vinogradov who characterized the main-direction in the use of radioactive isotopes in analytical chemistry. A.V.Nikolayev, A.A.Sorokina and A.S. Maslennikovaya reported on the use of radioactive isotopes in the elaboration of methods for the separation of rare earths. I.P.Alimarin and G.N. Bilimovich reported on the use of isotope-dilution for the determination of some rare elements. The abstract delivered by A.N. Yermakov, V.K. Belyayeva and I.N. Marov was devoted to the use of marked atoms with the investigation of the complex formation of circonium and hafnium with the oxalate-ion according to the method of anion-exchange. I.M.Korenman and F.R. Sheyanova talked about the use of anisotropic (?) (neizotopnykh) indicators for the solution of a series of analytical problems. A.I. Kulak reported at a partial

Card 2/5

75-13-2-25/27

Conference on the Use of Radioactive Isotopes in Analytical Chemistry

meeting on the quantitative determination of micro-admixtures of certain metals in iron-oxide by means of radioactive isotopes. Special attention was paid to the report delivered by V.B. Gaydadyanov and L.I. Il'ina on the analysis of binary tantalum-columbium-melts by means of reflexion (scattering) of beta-rays. G.S. Rozhavskiy and I.Ye. Zimakov dealt with the method of repeated radioactive dilution for the determination of small quantities of admixtures. M.B. Neyman, V.Ye. Yefremov and V.N. Panfilov delivered a report on the determination of alcohols by means of isotopic dilution. K.B. Yatsimirskiy and Ye.N. Roslyakova reported on the radiometric titration and the use of solutions of complex compounds of  $\text{Co}^{60}$ . I.P. Alimarin, A.K. Babko, V.I. Kuznetsov, N.P. Komar', K.B. Yatsimirskiy and others took an active part in the classification of the lectures attended. Professor I.M. Kol'tgof (USA) delivered a very voluminous article on the use of

Card 3/5

75-13-2-25/27

Conference on the Use of Radioactive Isotopes in Analytical Chemistry

radioactive isotopes with the investigation of the aging of crystalline deposits. The lectures delivered by the following authors were also attended: A.K. Lavrukhina, V.P. Shvedov and L.I. Ivanova; M.M. Senyavich, Ye. I. Il'yenko, B.P. Nikol'skiy and A.M. Trofimov; I. Ye. Starik, F.Ye. Starik, A.N. Apollonova; A.K. Babko, P.V. Marchenko; V.I. Kuznetsov, T.G. Akimova; Yu.V. Morachevskiy, A.I. Novikov. G.I. Irving (England) reported in the last session on the analytical chemistry of indium. A.K. Lavrukhina and S.S. Rodin reported subsequently on the investigation of the analytical chemistry of francium by means of the radioactive isotope  $\text{Fr}^{212}$ . K.B. Yatsimirskiy, N.B. Mikheyev, V.I. Kuznetsov and I.V. Tananayev participated especially in the lively discussion of this article. Further reports were delivered by Yu.I. Bykovskaya, A.A. Gridik and N.I. Marunina; M.I. Tsekhanskiy, N.I. Shishkina,

Card 4/5

75-13-2-25/27

Conference on the Use of Radioactive Isotopes in Analytical Chemistry

K.V. Khusnoyarov and G.D. Susloparov; P.V. Zimakov,  
L.A. Krasnousov and K.I. Karasev. A.P. Vinogradov de-  
livered the epilogue of the conference.

1. Chemistry--USSR
2. Radioisotopes--Performance

Card 5/5

5(4)

SOV/78-4-2-39/40

AUTHORS:

Yermakov, A. N., Belyayeva, V. K., Marov, I. N., Chmutova, M. K.

TITLE:

On the Use of Ion Exchange for Investigating the Composition of the Complex Oxalates of Pu(IV), Zr, and Hf (O primeneni i ionnogo obmena k izucheniyu sostava kompleksnykh oksalatov Pu(IV), Zr i Hf)

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 2, pp 493-496 (USSR)

ABSTRACT:

The complex compounds of plutonium, zirconium, and hafnium were investigated by means of the ion-exchange method by oxalic acid. The following formulas of the complexes were found:  $[Pu(C_2O_4)_5]^{6-}$ ,  $[Zr(C_2O_4)_5]^{6-}$ , and  $[Hf(C_2O_4)_5]^{6-}$ . These complexes are formed if oxalate ions in the solution are in excess at pH 5.8-6.2. The distribution coefficients and the exchange constants of the three elements in these compounds are almost equal. The coordination number of the metal in oxalate complexes of plutonium (IV), zirconium, and hafnium is probably 6. There are 1 figure, 3 tables, and 13 references, 10 of which are Soviet.

Card 1/2

SOV/78-4-2-39/40

On the Use of Ion Exchange for Investigating the Composition of the Complex  
Oxalates of Pu(IV), Zr, and Hf

SUBMITTED: November 12, 1958

Card 2/2

5(2).

SOV/78-4-8-18/43

AUTHORS: Ryabchikov, D. I., Yermakov, A. N., Belyayeva, V. K., Marov, I. N.

TITLE: An Investigation of the Complex Formations of Zirconium and Hafnium With Tartaric Acid by Means of the Ion Exchange Method  
(Izucheniye kompleksobrazovaniya tsirkoniya i gafniya s vinnoy kislotoy metodom ionnogo obmena)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 8, pp 1814-1826  
(USSR)

ABSTRACT: The investigation of the complex formations in aqueous solutions of zirconium and hafnium is rendered difficult by a strong tendency of these elements towards hydrolysis and polymerization. Therefore, the usual physico-chemical methods cannot be applied. For this reason the ion exchange method, the investigation of the equilibrium distribution of an element between two phases of a heterogeneous system are suggested. This relatively new method is described in detail on the basis of publication data.

The authors used  $Zr^{95} + Nb^{95}$  for their own experiments. In this case the softer  $\beta$ -radiation of  $Nb^{95}$  was absorbed by an aluminum filter, moreover  $Hf^{181}$  and the cation exchanger KU-2.

Card 1/2



An Investigation of the Complex Formations of Zirconium SOV/78-4-8-18/43  
and Hafnium With Tartaric Acid by Means of the Ion Exchange Method

The solution was buffered with  $\text{NaClO}_4$ . By means of experiments it was found that in the case of a concentration of 2 - 1.3 mol hydrogen ions per liter no hydrolysis or polymerization takes place. The following is assumed to be the probable reaction of the complex formation of Zr and Hf with tartaric acid:  $\text{Me}^{4+} + \text{H}_2\text{tart} \rightleftharpoons \text{MeH}_{2-n}\text{tart}^{4-n} + n\text{H}^+$ . The distribution coefficient was computed and its dependence on the ratio  $\frac{V}{m}$  (Table 3)  $V$  = volume of the solution,  $m$  = weighed portion of the cation exchanger) was determined. Moreover, the number of hydrogen ions released from tartaric acid in the complex formation was determined (Fig 5). The complex compounds of hafnium are more stable than those of zirconium (Tables 3, 4). A sorption of ions of the type  $\text{MeHtart}^{3+}$  or  $\text{MeHtart}^{2+}$  was not observed. Probably they do not take place due to steric factors or the weakening of the ionic charge in consequence of the linkage with the oxy groups of tartaric acid. There are 5 figures, 4 tables, and 38 references, 10 of which are Soviet.

SUBMITTED:  
Card 2/2

KORENMAN, Izrail' Mironovich; VINOGRADOV, A.P., akademik, glavnyy red.;  
BUSEV, A.I., prof., red.toma; ALIMARIN, I.P., red.; BABKO, A.K.,  
red.; VAYNSHTEYN, E.Ye., red.; YERMAKOV, A.N., red.; KUZNETSOV,  
V.I., prof., red.; PALEY, P.N., red.; RYABCHIKOV, D.I., red.;  
TANANAYEV, I.V., red.; CHERNIKHOV, Yu.A., red.; VOLYNETS, M.P.,  
red.izd-va; KASHINA, P.S., tekhn.red.

[Analytical chemistry of thallium] Analiticheskaya khimiya  
talliia. Moskva, Izd-vo Akad.nauk SSSR, 1960. 170 p.

(MIRA 14:3)

(Thallium--Analysis)

RYABCHIKOV, Dmitriy Ivanovich; GOL'BRAYKH, Yevgeniya Kas'yanovna; VINOGRADOV, A.P., akademik, glavnyy red.; ALIMARIN, I.P., red.toma; PALEY, P.N., red.toma; BABKO, A.K., red.; BUSEV, A.I., red.; VAYNSHTEYN, E.Ye.; red.; YERMAKOV, A.N., red.; KUZNETSOV, V.I., red.; TANANAYEV, I.V., red.; CHERNIKHOV, Yu.A., red.; TRIFONOV, D.N., red.izd-vs; POLENOVA, T.P., tekhn.red.

[Analytical chemistry of thorium] Analiticheskaya khimiya toriya.  
Moskva, Izd-vo Akad.nauk SSSR, 1960. 295 p. (MIRA 13:10)  
(Thorium--Analysis)

~~6155~~ 69536

S/078/60/005/05/11/037  
B004/B016

5.2200

AUTHORS: Ryabchikov, D. I., Yermakov, A. N., Belyayeva, V. K., Marov, I. N.

TITLE: Complex Formation<sup>1</sup> of Zirconium<sup>2</sup> and Hafnium<sup>2</sup> With Some Hydroxy Acids

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 5, pp. 1051-1067

TEXT: The authors intended to investigate the stability of the complex compounds of Zr and Hf with various organic acids, and, in the case of differences in their stability, the development of a method of separating these two elements. G. A. Yevtikova took part in this investigation. The authors describe the reagents applied (tartaric acid, citric acid, malic acid, trihydroxy-glutaric acid,  $\text{HClO}_4$ ,  $\text{ZrOCl}_2 \cdot 8\text{H}_2\text{O}$ ,  $\text{HfOCl}_2 \cdot 8\text{H}_2\text{O}$ , cation exchangers of the KU-2 type, anion exchangers of the

EDE-10p type).  $\text{Zr}^{95}$  and  $\text{Hf}^{181}$  were used as tracers. Preliminary experiments indicated that dicarboxylic acids (glutaric, glutamic, succinic, malonic, maleic, and fumaric acid) do not form complexes with Zr or Hf, whereas the afore-mentioned hydroxy acids (and the mesoxalic acid) change the distribution of Zr and Hf even in strongly acid media by the formation of stable complexes. Tables 1-5 give the experimental data for the five hydroxy acids in the presence of 0.125, 0.5, 1, and 2 M  $\text{HClO}_4$ , and the partition coefficients  $K_d$  as well as the separation factor  $\alpha = K_{d_{\text{Hf}}} / K_{d_{\text{Zr}}}^4$ .

Card 1/2

Complex Formation of Zirconium and Hafnium With Some Hydroxy Acids

65936 69536

S/078/60/005/05/11/037  
B004/B016

Figs. 1-5 show the change of  $K_d$  in dependence on the concentration of the organic acid.  $K_{dZr}$  is always smaller than  $K_{dHf}$ . For citric acid,  $\alpha = 4$ . The separation of Zr and Hf by means of KU-2 cation exchangers by elution with 1M HClO<sub>4</sub> and 0.0256 M citric acid is based thereupon, as suggested and described by the authors. Fig. 6 shows the yield curves of the chromatographically separated complexes of Zr and Hf, which were identified by measuring their peaks by means of a  $\gamma$ -spectrometer (Fig. 7). This was carried out by G. A. Chernov. Figs. 8-11 show the dependence of  $1/K_d$  on the concentration of the complexing substance. The authors determined the number of coordinate groups for the Zr and Hf complexes with the organic acids (Figs. 12-15). Table 6 presents the data for the adsorption of Hf onto the EDE-10p anion exchanger. The formation coefficients of the complexes are given in Table 7. The authors discuss the structure of the complex compounds. As may be seen from Table 8, dicarboxylic acids (succinic acid) do not form complex compounds, hydroxy-dicarboxylic acids, however, do. This is indicative of the participation of both carboxyl and hydroxyl groups in the complex formation. The stability of the complex compounds of Zr and Hf decreases in the following order: Oxalic acid > mesoxalic acid > trihydroxy-glutaric acid > citric acid > lactic acid > tartaric acid > malic acid. There are 15 figures, 8 tables, and 3 Soviet references.

SUBMITTED: July 30, 1959  
Card 2/2

S/078/60/005/012/016/016  
B017/B064

AUTHORS: Marov, I. N., Belyayeva, V. K., Yermakov, A. N., and  
Ryabochikov, D. I.

TITLE: Chromatographic Separation of Zirconium and Hafnium

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 12,  
pp. 2844-2847

TEXT: A new method of separating zirconium and hafnium by means of the KY-2 (KU-2) cationite was developed. A solution of 0.025 mole citric acid and 1 mole perchloric acid, or 1 mole nitric acid, was used as desorbent. The rate of desorption is 0.5 - 0.6 ml/min·cm<sup>2</sup>. Zirconium and hafnium were radiometrically analyzed in the extracts with the isotopes

Zr<sup>95</sup> and Hf<sup>181</sup>. Fig. 1 shows the curves for the chromatographic distribution of Zr<sup>95</sup> (+Nb<sup>95</sup>) and Hf. It was found that with an increased loading of the cationite the value  $V_{\max}$  rises, and the ratio

$V_{\max}^{\text{Hf}}/V_{\max}^{\text{Zr}}$  decreases. This effect is explained by the formation of polynuclear zirconium complexes, and the effect of the large zirconium  
Card 1/2

Chromatographic Separation of Zirconium  
and Hafnium

S/078/60/005/012/016/016  
B017/B064

quantity upon the chemical behavior of hafnium. Fig. 2 shows the desorption curve of the chromatographic separation of  $Nb^{85}$  from zirconium and hafnium. The effect of mineral acids as desorbents upon the intensity of zirconium separation from hafnium was investigated, and it was found that when  $H_2SO_4$  is used as desorbent separation is easier than when  $HNO_3$  is used. The stability of zirconium and hafnium complexes with mineral acids decreases in the order:  $H_2SO_4 \gg HCl > HNO_3$ . G. A. Yevtikova assisted in the work. There are 2 figures and 3 references: 2 Soviet and 1 US. ✓

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I.  
Vernadskogo Akademii nauk SSSR  
(Institute of Geochemistry and Analytical Chemistry imeni  
V. I. Vernadskiy of the Academy of Sciences USSR)

SUBMITTED: May 26, 1960

Card 2/2

BUSEV, Aleksey Ivanovich; VINOGRADOV, A.P., akademik, glav. red.;  
ALIMANIN, I.P., red.; BABKO, A.K., red.; VAYNSHTEYN, E.Ye.,  
red.; YERMAKOV, A.N., red.; KUZNETSOV, V.I., red.; PALEY, P.N.,  
red.; RYABCHIKOV, D.I., red.; TANANAYEV, I.V., red.; CHERNIKHOV,  
Yu.A., red.; VOLYNETS, M.P., red.; MAKUNI, Ye.V., tekhn. red.

[Analytical chemistry of molybdenum] Analiticheskaya khimiya mo-  
libdena. [By] A.I. Busev. Moskva, Izd-vo Akad. nauk SSSR, 1962.  
300 p. (MIRA 16:1)

(Molybdenum--Analysis)



UDAL'TSOVA, N.I.; SAVVIN, S.B.; NEMODRUK, A.A.; NOVIKOV, Yu.P.;  
DOBROLYUBSKAYA, T.S.; SIHYAKOVA, S.I.; BILIMOVICH, G.N.;  
SEMDYUKOVA, A.S.; BELYAYEV, Yu.I.; YAKOVLEV, Yu.V.;  
NEMODRUK, A.A.; CHMUTOVA, M.K.; GUSEV, N.I.; PALEY, P.N.;  
VINOGRADOV, A.P., akademik, glav. red.; ALIMARIN, I.P.,  
red.; BABKO, A.K., red.; BUSEV, A.I., red.; VAYNSHTEYN, E.Ye.,  
red.; YERMAKOV, A.N., red.; KUZNETSOV, V.I., red.; RYABCHIKOV,  
D.I., red. toma; TANANAYEV, I.V., red.; CHERNIKHOV, Yu.A., red.;  
SENYAVIN, M.M., red. toma; VOLYNETS, M.P., red.; NOVICHKOVA, H.D.,  
tekhn. red.; GUS'KOVA, O.M., tekhn. red.

[Analytical chemistry of uranium] Analiticheskaya khimiya urana.  
Moskva, Izd-vo Akad.nauk SSSR, 1962. 430 p. (MIRA 15:7)

1. Akademiya nauk SSSR. Institut geokhimii i analiticheskoy  
khimii.

(Uranium--Analysis)

YERMAKOV, A.N.

An inductive transducer for the anisotropy of electrical conductivity  
of nonmagnetic materials. Avtom.kont.i imm.tekh. no.6:133-138 '62.  
(MIRA 16:2)

(Metals—Testing)

(Metals—Measurement)

S/078/62/007/001/001/005  
B119/B110

AUTHORS: Ryabchikov, D. I., Yermakov, A. N., Belyayeva, V. K., Marov, I. N., Yao K'o-min

TITLE: Application of ion exchange for studying the complex formation of zirconium and hafnium with sulfate ion

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 7, no. 1, 1962, 69-75

TEXT: The experimental part of the present paper was carried out by the method described in Refs. 8 and 9 (Ref. 8: D. I. Ryabchikov, A. N. Yermakov, V. K. Belyayeva, I. N. Marov, Zh. neorgan. khimii, 4, 1814 (1959); Ref. 9: The same authors, Zh. neorgan. khimii, 5, 1051 (1960)). Anion exchanger 3A3-107 (EDE-10P) and cation exchanger KJ-2 (KU-2) were used. The complex formation of Zr and Hf with sulfuric acid was examined by cation exchange in chloric-acid solution with a hydrogen-ion concentration of  $[H^+] = 2.33$  moles/l. At sulfuric-acid concentrations of up to 0.1 mole/l, three complexes form with Zr, which correspond to the ratios of metal :  $H_2SO_4 = 1 : 1$ ,  $1 : 2$ , and  $1 : 3$ . Hf forms two complexes corresponding to metal :  $H_2SO_4 = 1 : 1$  and  $1 : 2$ . The equilibrium

Card 1/3

Application of ion exchange ...

S/078/62/007/001/001/005  
B119/B110

constants of the complexing reactions were calculated by methods of Fronaeus and Schubert.

$$\left[ K_j = \frac{[M(SO_4)_j]^{4-2j} [H^+]^j}{[M^{4+}] [HSO_4^-]^j} \right] \text{. Values for Zr: } K_1 = 361 \pm 12,$$

$$K_2 = (2.17 \pm 0.15) \cdot 10^3, K_3 = (4.06 \pm 1.2) \cdot 10^5; \text{ for Hf: } K_1 = 130 \pm 6.$$

$K_2 = (2.09 \pm 0.1) \cdot 10^3$ . It has been found that the complex  $M(SO_4)^{2+}$  is absorbed by the cation exchanger KY-2 (KU-2) within the limits of error. Mention is made of papers by V. F. Saksin (Ref. 4: Nauchn. dokl. vysshey shkoly. Khimiya i khim. tekhnologiya no. 1.75 (1959)), A. K. Kirakosyan, I. V. Tananayev (Ref. 5: Zh. neorgan. khimii, 4, 852 (1959)), Ye. P. Mayorova, V. V. Fomin (Ref. 11: Zh. neorgan. khimii, 3, 1937 (1958)). There are 6 figures, 4 tables, and 12 references: 5 Soviet and 7 non-Soviet. The four most recent references to English-language publications read as follows: E. L. Zebroski, H. W. Alter, F. K. Neumann, J. Amer. Chem. Soc., 76, 5646 (1954); R. A. Day, R. N. Wilhite, F. D. Hamolton, J.

Card 2/3

Application of ion exchange ...

S/078/62/007/001/001/005  
B119/B110

Amer. Chem. Soc., 77, 3180 (1955); J. C. Sullivan, J. C. Hindman. J. Amer.  
Chem. Soc., 76, 593 (1954); B. A. I. Lister. J. Chem. Soc. (11), 3123  
(1951).

SUBMITTED: January 3, 1961

Card 3/3

L 13505-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD/JG  
 ACCESSION NR: AP3003474 S/0078/63/008/007/1623/1633

AUTHOR: Yermakov, A. N.; Marov, I. N.; Belyayeva, V. K.

TITLE: Properties of aqueous solutions of zirconium oxychloride<sup>21</sup>

63  
56

SOURCE: Zhurnal neorganicheskoy khimii, v. 8, no. 7, 1963, 1623-1633

TOPIC TAGS: zirconium, zirconium oxychloride, potentiometry, cryoscopy

ABSTRACT: The authors studied the condition of zirconium in aqueous solutions of  $ZrOCl_2 \cdot 8H_2O$  by potentiometric, cryoscopic, and electric conductivity methods, and by measuring the diffusion rate. Purpose of study was to obtain information concerning hydrolysis and degree of polymerization of this compound.  $ZrOCl_2 \cdot 8H_2O$ , thrice recrystallized from a commercial chloride solution, was used for the study. The composition of the compound corresponded precisely to the formula. The solutions to be tested were prepared by dissolving a weighed portion of the salt in distilled water which was chilled to  $3-4^\circ$ . The solutions were kept at this temperature for 24 hours. In all cases, each experiment was repeated no less than two times. Authors determined the activity of hydrochloric acid in zirconium oxychloride solutions at 0.2, 10, and  $25^\circ$  in concentration ranges of 0.006-0.38 mol/l. The drops in the freezing points of the zirconium oxychloride solutions were measured in relation to salt concentration

Card 1/2

L 13505-63

ACCESSION NR: AP3003474

and aging conditions of the solution. The diffusion coefficients of the salts of  $ZrOCl_2 \cdot 2.8H_2O$ ,  $HfOCl_2 \cdot 2.8H_2O$ , and  $ThCl_4$  were determined. The electrical conductivity of zirconium oxychloride solutions was measured at 0.2, 10 and 25° in concentration range of 0.0617-0.3868 mol/l. Obtained results shown that products of slight molecular weight exist in zirconium oxychloride solutions. "The authors express their gratitude to D. I. Ryabchikov, V. O. Shpikiter, D. I. Leykis, O. L. Kabanova, V. V. Fomin and Yu. M. Kesler for valuable suggestions and help in the work." Orig. art. has: 5 figures and 6 tables. 7

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. B. I. Vernadskogo, Akademi nauk, SSSR (Institute of Geochemistry and Analytical Chemistry, Academy of Sciences, SSSR)

SUBMITTED: 14Sep62

DATE ACQ: 02Aug63

ENCL: 00

SUB CODE: CH

NO REF SOV: 009

OTHER: 020

Card 2/2

ACCESSION NR: AP4012454

S/0078/64/009/002/0499/0501

AUTHORS: Yermakov, A. N.; Marcv, I. N.; Yevtikova, G. A.

TITLE: Zirconium- and hafnium-complex formations with triacetonitrile

SOURCE: Zhurnal neorg. khim., v. 9, no. 2, 1964, 499-501

TOPIC TAGS: triacetonitrile, zirconium complexes, hafnium complexes, complexones, Zr-Hf complexes,

ABSTRACT: While inorganic complexes of  $Zr^{4+}$  and  $Hf^{4+}$  and their equilibrium and stability constants are known, nothing is known about their complexes with such wide spread substances as complexones. Therefore the authors undertook a study of  $Zr^{4+}$  and  $Hf^{4+}$  complex formation with triacetonitrile (TAN) in a strongly acidic medium and determined the compositions and the equilibrium constants of complex forming. In the tests, the ion exchange method was applied, and cation exchange resin KU-2 was used. Metal concentration ( $Zr^{95}+Nb^{95}$ ,  $HE^{181}$ ) was  $10^{-6}$  mol/l and acidity 1-2 mol/l  $HClO_4$ . TAN concentration varied between  $0.4 \cdot 10^{-4}$  and  $25 \cdot 10^{-4}$  mol/l; and its equilibrium concentration nearly equals the analytical. Tables of

Card 1/2



ACCESSION NR: AP4012454

experimental data were drawn up and corresponding curves plotted. It was found that in 1 and 2 mol solution of  $\text{HClO}_4$ , complexes of 1:1 type are formed. Formation constants of  $\text{HfA}^+$  and  $\text{ZrA}^+$  are determined as  $(0.68 \pm 0.03) \cdot 10^4$  and  $(1.2 \pm 0.1) \cdot 10^4$  / 2 mol  $\text{HClO}_4$ ;  $(11.2 \pm 2.0) \cdot 10^4$  and  $(27.4 \pm 2.6) \cdot 10^4$  / 1 mol  $\text{HClO}_4$ , respectively. It was found that in the TAN interaction with  $\text{Zr}^{4+}$  and  $\text{Hf}^{4+}$  ions, three hydrogen ions are liberated. Orig. art. has: 1 Figure, 10 Formulas, 2 Tables.

ASSOCIATION: None

SUBMITTED: 25Jul63

DATE ACQ: 26Feb64

ENCL: 00

SUB CODE: CH

NR REF SOV: 002

OTHER: 003

Card 2/2

YERMAKOV, A.N.; YUDINA, L.D.

Using electromagnetic methods in determining the thickness of metal sheets. Vop. mekh. real. tver. tela no.3:146-162 '64.

Method for determining electric conductivity directly in the metal-sheet material. Ibid.:163-173

(MIRA 17:11)

YERMAKOV, A.N.; MAROV, I.. : BELYAYEVA, V.K.; KAZANSKIY, L.P.

State of hafnium oxychloride in aqueous solutions. Zhur. neorg.  
khim. 9 no.10:2354-2358 0 '64.

(MIRA 17:12)

L 9803-66 ENT(m)/ETC/EPF(n)-2/ENG(m)/EWP(j)/T/EWP(t)/EWP(b) IJP(c) DS/JD/m/JJY  
 ACC NR: AT5026383 GS/RM SOURCE CODE: UR/0000/65/000/000/0294/0311 70  
 68  
 12+1

AUTHOR: Yermakov, A. N.; Marov, I. N.; Belyayeva, V. K.; Ryabchikov, D. I.  
 (Corresponding member AN SSSR)

ORG: None

TITLE: Study of the complexing of zirconium and hafnium in solutions by the ion exchange method

SOURCE: AN SSSR. Institut geokhimii i analiticheskoy khimii. Sovremennyye metody analiza; metody issledovaniya khimicheskogo sostava i stroeniya veshchestv (Modern methods of analysis; methods of investigating the chemical composition and structure of substances), 294-311

TOPIC TAGS: zirconium, hafnium, zirconium compound, hafnium compound, ion exchange, chemistry technique, analytic chemistry

ABSTRACT: Despite the growing interest in the chemistry of zirconium and hafnium, few studies have been performed on their complexing with organic and inorganic substances. There are only few determinations of the composition and stability constants of complex compounds of zirconium, and no analogous data for hafnium. New methods of investigation have made possible a more thorough approach to the study of processes of complexing of zirconium and hafnium with various substances in solutions. The present review article gives the results of some of the experiments conducted by the authors on the equilibrium reactions

UDC: 543.06

Card 1/2

L 9803-66

ACC NR. AT5026383

of complexing of ions of zirconium and hafnium with inorganic and organic ligands. The behavior of these elements in sulfate, nitrate, and chloride solutions are studied. Oxalic acid, several carbonic and hydroxycarbonic acids, and other complexes were extracted from the organic substances. The authors used the ion exchange method to determine the compositions and the stability constants. Soviet ionites (KU-2 cationite and the EDE-10P anionite)<sup>15</sup> were used in the experiments. Orig. art. has: 8 figures and 11 tables. 2

SUB CODE: 07 / SUBM DATE: 05Jul65 / ORIG REF: 030 / OTH REF: 032

Card 2/2

RYADCHIKOV, D.I. [deceased]; MAROV, I.N.; DUBROV, Yu.N.; BELYAYEVA, V.K.;  
YERMAKOV, A.N.

Stopped complex-forming reactions studied by the electron  
paramagnetic resonance method. Dokl. AN SSSR 166 no.3:623-  
626-Ja '66. (MIRA 19:1)

1. Institut geokhimii i analiticheskoy khimii im. V.I.  
Vernadskogo AN SSSR. Submitted July 19, 1965.

ACC NR: AP6036845

SOURCE CODE: UR/0020/66/171/002/0385/0388

AUTHOR: Marov, I. N.; Dubrov, Yu. N.; Belyayeva, V. K.; Yermakov, A. N.

ORG: Institute of Geochemistry and Analytical Chemistry im. V. I. Vernadskiy, Academy of Sciences, SSSR (Institut geokhimi i analiticheskoy khimii Akademii nauk SSSR)

TITLE: Electron paramagnetic resonance of the iodide complex of Mo(V)

SOURCE: AN SSSR. Doklady, v. 171, no. 2, 1966, 385-388

TOPIC TAGS: molybdenum compound, EPR spectrum, iodide

ABSTRACT: The EPR spectrum of the iodide complex of Mo(V) was studied with an RE-1301 spectrometer at ~9000 Mo. In all cases, EPR signals with  $g = 2.058 \pm 0.004$  were obtained. A study of the influence of various methods of preparation of the complex, concentration dependence and formation of mixed complexes (HI + HCl, HI + HBr) showed that the line with  $g = 2.058$  belongs indeed to the iodide complex of Mo(V), which has the same composition and structure as other halide complexes of Mo(V). Thus, the  $g$  factor of the iodide complex is greater than that of the free electron, this being very unusual for ions with a single  $d$  electron. An attempt was made to obtain more detailed information on  $g$  factors by studying the EPR spectra of the iodide complex of Mo(V) at 77°K; the values  $g_1 = 2.258 \pm 0.005$  and  $g_2 \approx 1.97$  were thus obtained. By using the average value of the  $g$  factor,  $g_1$  and the relation

Card 1/2

UDC: 541.67+546.77+538.113

ACC NR: AP6036845

$g = 1/3 (g_1 + 2g_2)$ , the value  $g_1 = 1.955$  was obtained. Causes of the variation of  $g$  factors in the series of halide complexes of molybdenyl are discussed. This variation can be accounted for only by considering spin-orbital interactions on the ligand and the contribution of the electron transitions from bonding orbitals. The paper was presented by Academician Vinogradov, A. P., 14 May 66. Orig. art. has: 3 figures, 2 tables and 2 formulas.

SUB CODE: 07/ SUBM DATE: 14 May 66/ ORIG REF: 005/ OTH REF: 004

20/

Card 2/2



RYABCHIKOV, D.I. [deceased]; MAROV, I.H.; DUBNOV, Ya.N.; BELYAYEVA, V.K.;  
YERMAKOV, A.H.

Electron paramagnetic resonance of molybdenum complex compounds.  
Dokl. AN SSSR 165 no.4:842-844 D '65.

(MIRA 18:12)

1. Institut geokhimii i metallicheskoy khimii im. V.I.  
Vernadskogo AN SSSR. 2. Chlen-korrespondent AN SSSR (for  
Ryabchikov).

31462  
S/651/61/000/005/005/009  
D209/D303

9.3280 (1147,1159)

AUTHOR: A.N. Yermakov

TITLE: Cathode switch detector

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TEXT: This paper describes the operation of a cathode switch detector that can be used in the pulse measuring technique, in phase sensitive circuits, or as a peak detector for measuring short pulses. The operation of the cathode detector commutated by rectangular voltage pulses coherent with the voltage acting on the control grid is described and following expressions denoted (see Fig. 1 and Fig. 2) :

$$U_{Cn} \cong \mu U_g \frac{R_k(1 - e^{-P_1})}{(p_1 + p_2)(R_i + R_k e^{-P_1})} \quad (2)$$

Card 1/4

Cathode switch detector

311,62  
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where:  $n = 1, 3, 5, \dots 2i + 1$  - number of pulses;  $U_{Cn}$  - voltage across  $C_k$  at the time of appearance of an  $n$ th pulse;  $U_{CT}$  - voltage across  $C_k$  in the presence of a constant potential on the screen grid acting during the period  $T$ ;  $P_1 = t/\tau$  charge and  $\tau$  charge =  $C_k R_i$ ;  $P_2 = T - \tau_1 / \tau$  discharge and  $\tau$  discharge =  $C_k R_k$ ;  $\tau_1$  - length of incoming pulse. Assuming that

$$|U_m \sin \omega t_0 - U_m \sin \omega \tau_1| < \epsilon \quad (3)$$

and that  $|\tau_1 - t_0| < \eta$ , where  $\epsilon \rightarrow 0$  with  $\eta \rightarrow 0$ , the transfer coefficient of the circuit becomes

$$K = \frac{U_C}{U_{in}} \cong \mu \frac{R_k (1 - e^{-P_1})}{(P_1 + P_2) (R_i + R_k e^{-P_1})} \quad (4)$$

For a pentode with large  $\mu$ ,  $K$  may equal 30 to 50. The magnitude  $U_m(\sin \omega$

Card 2/4

Cathode switch detector

311,62  
S/651/61/000/005/005/009  
D209/D303

$t_0$ ) is not amplified due to the presence of a 100 % a.c. negative feedback from the moment  $t_0$ . The maximum possible length of commutating pulse is

$$\tau_m = \frac{1}{\omega} \arcsin [(\gamma K + 1) \sin \omega t_0], \quad (5)$$

where

$$\gamma = \frac{U_m (\sin \omega \tau_1 - \sin \omega t_0)}{K \times U_m \sin \omega t_0}$$

and K - amplification factor ( $\gamma$  - non linear distortion factor). A practical example is worked out with known values of parameters: The circuit of the cathode detector is very selective and, therefore, it can be utilized in an equipment measuring magnitudes with correspondingly high noise to signal ratio. The circuit described in this paper forms the basis of an instrument designed to measure magnetic characteristics of materials. This instrument is now being subjected to laboratory tests. There are 5 figures and 5 Soviet-bloc references.

Card 3/4