

DMITRIYEV, I.N., inzh.; NIZOVITSEV, A.M., inzh.

Use of the International System of Units in the chemical machinery
manufacture (discussion). Khim.mashinostr. no.5:39-42 S-0 '63.

POPOV, Vladimir Petrovich; DMITRIYEV, I.N., red.; TRUKHINA, O.N.,
tekhn. red.

[Polymers in the mechanization of agriculture] Polimery v
mekhanizatsii sel'skogo khoziaistva. Moskva, Sel'khoziz-
dat, 1962. 86 p. (MIRA 15:10)
(Polymers) (Agricultural machinery)

YASHCHENKO, V.A.; DMITRIYEV, I.N., red.; GREBTSOV, P.P., red.;
TRUKHINA, O.N., tekhn. red.

[Machine milking of cows] Mashinnoe doenie korov, Moskva,
Sel'khozizdat, 1962. 222 p. (MIRA 16:6)
(Milking machines)

AVDEYEV, N.Ye.; KOROBV, V.A.; SOLOV'YEV, V.M.; DMITRIYEV, I.N., red.;
DEYEVA, V.M., tekhn.red.; TRUKHINA, O.N., tekhn.red.

[Concise manual for the combine operator] Kratkii spravochnik
kombainera. Izd. 3., perer. i dop. Moskva, Sel'khozizdat, 1962.
291 p. (MIRA 16:6)

LIVSHITS, L.G., kand. tekhn. nauk; POLYACHENKO, A.V., kand. tekhn. nauk; DMITRIYEV, I.N., red.; MAKHOVA, N.N., tekhn. red.; SOKOLOVA, N.N., tekhn. red.

[Reconditioning motor-vehicle and tractor parts]Vosstanovlenie avtotraktornykh detalei. Moskva, Sel'khozizdat, 1962. 319 p. (MIRA 15:10)

1. Gosudarstvennyy vsesoyuznyy nauchno-issledovatel'skiy tekhnologicheskii institut remonta i ekspluatatsii mashinno-traktornogo parka (for Livshits, Polyachenko).

(Tractors--Maintenance and repair)

(Motor vehicles--Maintenance and repair)

SHAPOVALOV, K.S.; DMITRIYEV, I.N., red.; TRUKHINA, O.N., tekhn.
red.

[The KDUE-16 "Omichka" conveyor-circular milking ar-
rangement] Konveierno-kol'tsevaia doil'naia ustanovka
KDUE-16 "Omichka." Moskva, Sel'khozizdat, 1963. 46 p.
(MIRA 17:1)

(Milking machines)

SLAVIN, R.M.; VASIL'YEV, V.G.; GERAS'KOV, N.I.; KISHECHNIKOV,
S.A.; DMITRIYEV, I.N., red.; TRUKHINA, O.N., tekhn.red.

[Overall mechanization in poultry raising] Kompleksnaia
mekhanizatsiia v ptitsevodstve. [By] R.M.Slavin i dr. Mo-
skva, Sel'khozizdat, 1963. 287 p. (MIRA 17:2)

DENISOV, A.D.; BALAKIN, V.M., red.; DMITRIYEV, I.N., red.

[Loose housing of cattle] Bespriviaznoe sodержanie skota;
sbornik statei. Moskva, Sel'khozizdat, 1963. 389 p.
(MIRA 17:6)

BUDZKO, I.A., akademik; BOLTINSKIY, V.M., akademik; SELIVANOV, A.I.,
doktor tekhn. nauk; IZAKSON, Kh.I., inzh. laureat Leninsoy
premi; DMITRIYEV, I.N., red.

[Contribution of science to agriculture; mechanization and
electrification] Nauka sel'skomu khoziaistvu; mekhanizatsiia
i elektrifikatsiia. Moskva, Koles, 1964. 287 p

(MIRA 18:3)

1. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk imeni
V.I.Lenina (for Budzko, Boltinskiy). 2. Chlen-korrespondent
Vsesoyuznoy akademii sel'skokhozyaystvennykh nauk imeni V.I.
Lenina (for Selivanov). 3. Glavnyy konstruktor Taganrogskego
kombaynovogo zavoda (for Izakson).

DUBROVSKIY, V.A.; DMITRIYEV, I.N., red.

[Fitting work in repairing agricultural equipment]
Slesarnye raboty pri remonte sel'skokhoziaistvennoi
tekhniki. Moskva, Kolos, 1965. 141 p. (MIRA 18:7)

GOBETSKAYA, Z.D.; BARANOVSKIY, Yu.V.; BERLINER, M.S.; BRAKMAN, L.A.;
EZENETSOVA, N.I.; MALYAROV, L.N.; CHUYAN, K.I.; DOBRUSHA, Ye.M.;
LEONT'YEV, I.B.; MARTYNOV, B.P.; ROSLYAKOVA, S.V.; HUGAYEVA,
V.A.. Primal uchastiye ~~DMITRIYEV, I.P.~~ STRUZHESTRAKH, Ye.I.,
inzh., red.; EL'KIND, V.D., tekhn.red.

[General engineering norms for cutting operations and time for
broaching] Obshchemashinostroitel'nye normativy rezhimov rezaniia
i vremeni na protiazhnye raboty. Moskva, Gos.nauchno-tekhn.izd-vo
mashinostroit.lit-ry, 1959. 73 p. (MIRA 12:12)

1. Moscow. Nauchno-issledovatel'skiy institut truda. Tsentral'noye
byuro promyshlennykh normativov po trudu. 2. Rabotniki Nauchno-
issledovatel'skogo instituta tekhnologii avtomobil'noy promyshlennosti
(NII Avtoprom) (for all, except Struzhestrakh, El'kind).
(Broaching machines)

DMITRIYEV, I.P.

TIKHONOVA, Z.I.; STEPANOVA, M.N., kandidat meditsinskikh nauk; MESHALKIN, Ye.N., kandidat meditsinskikh nauk; BAKULEV, A.N., professor; GULYAYEV, A.V., professor; VOZNESENSKIY, V.P., professor; DMITRIYEV, I.P., professor; OGHEV, B.V., professor; VAZA, D.L., professor; PETNOY, E.A., professor, predsedatel'; DOROFEYEV, V.I., sekretar'.

Minutes of the session of the Surgical Society of Moscow and Moscow Province of June 27, 1952. Khirurgiya no.3:84-88 Nr 153. (MIRA 6:6)

1. Khirurgicheskoye obshchestvo Moskvy i Moskovskoy Oblasti.
(Heart--Surgery) (Cardiovascular system--Surgery)

DMITRIYEV, IVAN PETROVICH

DMITRIYEV, Ivan Petrovich, professor; PETROVSKIY, B.A., redaktor;
~~SAGHEVA, A.I.; tekhnicheskii redaktor~~

[Surgical operations on the heart valves; experimental anatomy
research] Operatsii na klapanakh serdtsa; anatomo-eksperimental'-
noe issledovanie. Moskva, Gos. izd-vo meditsinskoi lit-ry, 1954.
38 p. (MLRA 8:3)

(Heart--Valves--Surgery)

KIRILLOV, Valerian Valerianovich; DMITRIYEV, I.N., retsenzent;
MATVEYEV, L.T., otv. red.; YASNOGORODSKAYA, M.M., red.

[International System of Units of Measurement (SI) in
meteorology] Mezhdunarodnaia sistema edinits izmerenii
(SI) v meteorologii. Leningrad, Gidrometeoizdat, 1965.
150 p. (MIRA 19:1)

14

PROCESSES AND PROPERTIES INDEX

The Oxygen Cutting of a Metal without Continuous Preheating. I. N. Duntrey and N. M. Abolotov. *CAW* (Communist) 1949, No. 5, Pp. 4-7. (In Russian). The method for the oxygen cutting of steel described is based on the preheating of the oxygen by reaction with a carbon tube through which it is passed. An arc is struck between the tube and the metal, which heats the metal and the tip of the tube. When the metal reaches the ignition temperature, the current is switched off and oxygen is admitted; this maintains the temperature of the tube. The consumptions of oxygen, carbon, and electricity are given. S. K.

ASAP-31A METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND LETTERS

3RD AND 4TH LETTERS

5TH AND 6TH LETTERS

7TH AND 8TH LETTERS

9TH AND 10TH LETTERS

11TH AND 12TH LETTERS

13TH AND 14TH LETTERS

15TH AND 16TH LETTERS

17TH AND 18TH LETTERS

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83RD AND 84TH LETTERS

85TH AND 86TH LETTERS

87TH AND 88TH LETTERS

89TH AND 90TH LETTERS

91ST AND 92ND LETTERS

93RD AND 94TH LETTERS

95TH AND 96TH LETTERS

97TH AND 98TH LETTERS

99TH AND 100TH LETTERS

DMITRIYEV, I.S.

USSR/Engineering - Welding Methods Aug 51

"Welding Rods for Reinforced Concrete by
N. G. Slavyanov's Method," Docent S. T.
Nazarov, Docent I. S. Dmitriyev, Cand Tech
Sci

"Avtogen Delo" No 8, pp 6-9

Describes expts for application of bath
method of elec-arc welding using ac or
dc welding machines. Quality of welding
by this method may be easily examd with
the aid of gamma-rays. Equipment is con-
venient for transportation.

200T48

ASM

402-K Choice of Method of Welding and Apparatus for Preparation of
Frameworks for Reinforced Concrete Buildings. (In Russian.) I. S.
Dmitriev. Avtozhenoe Delo, v. 22, Oct. 1951, p.17-20
Discussed and classified in tabular form. (K general, T26, CN)

DMITRIYEV, DOCENT I. S.

USSR/Engineering - Hydraulic Structures, Apr 52
Welding

"Application of Expedient Welding Methods in Great Structures of Communism as Essential Measure for Metal Conservation," Docent I. S. Dmitriyev, Card Tech Sci

"Avtogen Delo" No 4, pp 15-18

Discusses factors contributing to metal conservation due to using welded reinforcement in concrete, namely: welded reinforcing frames, use of optimum welding methods for joining rods, spot welding of rods, electrodes with high-quality coating, and

212T34

quality control of welded joints. Concludes that there are still many unused possibilities for improvement, despite wide application of welding in hydraulic construction works for period of 17 years.

212T34

DEIRIYEV, I. S.

Contribution of the All-Union Engineering and Technical Society of welders
to the great construction projects of communism; Avtog. delo 23, no 2, 1952.

DMITRIYEV, I.S.

BYKOV, N.D.; FISHBERG, V.M.; DMITRIYEV, I.S.; SOKOLOV, Ye.V.; SHCHERBININ, A.A.

Electric arc welding of concrete reinforcements by the dip method in
factories and on construction sites. Rats.i izobr.predl. v stroi.
no.100:6-10 '54. (MIRA 8:10)

(Electric welding)

DMITRIYEV, I.S., kand. tekhn. nauk, dots.; BORISOV, I.V., inzh.;
KRYUKOVSKIY, N.N., inzh.; MODEL', B.I., tekhn. red.

[Investigations and industrial practice in welding] Issledovaniia i proizvodstvennyi opyt po svarke. Moskva, Mashgiz, 1955. 221 p. (MIRA 16:7)

1. Vsesoyuznoye nauchnoye inzhenerno-tekhnicheskoye obshchestvo svarochnogo dela.

(Welding)

DMITRIYEV, I.S.

~~DMITRIYEV, I.S.~~
Socialist competition in the All-Union Scientific Society of Welding
Engineers and Technicians. Svar. proizv. no.1:31-32 Ja '55.
(MLRA 8:9)

1. Uchenyy sekretar' Vsesoyuznogo nauchnogo inzhenerno-tekhnicheskogo
obshchestva svarchikov. (Socialist competition)

DMITRIYEV, I.S., kandidat tekhnicheskikh nauk

In the All-Union Scientific Society of Welding Engineers and Technicians. Svar. proisv. no.2:3 of cover F '55.
(MLRA 8:9)

1. Uchenyy sekretar' Vsesoyuznogo nauchnogo inzhenerno-tekhnicheskogo obshchestva svarshchikov.
(Welding)

DMITRIYEV, I.S.
SUBJECT: USSR/Welding

135-8-13/19

AUTHORS: Dmitriyev, I.S., Candidate of Technical Sciences, and Sapiro, L.S., Engineer.

TITLE: Resurfacing of Coal-Mill Segment Teeth by Electrodes "T-590" (Naplavka Zub'ev segmenta ugledrobilok elektrodami T-590).

PERIODICAL: "Svarochnoye Proizvodstvo", 1957, #8, pp 34-35 (USSR).

ABSTRACT: Up to now, resurfacing of segment teeth for coal mills "A03" and "A03", which is necessary every 2-5 months, was done by gas welding with the use of expensive relite "T3 2154-49" consisting basically of tungsten carbide),

The All-Union Technological Research Institute for Coal Machine-building (former ORGUGLEMASH), collectively with the Machine-building Plant "imeni 15th Anniversary of the Komsomol", developed the new resurfacing method by arc welding with electrodes "T-590" and designed a special manipulator for this work, which is described in detail. It allows rebuilding of any tooth surface, is adjustable to accommodate roller segments of 500 to 1200 mm length, requires no counterweights, and is easily operated. Two segments can be fixed simultaneously on

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TITLE:

135-8-13/19

Resurfacing of Coal-Mill Segment Teeth by Electrodes "T-590"
(Naplavka Zub'ev segmenta ugledrobilok elektrodami T-590).

the manipulator.

Recommendations are made concerning the sequence of surfacing on a tooth and the proper angle at which the electrode must be applied to the work face.

The roller segments are cast of steel "35AII" (ГОСТ 977-53) and pass complex machining. Resurfacing of a segment is 20-times cheaper than a new one.

The article contains 2 photographs and 2 sketches.

ASSOCIATION (Zavod imeni 15-letiya LKSM) Plant imeni 15th Anniversary of Comsomol.

PRESENTED BY:

SUBMITTED:

AVAILABLE: At the Library of Congress.

Card 2/2

AKULOV, I.A., kand. tekhn.nauk,dots.; ALEKSEYEV, Ye.K., inzh.; GURARI, M.D., inzh.[deceased]; DMITRIYEV, I.S., kand.tekhn.nauk,dots.; YEVSEYEV, R.Ye., inzh.; ZIL'BERBERG, A.L., inzh.; LIVSHITS, L.S., kand.tekhn.nauk; MEL'NIK, V.I., inzh.; RAZUMOVA, E.D., inzh.; TARAN, V.D., prof., doktor tekhn.nauk; FAL'KEVICH, A.S., kand.tekhn.nauk; TSEGEL'SKIY, V.L., inzh.; CHERNYAK, V.S., inzh.; SHILOVTSEV, D.P., inzh.; ZVEGINTSEVA, K.V., inzh., nauchnyy red.; TYURIN, V.F., inzh.,nauchmyy red.; VOLNYANSKIY,A.K.,glav.red.; SOKOLOV,D.V.,zam.glav.red.; SEREBRENNIKOV,S.S., red.; MIKHAYLOV,K.A.,red.; STAROVEROV, I.G., red.; VOLODIN, V.Ye., red.; NIKOLAYEVSKIY, Ye.Ya.,red.; LYTKINA,L.S.,red.izd-va; PEREVALYUK,M.V.,red. izd-va; RUDAKOVA, N.I., tekhn. red.

[Welding operations in building]Svarochmye raboty v stroitel'stve. Moskva,Gosstroizdat,1962. 783 p. (MIRA 15:6)
(Welding—Handbooks, manuals, etc.) (Building)

NIKOLAYEV, V.S.; DMITRIYEV, I.S.; FATEYEVA, L.N.; TEPLOVA, Ya.A.

Changes in the charge of various ions due to their interaction
with the residual gas. Izv.AN SSSR. Ser.fiz. 26 no.11:1430-1434
H '62. (MIRA 15:12)

1. Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo
gosudarstvennogo universiteta im. M.V. Lomonosova.
(Ions) (Cyclotron)

MITRIYEV, I.S.; NIKOLAEV, V.S.

Semiempirical method for calculating the equilibrium distribution of
charges in a fast ion beam. Zhur. eksp. i teor. fiz. 47 no.2:615-623
Ag '64. (MIRA 17:10)

1. Moskovskiy gosudarstvennyy universitet.

L 23766-66 EWT(1)/EWT(m) AT/JG/JD

ACC NR: AP6006799 SOURCE CODE: UR/0386/66/003/001/0035/0040

AUTHORS: Dmitriyev, I. S.; Vinogradova, L. I.; Nikolayev, V. S.;
Popov, B. M.

ORG: Scientific Research Institute of Nuclear Physics, Moscow State University (Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta); Moscow Engineering Physics Institute (Moskovskiy inzhenerno-fizicheskiy institut)

TITLE: Autoionization of fast lithium-like nitrogen and oxygen ions after passage through a solid

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 3, no. 1, 1966, 35-40

TOPIC TAGS: nitrogen, oxygen, ionization cross section, electron loss, charge exchange

ABSTRACT: The authors describe the results of experiments set up to observe the increased probability of electron loss by fast ions passing through a medium. Beams of nitrogen and oxygen ions accelerated

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ACC NR: AP6006799

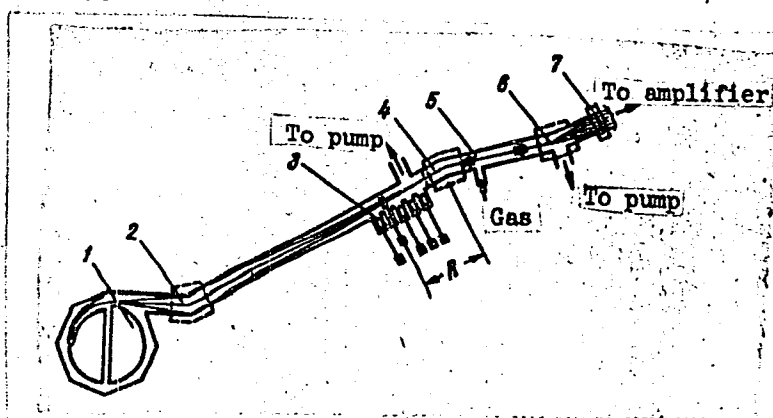


Fig. 1. Diagram of experimental setup: 1 - Cyclotron, 2 - focusing magnet, 3 - targets, 4 - mass monochromator, 5 - charge-exchange chamber, 6 - analyzer, 7 - detectors.

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ACC NR: AP6006799

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in a 72-cm cyclotron were focused at a distance of 8 meters from the cyclotron (Fig. 1). The targets were celluloid films placed at different locations on the path of the beam near the focus. Ions with different charges were produced after passage of the beam through the target. Ions of given charge were guided by means of a magnetic mass monochromator into a charge exchange chamber where they were converted into ions of different charge by collision with the gas atoms. A magnetic analyzer, described by the authors elsewhere (ZhETF v. 40, 989, 1961), was used to determine the charge composition of the ions leaving the charge exchange chamber. The experiment consisted of determining the relative number of nitrogen ions (with charges 2 -- 5) and oxygen ions (charges 3 -- 5) whose charge increased by unity in the charge exchange chamber, for different distances between the target and the center of the mass-monochromator. For most ions the relative change in the charge was independent of the distance, except in the case of N^{+4} and O^{+5} , where the relative number of the N^{+5} and O^{+6} ions increased appreciably with decreasing distance. It is shown that this increase cannot be attributed to an increase in the electron-loss cross sections but must be ascribed to autoionization of

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N⁺⁴ and O⁺⁵. Various experimental reasons for this interpretation are given. The authors thank S. Ye. Kupriyanov and G. A. Askar'yan for a discussion of the results. Orig. art. has: 2 figures and 1 formula. 2

SUB CODE: 20/

SUBM DATE: 16Nov65/

ORIG REF: 002/

OTH REF: 004

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PB

L 36124-65 ENT(L) IJP(s) AT

ACC NR: AP6018803

SOURCE CODE: UR/0056/66/050/1252/1259

AUTHOR: Dmitriyev, I. S.; Nikolayev, V. S.; Teplova, Ya. A.; Popov, B. M.; Vinogradova, L. I.

77
115
B

ORG: Institute of Nuclear Physics, Moscow State University (Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta)

TITLE: Experimental investigation of the effective cross sections for destruction and formation of fast negative ions in atomic collisions

SOURCE: Zh eksper i teor fiz, v. 50, no. 5, 1966, 1252-1259

TOPIC TAGS: capture cross section, negative ion, cyclotron, electron loss, atomic ~~collision~~ *structure*

ABSTRACT: The effective cross sections of loss of one, two, or three electrons in helium, nitrogen, or argon have been measured for negative carbon, nitrogen, and oxygen ions produced as a result of a charge exchange of positive ions accelerated in a 72-cm cyclotron to a velocity of $\gamma=2.6 \times 10^8$ cm/sec. The cross section of simultaneous loss of two

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ACC NR: AP6018803

electrons by negative ions is $\sim 50-70\%$ of the cross section of loss of a single electron. Comparison of the results obtained with the known cross sections of electron loss by other negative or positive ions shows that the specificity of negative ions, expressed in the weak coupling of the outer electron with the ion frame, does not appreciably affect the interaction between the negative ions and the given substance at a velocity $v=2.6 \times 10^8$ cm/sec. Data on the formation cross sections of negative ions as a result of capture of two electrons by positive ions or capture of an electron by neutral atoms have been obtained for carbon and oxygen. Equilibrium values have been obtained for the fraction of negative carbon or oxygen ions in a beam passing through a sufficiently thick layer of a substance (Φ_{-1}). Maximal values of Φ_{-1} are obtained in media in which the formation cross sections of negative ions at a given velocity, attain their maxima. The authors thank the cyclotron team headed by Yu. P. Divnogortsev and A. S. Kondrat'yev, as well as Yu. Druzhinin and V. Kalit for technical support of the cyclotron and experimental equipment. Orig. art. has: 7 figures and 1 table. [Based on authors' abstract]
[NT]

SUB CODE: 20/ SUBM DATE: 29Dec65/ ORIG REF: 013/ OTH REF: 004

Card 2/2 *llb*

DMITRIYEV, I.S.

AUTHOR: DMITRIYEV, I.S. PA - 2973
TITLE: The Probability of Electron Loss by Multi-charged Ions.
(o veroyatnosti poteri elektronov mnogozaryadnymi ionami, Russian)
PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 3, pp 570-575
(U.S.S.R.)
Received: 6 / 1957 Reviewed: 7 / 1957

ABSTRACT: It is assumed that the probability of the loss of a certain electron is a function of solely the ratio between ion velocity and the orbital velocity of the electron and does not depend upon the loss of other electrons.
The shape of this function $P \left(\frac{v_e}{v_J} \right)$ is obtained from experimental data on He, Li, Be and N. Thus various characteristic numbers of the interaction between the electrons of fast ions and the permeated substance are computed by summation over individual electrons and compared with experimental data; this is done, above all, in the case of the average charge of the ion and the percentage of ions with a certain charge (in which case the experiment shows that because of screening by exterior electrons the removal of interior electrons is somewhat more difficult in the case of $\frac{v_e}{v_J}$ being equal than

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The Probability of Electron Loss by Multi-charged Ions.

PA - 2973

that of exterior ones), both as a function of ion velocity, and further in the case of ionization work per unit of the length of path and herefrom the dependence of the length of path on the initial energy. On the whole, there is satisfactory agreement between computed and experimental results, and such deviations as occur may be due either to restricting assumptions made or to experimental errors. (5 Illustrations, 2 Tables, 20 Citations from Published Works).

ASSOCIATION: Moscow State University
PRESENTED BY:
SUBMITTED: 12.2.1957
AVAILABLE: Library of Congress

Card 2/2

DMITRIYEV, I. S.

56-5-4/55

AUTHOR
TITLENIKOLAYEV, V. S., FATEYEVA, L. N., DMITRIYEV, I. S., TEPLOVA, Ya. A.
Distribution of the Equilibrium of the Charge of Nitrogen Ions
(Ravnesnoye raspredeleniye zaryadov ionov azota. Russian)

PERIODICAL

Zhurn. Eksperim. i Teoret. Fiziki, 1957, Vol 32, No 5, pp 965-968 (U.S.S.R)

ABSTRACT

$^{14}_N+2$, $^{14}_N+3$, and $^{14}_N+4$ -ions are accelerated up to 0,95 to 9,4 MeV in a 72 cm cyclotron. The focussed beam penetrated a target at about 8 m distance from the cyclotron and was then deflected in a horizontal direction by a magnet. The targets consisted of a celluloid foil ($\sim 10 \mu\text{g}/\text{cm}^2$) on to which in the vacuum beryllium ($\sim 10 \mu\text{g}/\text{cm}^2$), nickel ($\sim 10 \mu\text{g}/\text{cm}^2$), and gold ($15 - 30 \mu\text{g}/\text{cm}^2$) was vaporized.

The recording device consisted of proportionality counter tubes arranged one behind the other, which had an input surface of $110 \times 0,1 \text{ mm}^2$ and were closed by cellophane ($\sim 70 \mu\text{g}/\text{cm}^2$). In the first counter all ions and in the second only ions with a certain charge were measured. The dependence of the average charge on the velocity of ions is graphically recorded.

A slight difference in the charge distribution of the ions after their passage through the above mentioned materials was found.

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56-5-4/55

Distribution of the Equilibrium of the Charge of Nitrogen Ions

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Not given

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DMITRIYEV, I. S.

AUTHORS: Nikolayev, V. S., Dmitriyev, I. S., 56-6-3/47
Fateyeva, L. N., Teplova, Ya. A.

TITLE: The Equilibrium Distribution of Charges in a Beam of
Ions of Light Elements (Ravnovesnoye raspredeleniye
zaryadov v puchke ionov legkikh elementov)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1957,
Vol. 33, Nr 6(12), pp. 1325-1334 (USSR)

ABSTRACT: The present paper determines the equilibrium distribution
of the charges of the ions of light elements with nuclear
charge numbers Z from 5 to 10 after their passage through
hydrogen, air, argon, and through a celloid film. These
ions had velocities of from 3,5 to 11,10⁸ cm/sec, i.e.
 $v \sim 1,5 - 5 v_0$, where it holds that $v_0 = e^2/\hbar$.
As a source of the fast particles a 72 cm cyclotron was
used, by means of which the following ions were accelerated:
 $11_B^{+1,+2,+3}$; $13_C^{+2,+3}$; $14_N^{+2,+3}$; $16_O^{+2,+3}$
and $20_{Ne}^{+2,+3}$. The ion beam emerging from the cyclotron
was deflected by a magnetic field after which it entered a

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The Equilibrium Distribution of Charges in a Beam of
Ions of Light Elements

56-6-3/47

re-charge chamber. The particles which passed through the chamber were analyzed by means of a magnet and were recorded by means of counters. The results of these measurements are illustrated by means of three diagrams. The distribution of charges in an ion beam in general differs after the passage through the various substances. Attention is also caused by the different character of the dependence of the ratio of the relative intensities Φ_{i+1}/Φ_i upon the velocity of the substance when passing through solid and gaseous matter. (Here i denotes matter) During the passage of ions through different media the following peculiarities may be observed in the behavior of the degree of ionization \bar{i}/Z . At $0,2 \leq \bar{i} \leq 0,6$ the average charge in argon is in all investigated ions larger than the average charge in hydrogen (by about 10-20 %). The average charge in air depends less on velocity than the average charge in hydrogen and argon. The average charge of the ions is, after having passed through a celluloid film, greater within a wide range of velocity than the average charge of ions in gases. With increasing nuclear charge number of the ions the average

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Ions of Light Elements

56-6-3/47

charge of ions after passage through the film increases much more rapidly than the average charge in air. The degree of ionization of the ions investigated here in air, hydrogen, and argon in the domain $0,2 \lesssim \bar{i} \lesssim 0,6$ can be represented for every gas by a special function of the parameter $v/v_0 Z^\alpha$ where $\alpha \sim 0,4$ holds in the case of all gases. In conclusion the authors discuss the here obtained results and compare them with those obtained by other authors. There are 7 figures, 2 tables, and 20 references, 7 of which are Slavic.

ASSOCIATION: Moscow State University (Moskovskiy gosudarstvennyy universitet)

SUBMITTED: June 28, 1957

AVAILABLE: Library of Congress

Card 3/3

DMITRIYEV, I. S.

AUTHOR: TEPLOVA, Ya. A., DMITRIYEV, I. S., NIKOLAYEV, V. S., 56-5-6/55
FATEYEVA, L. N.

TITLE: On the Interaction of Lithium Ions with Matter. ((vzaimodeystvii
ionov litiya s veshchestvom, Russian)

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 5,
pp 974 - 978 (U.S.S.R.)

ABSTRACT: In a 72 - cm cyclotron Li^7 ions were accelerated to 0,5 to
5 MeV and their specific ionization in air and hydrogen, the
equilibrium distribution of charge after passage through celluloid
and their ranges in hydrogen, air, and in the photoemulsion NIKFI-
YA-2 were determined. From the curves of the energy loss of the
 Li^7 ions in air (expressed in MeV per 1 cm path) a maximum at
about $7 \cdot 10^8$ cm/sec ion velocity can be observed, whereas for hydro-
gen a broad maximum between 4 and $8 \cdot 10^8$ cm/sec ion velocity is to
be noticed.

As a result of the charge equilibrium distribution of the Li^7 ions,
after they had entered into interaction with a celluloid foil of
 $\sim 20 \mu\text{g}/\text{cm}^2$ thickness, the corresponding curves for 4 different
charge states are given

The range curves of the Li^7 ions in the emulsion NIKFI-YA-2 are com-
pared with those of other photoemulsions.

Card 1/2

On the Interaction of Lithium Ions with Matter.

56-5-6/55

ASSOCIATION: Not given
PRESENTED BY:
SUBMITTED:
AVAILABLE: Library of Congress

Card 2/2

DMITRIYEV, I. S.

AUTHOR NIKOLAYEV, V.S., FATEYEVA, L.N., DMITRIYEV, I.S., TERLOVA, I.A.A. 56-7-63/66
 TITLE The Re-Charge Cross Section of Nitrogen Ions in Gases
 (Sacheniya perezaryadki ionov azota v gazakh. Russian)
 PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 33, Nr 7, pp 306 - 307
 (U.S.S.R.)

ABSTRACT N^{+2} , N^{+3} , N^{+4} - ions were accelerated to 1,3 - 9,7 MeV on a 72 cm cyclotron and the recharge cross section of these ions in nitrogen, argon, and hydrogen was measured. In form of curves the electron capture cross section and the electron loss cross section of N-ions in nitrogen is represented. The electron capture cross section for nitrogen and argon can be represented by

$$\sigma_{i,i-1} = 2\pi \cdot a_0^2 (v_0/v)^5 i^{5/2} Z^{1/2}$$

(i - charge, a_0 , v_0 = Bohr's radius and velocity of the electron in the hydrogen atom, Z - atomic number of the investigated gas).
 The electron loss cross section $\sigma_{i,i+1}$ is 2 - 2,5 times greater in argon, and 6 - 10 times smaller in hydrogen than that of nitrogen. (With 1 illustration and 4 Slavic references).

Card 1/2

The Re-Charge Cross Section of Nitrogen Ions in Gases

56-7-63/66

ASSOCIATION Moscow State University
(Moskovskiy gosudarstvennyy universitet)
PRESENTED BY
SUBMITTED 23.4.1957
AVAILABLE Library of Congress

Card 2/2

AUTHORS: Teplova, Ya. A., Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N. SOV/56-34-3-5/55

TITLE: Ranges and Specific Ionisation of Multi-Charged Ions in Gases
(Probegi i udel'naya ionizatsiya mnogozaryadnykh ionov v gazakh)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958,
Vol. 34, Nr 3, pp. 559-568 (USSR)

of the path length

ABSTRACT: Measurements were made and the specific ionisation of the ions from Be to Ne at velocities of from $1.5 \cdot 10^8$ to $12.1 \cdot 10^8$ cm/sec in argon, air, and hydrogen. The authors start with the description of the experimental method, they here use a focused ion beam from a 72 cm cyclotron. The method of the measurement is based upon that the recorder of the charged particles, which was mounted on a movable bar, was moved on the trajectory of the beam inside the slowing down chamber to measure the relative ionisation along the beam. Also the slowing down of the ions in a gas filled chamber is described. The specific ionisation and the ranges of the ions with velocities of from $1.5 \cdot 10^8$ to $12.1 \cdot 10^8$ cm/sec were measured by means of a calibrated counter with a linear amplifier. The ranges of the nitrogen ions at velocities of from

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Ranges and Specific Ionisation of Multi-Charged Ions in Gases SOV/56-34-2-7/55

$1.5 \cdot 10^8$ to $4 \cdot 10^8$ cm/sec were measured by means of a planar ionisation chamber. The next paragraph deals with the analysis of the results and with the experimental errors. The measurements furnished the dependence of the magnitude of the momenta (or of the ionisation current) on the distance between the counter and the spot where the beam entered the slowing down chamber. The results of the measurement of the ranges are illustrated in a diagram in form of the dependence of $Z^2 R/A$ on E/A , i. e. in units which do not depend on the isotopic mass of the ion A . The energy which has to be used up for the production of an ion pair does not depend, within the measuring error limits, on the velocity and on the shape of the ion A ; that is to say, the shapes of the curves of the specific ionisation and of the mean energy loss dE/dx agree with each other. A comparison of the ranges of the ions in various gases shows the following: At the same velocity the range in argon is by 6% longer and in hydrogen 3,7 times as long as in air and this relation decreases somewhat with increasing Z of the ion. The specific ionisation at $v < 5 \cdot 10^8$ cm/sec is proportional to the velocity and it has a maximum at $v \approx 6 \cdot 10^8$ cm/sec similar as in the Bragg curve for the α - particles. In the maximum $dE/dx \approx 1,5 Z$ MeV/cm holds. For the transition from argon to air for all ions the coefficient 0.92 ± 0.05 can be used, and

Card 2/3

Ranges and Specific Ionisation of Multi-Charged Ions in Gases SOV/56-34-2-5/55

for the transition from hydrogen into air the coefficient 0.29 ± 0.01 . The last paragraph gives a discussion of the results. The ranges of the ions in air, measured by means of a ionisation chamber are by about 1 mm shorter than the ranges measured by a counter. This can be explained qualitatively only by nuclear collisions. The slowing down power of the photoemul= sion for the here examined ions in air resembles the slowing down power for α - particles. The results of the measuring of the specific losses in case of the ions ^{14}N agree with the data already known before within the experimental errors. But the here found data for the ions ^{20}Ne are by 30% higher than the values found before. This difference can hardly be explained by the influence or nuclear collisions. There are 5 figures, 2 tables, and 26 references, 7 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)
SUBMITTED: September 20, 1957.

Card 3/3

24 (7)

AUTHORS:

Teplova, Ya. A., Nikolayev, V. S.
Dmitriyev, I. S., Fateyeva, L. N.

SOV/48-23-7-23/31

TITLE:

The Path Length and the Specific Ionization of Multiply Charged Ions (Probegi i udel'naya ionizatsiya mnogozaryadnykh ionov)

PERIODICAL:

Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 7, pp 894-897 (USSR)

ABSTRACT:

As the known experimental data on the stopping of multiply charged ions in a substance are considered insufficient by the authors, they carried out experiments with the ions ^{23}Na , ^{25}Mg , ^{27}Al , ^{31}P , ^{37}Cl , ^{40}Ar , ^{39}K , ^{81}Br and ^{84}Kr . A 72-centimeter cyclotron was used as ion source which delivers ions with the velocities of 2.5 to $12 \cdot 10^8$ cm/sec which corresponds to an energy of 25 to 600 kev. The particles were recorded by a twofold proportional counter, and details of the measuring methods are described. The measurements showed that the specific ionization is proportional to the path length, and the path length is proportional to the velocity of the particles if the latter does not exceed $5 \cdot 10^8$ cm/sec. Subsequently, the dependence of

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The Path Length and the Specific Ionization of Multiply Charged Ions SOV/48-23-7-23/31

the path length at an air pressure of 760 mm Hg on the nuclear-charge number of the ions is investigated, and the results are represented in a diagram (Fig 3). The stopping power of air and celluloid in dependence on the nuclear-charge number of the ions was calculated for an ion velocity of $3.5 \cdot 10^8$ cm/sec, and the results are represented in the diagrams in figures 5 and 6. The data obtained in the experiments described are used for this calculation. Finally, the difference between the mean charge of ions in gases and in solid substances is investigated, and it is ascertained that the stopping power very much depends on the nuclear-charge number in solid substances. There are 6 figures and 6 references, 4 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki
Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific
Research Institute of Nuclear Physics of Moscow State
University imeni M. V. Lomonosov)

Card 2/2

DMITRIYEV, I.S.

PHASE I BOOK EXHIBITION: 607/5535

Pchelintseva, G. M., ed.

Vestnik stroy (Accelerators; Collection of Articles) Moscow, Atomizdat, 1960. 121 p. Errata slip inserted. 5,000 copies printed.

Scientific Ed.: B.M. Yablakov; Ed.: G.M. Pchelintseva; Tech. Ed.: N.A. Vlasova.

PURPOSE: This collection of articles is intended for scientists and engineers engaged in the construction and operation of particle accelerators.

COVERAGE: These original articles treat specific problems arising in the operation of present-day accelerators, particularly linear electron accelerators. A new accelerator put into operation at the Ukrainian Physical Institute (Ukrainian Physicochemical Institute) is described and problems in the dynamics of particles in linear electron accelerators discussed. New methods are discussed for the extraction of particles from accelerators. Problems associated with the shaping of electron beams in accelerators are also treated. The character of the series cyclotron to the phaseotron acceleration mode with a view to increasing the energy of accelerated particles is described, and some problems connected with the bunching of particles are elaborated. No personalities are mentioned. References accompany each article.

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83678

S/048/60/024/009/015/015
BOG3/BO63

26.1420 (2117, 2217)

AUTHORS: Dmitriyev, I. S., Nikolayev, V. S., Fateyeva, L. N.,
Teplova, Ya. A.TITLE: The Amount of the Mean Charge of Ions Passing Through a
SubstancePERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960,
Vol. 24, No. 9, pp. 1169-1174

TEXT: The present paper describes an experimental study of the equilibrium charge distribution of ions of light elements ($2 \leq Z \leq 18$) and of Kr ions in helium, nitrogen, argon, krypton, and celluloid foil. Besides, the authors measured the charge exchange cross sections of these ions in gases. A 72-cm cyclotron (Ref. 3) served as the source of fast, multiply charged ions. The experimental arrangement is shown in Fig. 1. The equilibrium charge distribution of the ions with $Z \leq 10$ was measured in the velocity range of $(2.6 \div 12) \cdot 10^8$ cm sec⁻¹. In this velocity range and for the above-mentioned substances, the width of distribution $\bar{\epsilon}$ is nearly equal for each ion. The dependence of the degree of ionization \bar{i}/Z on the ion

cont 1/z

83678

The Amount of the Mean Charge of Ions Passing
Through a Substance

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B003/B063

velocity differs in the various media (Fig. 2). The monotonous course of \bar{i}/Z is a matter of fact within one period of Mendeleev's periodic table. As it seemed to be unjustified to extend this dependence to a wider range of variations of Z , the equilibrium charge distribution of the ions with $Z > 10$ in the above-mentioned substances was measured at velocities of $2.6 \cdot 10^8$ and $4.1 \cdot 10^8$ cm sec⁻¹. It was found that at these ion velocities the mean charge \bar{i} increases with increasing Z in all substances. The Z -dependence of the degree of ionization \bar{i}/Z shows different characters in gases and solids. Fig. 3 shows the dependence of \bar{i}/Z on Z in helium (I) and celluloid foil (II) for

$v = 2.6 \cdot 10^8$ cm sec⁻¹ (a) and $v = 4.1 \cdot 10^8$ cm sec⁻¹ (b). Fig. 4 shows the dependence of \bar{i}^2 on Z in nitrogen (1) and celluloid foil (2) for

$v = 2.6 \cdot 10^8$ cm sec⁻¹ (a) and $v = 4.1 \cdot 10^8$ cm sec⁻¹ (b). Fig. 5 shows the dependence of ϕ_i on Z and Fig. 6 the dependence of the width of the

equilibrium charge distribution $\sigma = \sqrt{i^2 - \bar{i}^2}$ on Z . The perturbation of the continuity of \bar{i} and ϕ_i as a function of Z is due to the fact that

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The Amount of the Mean Charge of Ions Passing Through a Substance

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B063/B063

the filling of the third electron shell begins in the range $Z = 11-13$. The equilibrium charge distribution of the ion beam depends on the cross sections of the electron loss (Q_n) and capture (Q_3). The measurement of these cross sections shows that the dependence of Q_n and Q_3 on Z of the ions does not take a monotonic course (Fig. 7). The results obtained prove that it is necessary to take into account the effect of the periodic structure of the electron shell of the ions upon the amounts of \bar{i} and \bar{i}^2 . There are 7 figures and 5 Soviet references.

✓

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki
Moskovskogo gos. universiteta im. M. V. Lomonosova
(Scientific Research Institute of Nuclear Physics of Moscow
State University imeni M. V. Lomonosov)

Card 3/3

BOP

84383

24.2100 - 1043, 1482 ndy

S/056/60/039/004/001/048
B004/B070

26.2310

AUTHORS:

Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N.,
Teplova, Ya. A.

TITLE:

Investigation of the Equilibrium Charge Distribution in a
Beam of Fast Ions

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 39, No. 4(10), pp. 905-914

TEXT: This is in continuation of an earlier work of the authors (Ref. 1) in which they studied the equilibrium charge distribution in a beam of ions of light elements ($Z = 5$ to $Z = 10$) and found a monotone dependence of the average charge \bar{I} on Z . The purpose of the present work was to study the function $\bar{i} = f(Z)$ at the transition from one period of the periodic system to another. For this purpose, the equilibrium distribution of ions of He, Li, B, N, Ne, Na, Mg, Al, P, Ar, and Kr in helium, nitrogen, argon, krypton and in a celluloid film was measured. The measurements for He, B, N, and Ne were made in a larger range of

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Investigation of the Equilibrium Charge
Distribution in a Beam of Fast Ions

S/056/60/039/004/001/048
B004/B070

velocities than in Ref. 1. For ions with $Z > 10$, the measurements were made only at $v = 2.6 \cdot 10^8$ cm/sec; for Na, P, and Ar the measurements were also made at $4.1 \cdot 10^8$ cm/sec. The multi-charge ions were accelerated in a 72-cm cyclotron. Ions of charges $i \pm 1$, $i \pm 2$, etc. were obtained from those of the initial charge i by passing them through a celluloid film of approximate thickness $2 \mu\text{g}/\text{cm}^2$. The data for the equilibrium distribution of ions with $Z \leq 10$ are given in Tables 1-3, and in Fig. 1. In all mediums, the distribution was nearly Gaussian: ✓

$\Phi_i \approx (1/\sigma\sqrt{2\pi}) \exp[-(i - \bar{I})^2/2\sigma^2]$. The curve is characterized by two

parameters: the average charge $\bar{I} = \sum_i \Phi_i i$ and the width of the

distribution $\sigma = \left[\sum_i \Phi_i (i - \bar{I})^2 \right]^{1/2}$. For He, Li, B, N, and Ne, σ was

again found to increase monotonically with increasing Z . \bar{I} was found to be different in the different media (Fig. 2). The following rule was found to hold for all ions: maximum value of \bar{I} in nitrogen and argon,

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Investigation of the Equilibrium Charge
Distribution in a Beam of Fast Ions

S/056/60/032/004/001/048
B004/B070

$\bar{I}_{He} < \bar{I}_N ; \bar{I}_{Kr} < \bar{I}_{Ar}$. The authors note that the dependence of \bar{I} on the atomic weight Z_m in gases does not fit the theoretical estimates made in Refs. 14 - 16 on the basis of the statistical model of the atom. The data for the equilibrium distribution of $Z > 10$ ions are given in Figs. 3 and 4. For the same velocities, the dependence of \bar{I} on the medium was about the same as for $Z \leq 10$. However, the difference between \bar{I} in gases and in celluloid film increases very much for $Z > 10$. The maximum of this difference for light ions is 15%, while for Ne it is about 50%, for Na, Mg, and Al about 60%, for P about 80%, and for Kr about 130%. For a given velocity, \bar{I} increases with Z in all media. In contrast thereto, the degree of ionization \bar{I}/Z decreases monotonically in gases (Fig. 5). Around $Z = 10$, however, the decrease in the degree of ionization becomes slower, and for solid media even an increase takes place. Still more noticeable is the perturbation in the continuity of the function $\bar{\Phi}_i = f(Z)$ (Fig. 3). For $Z = 12$, $\bar{\Phi}_0$ and $\bar{\Phi}_i$ show clear minima. In this range of Z , the width σ of the equilibrium distribution also becomes less (Fig. 6). This discontinuity in the dependence of $\bar{\Phi}_i$, i , and σ on Z

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Investigation of the Equilibrium Charge
Distribution in a Beam of Fast Ions

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B004/B070

observed in the range $Z \sim 10 - 12$ is explained as being due to the beginning of the filling of a new electron shell. There are 6 figures, 3 tables, and 18 references: 7 Soviet, 7 US, 2 British, and 2 Danish.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of the Moscow State University)

SUBMITTED: April 13, 1960

Card 4/4

NIKCLAYEV, V.S.; DMITRIYEV, I.S.; FATEYEVA, L.N.; TEPLOVA, Ya.A.

Experimental study of electron capture by multiply charged ions.
Zhur. eksp. i teor. fiz. 40 no.4:989-1000 Apr '61. (MIRA 14:7)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Electrons--Capture) (Ions) (Cyclotron)

NIKOLAYEV, V.S.; FATEYEVA, L.N.; DMITRIYEV, I.S.; TEPLOVA, Ya.A.

Capture of several electrons by fast multicharge ions. Zhur. eksp. i
teor. fiz. 41 no.1:89-99 J1 '61. (MIRA 14:7)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Electrons---Capture) (Ion beams)

TEPLOV, I.B.; ~~DMITRIYEV, I.S.~~; TEPLOVA, Ya.A.; SHEVCHENKO, O.P.

Study of excited states of Be^8 with the aid of the reaction
 $\text{Li}^7(p, \alpha)\text{He}^4$. Izv. AN SSSR. Ser. fiz. 26 no.9:1150-1153 S
'62. (MIRA 15:9)
(Nuclear reactions) (Beryllium--Isotopes)

S/048/62/026/011/018/021
R125/B102

AUTHORS: Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N., and
Teplova, Ya. A.

TITLE: Charge exchange of various ions in their interaction with
residual gas

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya,
v. 26, no. 11, 1962, 1430-1434

TEXT: The charge distribution in ion beams was measured after their passage through the experimental setup used for determining the cross sections of electron loss and capture by ions with $2 \leq Z \leq 18$. This setup contains only the residual gas of $(1.2-1.5) \cdot 10^{-5}$ mm Hg. For ions with $Z \leq 10$ the measurements were made at energies of 35-350 keV per nucleon and ion velocities of $2.6 \cdot 10^8$ to $8 \cdot 10^8$ cm/sec, for $Z > 10$ at $v = 2.6 \cdot 10^8$ cm/sec, and for phosphorus and argon ions at $v = 4.1 \cdot 10^8$ cm/sec. These ions (charge i) were accelerated in a 72-cm cyclotron and passed through a charge exchange chamber, then recorded by a system of eight proportional counters. This apparatus was evacuated by oil vapor diffusion pumps. The ion beam that had passed through the setup always contained ions with
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Charge exchange of various ...

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B125/B102

final charges $k \neq i$ besides ions with the initial charge i . Fig. 2 shows typical distributions of charges in the ion beam. The ion charges are evidently changed by one interaction with the residual gas molecules. $\bar{\Phi}_{ik} = n\sigma_{ik}$ holds for $k \neq i$, where σ_{ik} is the mean charge exchange cross section (from charge i to k). n is the mean number of molecules in the volume: unit cross section \cdot path of the ion; $\bar{\Phi}_{ik}$ is the relative number of ions with charge k . Notwithstanding the presence of oil vapor, the experimental values of $\bar{\Phi}_{ik}$ in the residual gas nearly always agree with the values of $\bar{\Phi}_{ik}$ in nitrogen, except the values of $\bar{\Phi}_{10}$ which are much higher for ions with $Z \sim 11-12$ than for nitrogen ions. Therefore the minimum of the function $\bar{\Phi}_{10}(Z)$ is less deep than for nitrogen. This minimum is still less deep for the residual gas than for krypton. If the ion beam passes through a celluloid film, the values of $\bar{\Phi}_{i,i+1}$ mostly exceed the theoretical values. This suggests the presence of excited ions with lifetimes of $\sim 10^{-7}$ sec in the ion beam. There are 4 figures.

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Charge exchange of various ...

S/048/62/026/011/018/021
B125/B102

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki
Moskovskogo gos. universiteta im. M. V. Lomonosova
(Scientific Research Institute of Nuclear Physics of the
Moscow State University imeni M. V. Lomonosov)

Fig. 2. The values of $\bar{\Phi}_{ik}$ for phosphorus ions after their passage
through the residual gas (1) and nitrogen (2) at the ion velocity
 $v = 2.6 \cdot 10^8$ cm sec⁻¹, ion energy $E \approx 1.1$ Mev.

Card 3/4

33991

S/056/62/042/001/003/048

B125/B108

24.6712

AUTHORS: Dmitriyev, L. S., Nikolayev, V. S., Fateyeva, L. N.,
Teplova, Ya. A.

TITLE: Experimental study of electron losses by multiply charged ions
in gases

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42,
no. 1, 1962, 16 - 26

TEXT: The cross sections $\sigma_{i,i+1}$ of collisions with loss of an electron of
1-6-fold charged ions of light elements ($Z = 2 - 18$) and krypton ions in
helium, nitrogen, argon, and krypton for ion velocities of $2.6 \cdot 10^8 - 12 \cdot 10^8$
cm/sec were measured by mass spectroscopy with an apparatus described by
V. S. Nikolayev et al. (ZhETF, 40, 989, 1961). The error was below $\pm 15\%$.
The ions were scattered through angles of $\theta \lesssim 0.005$ radians. The $\sigma_p / \sigma_{i,i+1}$
ratios decrease rapidly with increasing ion velocity; σ_p denotes the total
cross section of scattering through angles $\theta \lesssim 0.005$. The values of σ_{12}

Card (1/4)

33991

S/056/62/042/001/003/048

B125/B108

Experimental study of electron...

found by M. I. Korsunskiy et al. (DAN SSSR, 103, 399, 1955) for N ions in nitrogen are by 25% lower than the present results. The dependence of the impact cross sections with loss of an electron on ion velocity has the same character for all gases investigated. The cross sections for ions with $i = 1$ and $i = 2$, and for N ions with $i = 3$ and $i = 4$ attain maximum values. The velocity v_m which corresponds to the maximum cross section increases with increasing ion charge as $v_m \sim \gamma u$; $u = (2I/\mu)^{1/2}$, $I =$ binding energy of the lost electron, $\mu =$ electron mass, $\gamma =$ coefficient dependent on the medium. The cross sections $\sigma_{i,i+1}$ generally increase with Z . For a given Z , the cross sections decrease $\sigma_{i,i+1}$ with increasing i as $\exp(-mi)$, where $m \sim 1$ at $v \sim 3 \cdot 10^8$ cm/sec for $Z = 10$ and $Z = 18$, and $m \sim 1.5$ for $Z = 3$ and $Z = 12$. Generally, the electrons are lost from the outer shell. For equal v/u , the $\sigma_{i,i+1}/q$ ratio is approximately proportional to I^{-a} ; a depends only slightly on v/u , and is near unity. q denotes the number of electrons in the outer shell. The dependences of the theoretical and experimental cross sections on v and I are qualitatively the same. Considering screening of the Coulomb field, the electron losses in light media at $v \gg u$ agree with the experimental value. For heavy media, the generalized Bohr formula is

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33991

S/056/62/042/001/003/048
B125/B108

Experimental study of electron...

$$\sigma_{i,i+1} \approx \pi a_0^2 q Z_c^2 / 3 v_0^2 / v u, \text{ where } a_0 = 0.53 \cdot 10^{-8} \text{ cm and } v_0 = 2.19 \cdot 10^8 \text{ cm/sec.}$$

The approximate theoretical results of O. B. Firsov (ZhETF, 36, 1517, 1959), which are applicable for $v \ll v_0$, differ from the present results by a factor

of 2.5 at most. The experimental data indicate the correctness of the theoretical calculations for very small and very large ion velocities and also for the range $v \sim u$. In the range $0.5 < v/u < 1.5$, $\sigma_{i,i+1} \approx q I^{-1} f(v/u)$

holds according to Ya. M. Fogel' et al. (ZhETF, 32, 453, 1957). The general character of the dependence of $\sigma_{i,i+1}$ on v agrees with H. S. W. Massey's adiabatic hypothesis. The adiabatic parameter can be represented in the form pa/k or p/p_0 according to G. P. Drukarev (ZhETF, 37, 847, 1959).

$p = |\Delta E|/v$ denotes the change in ion momentum in inelastic forward scattering. There are 8 figures and 18 references: 10 Soviet and 8 non-Soviet. The four most recent references to English-language publications read as follows: S. K. Allison. Rev. Mod. Phys., 30, 1137, 1958; S. K. Allison, J. Guevas, M. Garcia-Munoz. Phys. Rev., 120, 1266, 1960; H. L. Reynolds, L. D. Wyly, A. Zucker. Phys. Rev., 98, 1825, 1955; S. Krasner. Phys. Rev., 99, 520, 1955.

Card 3/4

33991

S/056/62/042/001/003/048
B125/B108

Experimental study of electron...

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo
universiteta (Institute of Nuclear Physics of the Moscow State
University)

SUBMITTED: June 21, 1961

✓

Card 4/4

33993

S/056/62/042/001/007/048

B125/B108

24.6712

AUTHORS: Teplova, Ya. A., Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N.

TITLE: Slowing down of multiply charged ions in solid and gaseous media

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 44 - 60

TEXT: The ranges R , the specific energy losses dE/dx , and the straggling S of fast multiply charged ions of He, Li, Be, B, C, N, O, Ne, Na, Mg, Al, P, Cl, K, Br, and Kr ($2.6 \cdot 10^8 - 11.8 \cdot 10^8$ cm/sec) with energies of 25 - ~700 kev/nucleon in hydrogen, helium, methane, benzene, air, argon, and various mixtures of these gases were measured. Moreover, the specific energy losses in celluloid, Al, Ni, Ag, and Au were measured for a wide range of Z and Z_c (Z = ion charge, Z_c = atomic number of the medium) by means of a multiwire proportionality counter. The ions were accelerated with a 72-cm cyclotron. The methods of measuring R and dE/dx have been

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33993

S/056/62/042/001/007/048

B125/B108

Slowing down of multiply charged...

presented before (Izvestiya AN SSSR, seriya fiz., 23, 894, 1959; ZhETF. 34, 559, 1958). Because of the small range and weak intensity of the ion beams of Be, C, Na, Mg, Cl, K, Br, and Kr, only their maximum ranges R'' were measured. The relation $R = kv$ holds with an accuracy of 5 - 7% for ions with $Z \geq 2$ up to a certain maximum velocity v_m ; k increases with Z as $\sim Z^{1/2}$. For ions of He to Ne v_m ranges from $5 \cdot 10^8$ to $8 \cdot 10^8$ cm/sec. In the velocity range investigated, R'' increases not monotonically on Z but fluctuates periodically by $\sim 30\%$. The fluctuation amplitude decreases with increasing velocity. The dependence $R(Z_c)$ of N ions is similar to that of protons. With decreasing velocity, the absolute value of straggling, S , becomes smaller but the ratio still $\delta = S/R$ increases. At constant velocity, the functions $S(Z)$ and $\delta(Z)$ are nonmonotonic. The fluctuations of $R(Z)$ and $S(Z)$ are explained by a considerable effect of the electron structure (filling up of the L and M shells, etc.) of the ions. The law of additivity of dE/dx in mixtures is fulfilled for multiply charged ions as well as for protons and α -particles. In the qualitatively valid relation $dE/dx \approx v^m f(Z_c, Z)$, m is near unity at velocities below $8 \cdot 10^8$ cm/sec,

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Slowing down of multiply charged...

decreases with increasing velocity, and tends to -2 at $v \gg 12 \cdot 10^8$ cm/sec.

$(dE/dx)_{\max} \sim Z^f(Z_c)$ holds for any ion group. According to V. G.

Tel'kovskiy et al. (DAN SSSR, 113, 1035, 1957), the experimental values of dE/dx for protons in Ag are 50% higher than the theoretical values.

O. B. Firsov (ZhETF, 36, 1517, 1959) found that $-dE/dx = 2.34(Z+Z_c)v \cdot 10^{-15}$

ev·cm²/atom. Because of the electron structure of the ions, which becomes more and more distinct with increasing velocity ($v > v_0$), it is more

convenient to use the Hartree-Fok method instead of the Thomas-Fermi model. At $v \gg u$ (u = velocity of orbital electrons of the medium), the calculation of dE/dx for inelastic collisions of protons in hydrogen with electrons from modified quantum-mechanical formulas of Bethe and Bloch, and from the classical formula of Bohr at $v \sim 4 \cdot 10^8$ cm/sec yields a value 5 - 7% smaller than the experimental values. For multiply charged ions, this applies to large v , but with increasing Z_c and decreasing v this

theory deviates more and more from the experiment. S. S. Vasil'yev is thanked for interest, the cyclotron team, particularly A. A. Danilov, Card 3/4

33993

S/056/62/042/001/007/048

B125/B108

Slowing down of multiply charged...

M. Kh. Listov, and V. P. Khlapov for performing the experiments, and O. B. Firsov for discussions. There are 8 figures and 26 references: 8 Soviet and 18 non-Soviet. The four most recent references to English-language publications read as follows: P. G. Roll, F. S. Steigert. Nucl. Phys., 17, 54, 1960; D. J. Porat, K. Ramavataram. Proc. Phys. Soc., 77, 97, 1961; J. M. Alexander, M. F. Gazdik. Phys. Rev., 120, 874, 1960; P. G. Roll, F. E. Steigert. Phys. Rev., 120, 470, 1960.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University) ✓

SUBMITTED: July 12, 1961

Card 4/4

34634
S/056/62/042/002/007/05
B102/B138

24.6600

AUTHORS: Teplov, I. B., Dmitriyev, I. S., Teplova, Ya. A., Shevchenko, G. P.

TITLE Investigation of α -particle angular distribution in $\text{Li}^7(p,\alpha)\text{He}^4$ reactions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 3, 1962, 353 - 357

TEXT. The angular distributions of the α -particles from $\text{Li}^7(p,\alpha)\text{He}^4$ reactions were measured in the range $20 - 160^\circ$ for $E_p = 5.78, 6.35$ and 6.85 Mev using a telescope arrangement of three proportional counters, and Li_2CO_3 targets $0.16, 0.52,$ and 0.92 mg/cm^2 thick corresponding to energy losses of 6-Mev protons of 13, 41 and 70 kev. The angular distributions were obtained as $d\sigma/d\Omega = (\sigma/4\pi) [1 + A_2P_2(x) + A_4P_4(x)]$ with

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S/036/62/042/002/007/055
B102/B133Investigation of α -particle...

E_p , Mev	a_2	A_2	A_4
6.55	-0.169	-0.167	-0.102
6.45	-0.357	-0.356	-0.010
5.78	-0.717	-0.693	+0.085

σ is the total cross section. The experimental results are satisfactorily described, even by $d\sigma/d\Omega \sim A_2 P_2(x)$. The excitation curves were measured for $5.25 \leq E_p \leq 6.55$ Mev (angle of α -particle emission, 30° - or, in the c.m.s., 95°) and for $3.5 \leq E_p \leq 6.55$ Mev (80° or 90° in c.m.s.). From the resonance structure of the excitation curve of the $Li^7(p,\alpha)He^4$ reaction, it was found that the reaction takes place mainly via formation of a Be^8 compound nucleus. The excitation curve has two resonance peaks, at 3.0 and 5.6 Mev. The first can be explained if it is assumed that in the Be^8 nucleus there is a 2^+ level with an excitation energy of 19.5 Mev and a 0^+ level above the resonance range. The second can be explained if the Be^8 nucleus has a level with 22.3 Mev excitation energy of 0^+ Mev width, even spin and positive parity, most probably 2^+ . There are 4 figures and 9 Card 2/3

Investigation of α -particle...

S/056/62/042/002/007/055
B:02/B:39

references: 2 Soviet and 7 non-Soviet. The four most recent references in English-language publications read as follows: J. M. Freeman et al. Nucl. Phys. 2, 148, 1958; F. Ajzenberg, T. Lauritsen. Nucl. Phys. 11, 1, 1959; F. Hirst et al. Phil. Mag. 45, 762, 1954; J. H. Gibbons, R. L. Macklin. Phys. Rev. 114, 571, 1959.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: June 18, 1961

Card 3/3

L 18112-63 EWT(1)/BDS/ES(w)*2 AFPTC/ASD/LJP(C)/SSD Pub-1
ACCESSION NR: AP3004504 S/0048/63/027/008/1078/1080

AUTHOR: Nikolayev, V.S.; Dmitriyev, I.S.; Teplova, Ya.A.; Fateyeva, L.N. (23)

TITLE: Variation of the mean charge of fast ions as a function of the density of the medium /Report presented at the Second All-Union Conference on the Physics of Electronic and Atomic Collisions held in Uzhgorod 2-9 Oct 1962/

SOURCE: AN SSSR, Izvestiya, ser.fiz., v.27, no.8, 1963, 1078-1080

TOPIC TAGS: ion charge, electron loss, electron capture, ionization loss, N

ABSTRACT: The mean charge of uranium fission fragments, established incident to their passage through a gas, is known to increase with increasing gas density. According to N.Bohr and J.Lindhard (Kgl.danske ved.selskab.Nat.fys.medd., 28, No.7, 1954), this is due to increase in the probability for loss of electrons from the excited states with decrease of the interval between successive ion-atom encounters. In the present work increase of the mean ion charge incident to increase in gas density was observed in experiments with 4.9 MeV ($v = 8.2 \times 10^8$ cm/sec) triply charged nitrogen ions. The cyclotron accelerated ions entered a 10 cm diameter 4.8 meter long collision chamber. The particles traversing the chamber were analyzed by a magnet and detected by proportional counters. The relative numbers ϕ_i

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L-18112-63
ACCESSION NR: AP3004504

of ions with different charges were determined at nitrogen pressures from 4×10^{-5} to 5×10^{-2} mm Hg. The results are shown in the figure (see Enclosure). At pressures under 10^{-3} mm Hg the experimental values of ϕ_1 and the mean charge \bar{I} virtually agree; above 10^{-3} mm Hg the charge distribution in the ion beam approaches an equilibrium value and the ϕ_1 curves level off. Above $>10^{-2}$ mm Hg the mean charge begins to decrease with rising pressure owing to decrease in the ion velocity as a result of collision slowing down. Thus, gas at 10^{-2} mm Hg and up cannot be regarded as sufficiently rarified where passage of light element ions is concerned. This fact and the pressure variation of ϕ_1 in the region of lower pressures should be taken into account in using experimental data on ϕ_1 for determining electron loss cross sections on the basis of electron capture cross sections (and vice versa).
Orig.art.has: 1 figure.

ASSOCIATION: none

SUBMITTED: OO

SUB CODE: PH

DATE ACQ: 26Aug63

NO REF SOV: 008

ENCL: 01

OTHER: 004

Card 2/22

L 18141-63

EWT(1)/EWT(m)/BDS/ES(w)-2--AFFTC/ASD/ESD-3/AFWL/LJP(C)SSD--Pap-4

ACCESSION NR: AP3004505

S/0048/63/027/008/1081/1082

66

AUTHOR: Dmitriyev, I.S.

TITLE: Regarding the possibility of obtaining multiply charged ions in a cyclotron by proton impact /Report presented at the Second All-Union Conference on the Physics of Electronic and Atomic Collisions held in Uzhgorod 2-9 Oct 1962/ 19

SOURCE: AN SSSR, Izvestiya, ser. fiz., v.27, no.8, 1963, 1081-1082

TOPIC TAGS: proton impact, multiple ionization, stripped atom, cyclotron

ABSTRACT: A fundamental problem in accelerating heavy particles is obtaining highly ionized ions. In order to strip an atom of a large number of electrons there must be transferred to it an energy $\Delta E = 1-2$ keV and ΔE increases with Z . Since it is difficult to supply fast electrons to a cyclotron ion source, most multiply charged ions are formed as a result of step ionization by slow electrons so that the effective yield is low. The authors propose a method for obtaining ions entirely stripped of their electron shells by proton impact. The procedure is based on the fact that when molecular hydrogen ions are accelerated in a cyclotron an appreciable fraction of the H_2^+ ions in colliding with the atoms of the residual gas dissociate into H^0 and H^+ or $2H^+$. The protons, not being in resonance with the acce-

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L 18141-63
ACCESSION NR: AP3004505

erating field, move in a circular orbit with half the radius of the H_2^+ orbit, intersecting the central part of the chamber so that the effective proton current density in the region of the ion source may be very high. Under the usual cyclotron conditions the protons leave the central region only after several tens of turns. Thus, by introducing into the ion source, together with the heavier gas, a quantity of hydrogen there can be obtained fully stripped ions, for example, C^{6+} , N^{7+} and B^{5+} . The process does not require raising the residual gas pressure above the usual. Evaluations, based on nominal cyclotron conditions, indicate that there may be obtained a yield of 10^{-5} C^{6+} ions per primary proton. Thus, an intensity comparable to that obtained as a result to step ionization (1011 per sec) may be achieved at a proton current of 0.1 to 1.0 mA. The heavy ions may be separated from the hydrogen and helium ions by passing the beam first through a thin film (for differential slowing down) and then through a magnetic field for mass separation. Orig.art.has:
1 formula.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 26Aug63

ENCL: 00

SUB CODE: PH

NO REF SOV: 003

OTHER: 005

Card 2/2

S/056/62/043/002/001/053
B102/3104

39473

17

26-2340

AUTORS: Dmitriyev, I. S., Nikolayev, V. S., Fateyeva, L. N., Teplova, I. A.

TITLE: Study of the loss of several electrons by fast multiply charged ions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 361-369

TEXT: Many-electron loss cross sections for multiply-charged ions of light elements with $Z \geq 3$ were measured in He, N, Ar, and Kr. The velocity of the ions was $(2.6-12) \cdot 10^8$ cm/sec (35 - 750 kev per nucleon). The cross sections were determined by mass spectrometry, using an apparatus described in ZhETF, 40, 989, 1961. Two-electron loss cross sections were determined for Li, B, C, N, O, Ne, Na, Mg, Al, P, and Ar, three-electron loss cross sections for N, Ne, Na, Mg, Al, P, and Ar, four-electron cross sections for N, Ne, P, and Ar, and five-electron cross sections for P and Ar. The first two had an error of 15-20%, and the last two had one of 30%. The

X

Card 1/3

S/056/62/043/002/001/053
B102/B104

Study of the loss of several electrons ...

cross sections are denoted by $\sigma_{i,i+n}$, $n=2....5$. The electron loss cross section is proportional to the electron number q_i of the outer shell, so

that $\sigma_i = (1/q_i) \sum_{s=1}^q s \sigma_{i,i+s}$ for the loss of one electron, $\sigma_i^{(2)}$

$= C_q^{-2} \sum_{s=2}^q C_s^2 \sigma_{i,i+s}$ for the loss of an electron pair, where $C_s^2 = s(s-1)/2$,

C_s^2 and C_q^2 (analogously defined) are the numbers of pairs which can be formed from s and q electrons, respectively. Formulas are also given for the loss probability and the cross-section ratios. The results suggest that the loss of an electron is independent of the existence of the others in an ion-atom collision of the medium. The mean loss probability of individual electrons is small and depends on the binding energy of the electron in the ion. Electron losses occur chiefly if the collision parameters are of the order of the electron shell dimensions. The case under consideration (ion scattering angle $\theta \leq 0.005$ rad) corresponds to

Card 2/3

S/056/62/043/002/001/053
B102/B104

Study of the loss of several electrons ...

collision parameters $p \geq 3 \cdot 10^{-9}$ cm. The experimental values are 5-10 times higher than the cross sections calculated by Russek and Thomas (Phys. Rev. 109, 2015, 1958; 114, 1538, 1959) for these p-values on the basis of the quasimolecular electron loss mechanism. However, the experimental results are in very good agreement with the assumption of a direct interaction. Simultaneous loss of several electrons has a considerable effect on the equilibrium charge distribution when the ion beam passes through the gas, which is nearly Gaussian without multiple electron exchanges. There are 4 figures. ✓

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: November 14, 1961

Card 3/3

S/056/63/044/002/040/065
B108/B186

AUTHORS: Dmitriyev, I. S., Nikolayev, V. S.

TITLE: Calculation of the cross-section of electron loss by fast ions in light media

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 44, no. 2, 1963, 660-665

TEXT: The cross-section is calculated in free-collision approximation for hydrogen and helium media. Resonance effects are neglected owing to screening. The latter has a considerable effect on the cross-section and is taken into consideration here. The general expression for the cross section

$$\sigma = \pi a_0^2 (v/Z^*v_0)^2 \{ Z^2 [G_y(u/2Z^*v_0) - G_y(v/Z^*v_0)] + Z [G_{n,y}(u/2Z^*v_0) - G_{n,y}(v/Z^*v_0)] \}; \quad (2)$$

$$G_y(x) = (1+x^2)^{-1} + (1+x^2)^{-2} + \frac{1}{3}(1+x^2)^{-3},$$

$$G_{n,y}(x) = 4 \ln(1+x^2) + 6(1+x^2)^{-1} + 2(1+x^2)^{-2} + \frac{1}{3}(1+x^2)^{-3},$$

Card 1/3

S/056/63/044/002/040/065
B108/B186

Calculation of the cross-section ...

calculated here assumes the simple form

$$\sigma = 4\pi a_0^2 Z^2 (v_0^2/vu)^2 [1 + Z^{-1} - (u/v)^2 (\frac{1}{4} + Z^{-1})]. \quad (3)$$

for $u \gg 2Z^* v_0$ and $v \gg u$. This form contains Bohr's formula, in which the screening of the nuclear Coulomb field of the medium is not considered. $\epsilon = 1$ for $vu > 2I_c/\mu$; $\epsilon \approx \mu vu/2I_c$ for $vu < 2I_c/\mu$. Z^* is the effective nuclear charge, Z is the atomic number, $v_0 = e^2/\hbar$, v is the velocity of the free electron, μ its mass, I the binding energy of the electron in the ground state of the atom, $u = (2I/\mu)^{1/2}$, I is the binding energy of the lost electron, $n_0 = \hbar^2/\mu e^2$. The screening will be the main factor determining the cross-section if the binding energy of the lost electron is low. In this case and for high velocities the free-collision results agree with those obtained in the Born approximation. There are 3 figures.

Card 2/3

Calculation of the cross-section ...

S/056/63/044/002/040/065
B108/B186

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo
universiteta (Institute of Nuclear Physics of the Moscow
State University)

SUBMITTED: August 11, 1962

Card 3/3

ACCESSION NR: AP4043638

S/0056/64/047/002/0615/0623

AUTHORS: Dmitriyev, I. S.; Nikolayev, V. S.

TITLE: Semiempirical method of calculating the equilibrium charge distribution in a beam of fast ions

SOURCE: Zh. eksper. i teor. fiz., v. 47, no. 2, 1964, 615-623

TOPIC TAGS: charged particle distribution, ion beam, capture cross section, fast particle, equilibrium condition, Gauss equation, statistical physics

ABSTRACT: In view of the great difficulties in a consistent theoretical derivation of the equilibrium charged state of ion beams from the cross sections for the loss and capture of electrons, owing to the difficulty in the calculation of the cross sections, the authors propose a simple semiempirical method, which permits calculation of the average charges and the equilibrium charge distribu-

ACCESSION NR: AP4043638

tion of fast ions moving in solid and gaseous media. The method is based on established laws governing the equilibrium distribution of the charges and makes use of concrete experimental data. The relative number of ions in the beam with different charges is assumed, in accordance with the experimental results, to depend on two parameters and to be given by a Gaussian curve. In calculating the average charge and the width of the equilibrium distribution, the generalized Bohr criterion is used in conjunction with the statistical model of the ion. The method can be applied to calculate the charge composition of a beam of ions of arbitrary elements with atomic numbers $Z > 2$ at an ion velocity $v > v_0 = e^2/h = 2.19 \times 10^8$ cm/sec. Data for ions of boron, neon, chlorine, argon, and mercury show agreement with the theory within 5--10%. Orig. art. has: 7 figures and 11 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

ACCESSION NR: AP4043638

SUBMITTED: 21Feb64

SUB CODE: NP

NR REF SOV: 009

ENCL: 00

OTHER: 015

Card 3/3

I. 5348-66 EWT(1)/EPA(w)-2/EWA(m)-2 IJP(c)
ACCESSION NR: AP5021115

AT UR/0056/65/049/002/0500/0514

AUTHOR: ^{44, 68} Dmitriyev, I. S.; ^{44, 68} Zhileykin, Ya. M.; ^{44, 68} Nikolayev, V. S. ^{21, 44, 55}

TITLE: Calculation of the effective cross section for the loss of electrons by fast hydrogen-like ions during encounters with hydrogen and helium atoms

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 49, no. 2, 1965, 62
500-514 ²⁷ B

TOPIC TAGS: helium, electron loss, ion interaction, electron interaction

ABSTRACT: Approximate formulas in a form convenient for practical calculations are derived for the cross sections of K-electron loss by any element in encounters with hydrogen or helium atoms. Earlier calculations by the authors (ZhETF v. 44, 660, 1963) in the free-collision approximation did not yield a sufficiently complete and correct picture of the effect of variation of the colliding-particle velocity or of charge on the cross sections. The nonrelativistic Born approximation is used in the present article, and the energy and velocity ranges in which this approximation is valid are determined. The relative contributions of elastic and inelastic interactions are compared. For low-charge ions the approximation yields cross sections identical with those calculated in the free-collision approximation. In other cases the calculated cross sections are somewhat higher than the experimental ones

Card 1/2

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L 5348..66

ACCESSION NR: AP5021115

or those calculated in the adiabatic approximation. The results can be used also to estimate the cross sections for electron loss from other shells. "The authors thank G. B. FIKSOV for valuable advice and remarks." Orig. art. has: 4 figures and 15 formulas. ^{44, 55}

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta
(Institute of Nuclear Physics of the Moscow State University) ^{44, 55}

SUBMITTED: 28Dec64

ENCL: 00

SUB CODE: NP

NR REF SOV: 006

OTHER: 016

Card 2/2 *md*

L 55019-65 EWT(d)/EWT(m)/EWP(w)/EWP(f)/EWP(v)/EPR/T-2/EWP(k)/EWA(h)/EWA(c)
Pf-4/Ps-4/Peb WW/EM

ACCESSION NR: AP5015552

UR/0286/65/000/008/0097/0097
629.135/138

AUTHOR: Dmitriyev, I. S.; Dragunov, N. S.; Voytas, Ye. V.

TITLE: Stick for the overall control of a helicopter's engine and main-rotor pitch (pitch-throttle). Class 62, No. 170303

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 8, 1965, 97

TOPIC TAGS: helicopter engine control, control lever, engine control lever, rotor pitch control, pitch control, helicopter, helicopter rotor

ABSTRACT: An Author Certificate has been issued for a control stick for regulating the engines and the collective pitch of a helicopter's main rotor (see Fig. 1 of the Enclosure). It consists of a lever, with an eye-hinge connection, by which engine control is effected through a chain-link drive system using a friction device consisting of spring-loaded friction disks mounted on the axle of the horizontal flapping hinge. This disengages under hydraulic pressure and is spring compressed in order to provide continuous pitch and engine control.

Card 1/3

L 55019-65
ACCESSION NR: AP5015552

In order to regulate the compressive force of the friction device and to disengage the stick, in its lower part is mounted a pivoting element which shifts the guide spring. Orig. art. has: 1 figure. [WH]

ASSOCIATION: Organizatsiya gosudarstvennogo komiteta po aviatsionnoy tekhnike SSSR (Organization of the USSR State Committee for Aviation Technology)

SUBMITTED: 12Dec63

ENCL: 01.

SUB CODE: AC, PR

NO REF SOV: 000

OTHER: 000

ATD PRESS: 4027

Card 2/3

DMITRIYEV, I. V.

Uchet ispol'zovaniia osnovnykh svedstv na promyshlennykh predpriyatiakh /Calculating
the use of basic resources at industrial enterprises/. Moskva, Gosfinizdat SSSR,
1953. 148 p.

O: Monthly List of Russian Accessions, vol. 6 No. 11 February 1954.

DMITRIYEV, I.V.

~~Simulating~~ the hydraulic conditions in heating networks by means
of hydraulic models. Nauch.dokl.vys.shkoly; energ. no.4:215-222
'58. (MIRA 12:5)

1. Rekomendovani kafedroy teplovykh ustanovok prompredpriyatiy
Moskovskogo energeticheskogo instituta.
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TITLE: Connection between the upper glass-formation limit and the phase diagrams of certain binary systems

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TOPIC TAGS: phase diagram, glass, crystallization

ABSTRACT: Starting from the "composition-property" and the corresponding phase diagrams (see, e.g., N. S. Kurnskov, Vvedeniye v fiziko-khimicheskiy analiz /Introduction to the Physico-Chemical Analysis, M.-L., 1940), the authors studied the relations between the phase diagrams and the upper glass-formation limits of the M_2O-SiO_2 and $MSiO_2$ binary systems. The results show that the glass-formation limits in the system under study either coincide with the eutectic and peritectic points, or appear in the vicinity or at the maximum of the corresponding phase diagrams of the binary compound. The crystallization kinetics, determining the glass-producing capability of melts, changes periodically and discontinuously as function of the

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isostructural domains, of the nature of the elements, and of the liquidus curves on the phase diagrams. The theoretically allowable upper glass-formation limit in the Na₂O-SiO₂ type systems tends towards the peritectic point. To the left of it, the modified component crystallizes as primary phase. [M = cation of element in Groups I or II of periodic system.]
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ASSOCIATION: Chemisch-technologisches Institut, Sofia-Darveniza (Institute of Chemical Technology)

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