83919
S/051/60/009/004/015/034
E201/E191

A Monochromator for Very Soft X-rays which can be Used to Count the Absolute Number of Quanta

(the counter is shown schematically in Fig 4). The power supply and counting circuits are given in Fig 3.
Acknowledgement is made to A.A. Lebedev for his advice.
There are 5 figures and 6 references: 3 Soviet, 2 English and 1 translation into Russian.

SUBMITTED: January 26, 1960

Card 2/2

83920
S/051/60/009/004/016/034
E201/E191

9.6150

AUTHORS: Lukirskiy, A.P., Rumsh, M.A., and Smirnov, L.A.

TITLE: Measurement of the Photoelectric Yield of Very Soft X-ray Radiation

PERIODICAL: Optika i spektroskopiya, 1960, Vol 9, No 4, pp 511-515

TEXT: The authors describe a technique of measuring the photoelectric yield of very soft (23-113 Å) X-ray radiation. Photocurrents were measured with an Allen-type photomultiplier (Ref 1) which could count single photoelectrons. The power supply and recording circuits of the Allen multiplier are shown in Fig 1. The authors give also dependences of the recorded number of photoelectrons on the amplification factor of a wide-band amplifier used in conjunction with the multiplier (Fig 2), on the voltage between the photocathode and the second dynode (Fig 3), and on the location of the point of incidence of a monochromatic beam on the photocathode (Fig 4). The absolute number of the X-ray quanta was counted with a Geiger counter. The photoelectric yields, obtained for Be, Ni, W, LiF, NaF, CaF_2, SrF_2 and NaCl, are listed in a table on p 515. The yields ranged from 0.7% for Be subjected to X-rays of 23.6 Å wavelength to 27% for NaCl

Card 1/2

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S/051/60/009/004/016/034
E201/E191

Measurement of the Photoelectric Yield of Very Soft X-ray Radiation

subjected to 113 Å X-rays. The yields rose with increase of the X-ray wavelength.
Acknowledgement is made to A.A. Lebedev for his advice.
There are 4 figures, 1 table and 15 references: 2 Soviet, 11 English and 2 Indian.

SUBMITTED: January 26, 1960

Card 2/2

84691

9.6150

S/051/60/009/005/012/019
E201/E191

AUTHORS: Lukirskiy, A.P., Rumsh, M.A., and Karpovich, I.A.

TITLE: Measurement of the Photoelectric Emission Yield for 1.54-13.3 Å X-rays

PERIODICAL: Optika i spektroskopiya, 1960, Vol.9, No.5, pp 653-657

TEXT: In an earlier paper (Ref. 1) the authors described a technique of measuring the photoelectric yield of ultrasoft X-rays by determination of the intensity of X-rays with a Geiger counter and the number of photoelectrons with an Allen-type electron multiplier (Ref. 2). The present paper describes the use of this technique for X-rays of λ = 1.54-13.3 Å. A vacuum X-ray monochromator (Ref. 3) was employed; it is shown schematically in Fig. 1. Dependence of the counting rate of an Allen-type electron multiplier on the amplification factor of the electronic circuit, on the place where the X-ray beam fell on the multiplier photocathode, and on the voltage between the photocathode and the first dynode, is given in Figs 2, 3 and 4 respectively. The photoelectric yields were found for Ti, W, Pt, NaBr, CsI and SrF_2; they are listed (in %) in a table on

Card 1/2

84691

S/051/60/009/005/012/019
E201/E191

Measurement of the Photoelectric Emission Yield for 1.54-13.3 Å X-rays

page 657. The photoelectric yield generally tended to rise with increase of the X-ray wavelength. Ionic crystals had usually much greater photoelectric yields than metals.
There are 4 figures, 1 table and 5 Soviet references.

SUBMITTED: January 26, 1960

Card 2/2

9.6150
26.1512

S/020/60/135/001/014/030
B006/B056

AUTHORS: Rumsh, M. A., Lukirskiy, A. P., and Shchemelev, V. N.

TITLE: The Photoeffect From Metallic Cathodes in the Wavelength Region of From 1.39 to 13.3 A

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 1, pp. 55-57

TEXT: By means of a method described already earlier (Refs. 1, 2), the authors investigated the dependence of the quantum yield $\varkappa$ on the glancing angle θ of W-, Ni-, and Be-photocathodes in the range of 1.39-13.3 A. It was found experimentally that the quantum yield decreases rapidly with a decrease of the glancing angle; this function may well be approximated in the case of small θ by a cosec θ function. Fig. 1 shows $\varkappa \sin\theta = f(\theta)$. In the case of very small angles (up to 3°), the rapid decrease of the curves may be explained by the total reflection of X-ray radiation. All curves have a tendency toward a decrease of $\varkappa \sin\theta$ with a decrease of θ of from $10 - 15^\circ$ to $2 - 3^\circ$. The effects observed may be explained by assuming that, as a result of the absorption of the radiation energy in metal,

Card 1/5

The Photoeffect From Metallic Cathodes in the Wavelength Region of From 1.39 to 13.3 A

S/020/60/135/001/014/030
B006/B056

"free" electrons occur, which move with a velocity that is sufficient to overcome the work function. In a layer of the thickness dx, the energy $dE = I(\mu/\sin\Theta)dx$ is absorbed per time unit, and leads to the occurrence of $dn = dE/\varepsilon$ "free"electrons. $(I = N_0(hc/\lambda)[1-R(\Theta)]\exp(-\mu x/\sin\Theta))$. $R(\Theta)$ - reflection coefficient, μ - linear attenuation factor; $I_0 = N_0 hc/\lambda$ - intensity of the incident beam, N_0 - number of the incident quanta per sec, λ - wave length, ε - the energy necessary for the forming of one "free" electron. For the quantum yield the following formula is obtained: $\varkappa = \frac{hc}{\varepsilon\alpha}\frac{\mu}{\lambda}\left[1-R(\Theta)\right]\operatorname{cosec}\Theta\frac{\alpha}{\alpha+\mu/\sin\Theta}$. For X-rays, $R(\Theta) = 0$, with the exception of very small Θ, where total reflection occurs. The factor $\alpha/(\alpha+\mu/\sin\Theta)$ differs only little from unity. Small angles excepted, it is possible to put $\varkappa = (hc/\varepsilon\alpha)(\mu/\lambda)\operatorname{cosec}\Theta$; (this relation holds for $\Theta \geqslant 10 - 15^{\circ}$). The numerical results of measurements are given in a table. In the spectral range investigated here, $\varkappa = k\lambda^2$. Fig. 3 shows $\log\varkappa = f(\log\lambda)$ (experimentally). The linear course of this function and the angle of inclination confirm the assumption made concerning the nature of the effects observed. The authors finally thank Academician

Card 2/5

The Photoeffect From Metallic Cathodes in the Wavelength Region of From 1.39 to 13.3 A

S/020/60/135/001/014/030
B006/B056

A. A. Lebedev for his interest and discussions. There are 3 figures and 6 references: 3 Soviet, 2 German, and 1 US.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet im. A. A. Zhdanova (Leningrad State University imeni A. A. Zhdanov)

PRESENTED: June 11, 1960, by A. A. Lebedev, Academician

SUBMITTED: May 26, 1960

Card 3/5

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S/020/60/135/001/014/030
B006/B056

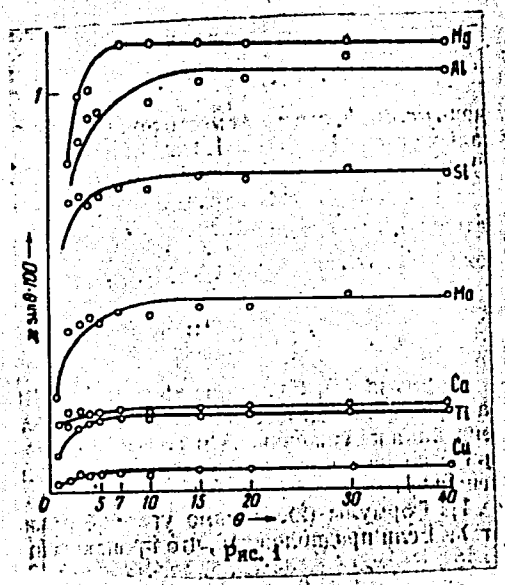

Рис. 1

Card 4/5

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B006/B056

Photocathodes

Таблица 1*.

λ, в Å	W-фотокатод			Ni-фотокатод			Be-фотокатод		
	$\varkappa \cdot 10^3$	$\frac{\mu}{\lambda} \cdot 10^{-5}$	$\frac{\varkappa}{\mu/\lambda} \cdot 10^3$	$\varkappa \cdot 10^3$	$\frac{\mu}{\lambda} \cdot 10^{-5}$	$\frac{\varkappa}{\mu/\lambda} \cdot 10^3$	$\varkappa \cdot 10^3$	$\frac{\mu}{\lambda}$	$\frac{\varkappa}{\mu/\lambda} \cdot 10^3$
1,389				1,9	1,75	1,08			
1,537	1,8	2,16	8,3	0,3	0,26	1,15	0,78	2,5	3,10
2,743	4,8	4,6	10,4	1,1	0,53	2,07	1,3	5,5	2,36
3,351	5,9	6,0	9,8	1,2	0,94	1,22	2,9	8,1	3,60
5,395	11,0	8,5	13,0	2,5	1,06	2,35	7,7	18,4	4,2
7,111	5,4	7,8	6,9	4,4	2,54	1,73	11,4	30,5	3,74
8,321	7,3	9,5	7,7	5,6	3,08	1,82	14,6	41,5	3,52
9,870	8,1	12,0	6,8	7,0	3,77	1,86	22,5	55,0	4,1
13,33				11,5	5,0	2,30	39,0	92,0	4,2

* Квантовый выход $\varkappa$ измерен для угла $\theta = 10°$.

* Quantum yield $\varkappa$ given for $\theta = 10^0$

Card 5/5

RUMSH, Mikhail A., LUKIRSKIY, A. P., and SMIRNOV, L. A.

"Instrumentation Between 13A and 120A"

report to be submitted for the 1st Intl. Conference on Ultraviolet Vacuum Radiation Physics.
University of Southern California
16-19 April 1962

L 14207-66 EWT(1) LJP(c) AT
ACC NR: AP6003613 SOURCE CODE: UR/0054/65/000/003/0069/0073

AUTHOR: Yeliseyenko, L. G.; Shchemelev, V. N.; Rumsh, M. A. 63 B

ORG: Leningrad State University (Leningradskiy gosudarstvennyy universitet)

TITLE: X-ray photoemission study of the passage of medium energy electrons through materials

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 3, 1965, 69-73

TOPIC TAGS: photoelectric effect, copper, aluminum, iron, nickel, titanium, x ray emission, photoelectron, photocathode

ABSTRACT: The x-ray photoelectric yield 21,44,55 was studied in Cu, Al, Fe, Ni, and Ti films used as photocathodes. For Cu, Al, and Fe, thickness curves representing the variation of the quantum yield coefficient χ with film thickness x were determined for various wavelengths, and from these cruves, $r = AE^n$ was determined, where r is the depth

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ACC NR: AP6003613

of formation of the x-ray photoelectric effect, A and n are constants dependent on the medium, and E is the electron energy. The spectral variation was determined for all five elements, and thus B and n' in the formula $1/\alpha = BE^{n'}$ (where α is a constant dependent on the medium and electron energy) could be obtained. It was found that the effective depth of formation of the x-ray photoelectric effect is less than the effective electron path. Orig. art. has: 3 figures, 2 formulas.

SUB CODE: 20/ SUBM DATE: 02Jul64/ ORIG REF: 008/ OTH REF: 001

TS
Card 2/2

ACC NR: AP7005862 SOURCE CODE: UR/0181/66/008/012/3647/3649

AUTHOR: Yeliseyenko, L. G.; Shchemelev, V. N.; Rumsh, M. A.

ORG: Leningrad State University im. A. A. Zhdanov (Leningradskiy gosudarstvennyy universitet)

TITLE: Ratio of directional and diffusion parts of the free path of kilovolt electrons in a solid

SOURCE: Fizika tverdogo tela, v. 8, no. 12, 1966, 3647-3649

TOPIC TAGS: free path, physical diffusion, electron emission, photoelectron, x ray effect, electron energy

ABSTRACT: Using apparatus described in an earlier paper (Opt. i spektr. v. 9, 653, 1960), the authors determine the distribution of the electron emission direction in the case when the photoelectrons are primarily of the Auger type. The secondary electrons were suppressed. The varied parameter was the angle between the x-ray beam and the emitter plane. In the case of the Auger electrons, it was found that the emission in a narrow solid angle, whose axis makes an angle α with the normal to the plane boundary of the cathode, is proportional to $\cos\alpha$. In the case of x-ray photoelectrons, a cosinusoidal variation of the emitting volume was also observed, although this is not quite evident from the theory. Measurement of the energy distribution of the emission in two different directions shows that the relation between the number of photoelectrons and Auger electrons is approximately constant, confirming the cosinu-

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ACC NR: AP7005862

soidal law obtained in the other measurements. This demonstrates that the energy composition of the integral emission can be obtained by investigating the energy distribution (by plotting the delay curves) in a narrow solid angle. The authors thank A. A. Lebedev for interest in the work and a discussion of the results. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 10Jun66/ ORIG REF: 003/ OTH REF: 001

Card 2/2

ACC NR: AP7005863 SOURCE CODE: UR/0181/66/008/012/3649/3652

AUTHOR: Yeliseyenko, L.G.; Shchemelev, V.N.; Rumsh, M.A.

ORG: Leningrad State University im. A.A. Zhdanov (Leningradskiy gosudarstvennyy universitet)

TITLE: The absorption of electron fluxes of kilovolt energy during their penetration of a solid body

SOURCE: Fizika tverdogo tela, v. 8, no. 12, 1966, 3649-3652

TOPIC TAGS: x ray absorption, electron beam, electron capture, electron flux, electron loss

ABSTRACT: Two factors are responsible for a decrease in the number of electrons which can penetrate thin film: scattering, and retardation. To determine which process is predominant at a given film thickness, an investigation was made of the penetration of electron fluxes through a solid body. The study was based on the x-ray photoeffect of large cathodes. The theoretical quantum yield (X_r) of the photoeffect was calculated by means of a formula whose derivation was based on a spherically symmetric representation. A quasi-spherical analyzer was used to obtain the quantum yield (X_r (50)) experimentally under conditions of a 50-volt retardation. The theoretical and experimental values were in good

Card 1/2 UDC: none

ACC NR: AP7005863

agreement, from which it follows that the mean free path and the practical path in the spherically symmetric experiment virtually coincide and are equal to the free path as determined experimentally in a thin film. This in turn shows that the attenuation at film thicknesses smaller than the practical path is associated with scattering by angles close to and larger than 90°, which results in reflected electrons and electrons which escape along the layer where they are retarded. The authors thank A. A. Lebedev for his interest in the work and for discussing the results. Orig. art. has: 2 formulas and 1 table. [JA]

SUB CODE: 20/ SUBM DATE: none/ ATD PRESS: 5116

Card 2/2

ACC NR: AP7005342 SOURCE CODE: UR/0181/67/009/001/0171/0174

AUTHOR: Yeliseyenko, L. G.; Shchemelev, V. N.; Rumsh, M. A.

ORG: Leningrad State University im. A. A. Zhdanov (Leningradskiy gosudarstvennyy universitet).

TITLE: On the ratio of the mean free paths of fast and slow electrons in alkali-halide compounds

SOURCE: Fizika tverdogo tela, v. 9, no. 1, 1967, 171-174

TOPIC TAGS: alkali halide, cathode, photoeffect, quantum yield, x ray effect, free path, electron energy

ABSTRACT: This is a continuation of earlier work (FTT v. 8, 3649, 1966 and earlier) dealing with the x-ray photoeffect of bulky cathodes. In the present investigation, by comparing the pulsed quantum yields and the quantum yields of the x-ray photoeffect proper (these quantities were defined in the earlier work) in the x-ray wavelength range 1.5 - 10 Å, and the thickness dependence of the pulsed quantum yields in the case of a CsI photocathode, the authors show that the mean free paths of the fast x-ray electrons in alkali-halide compounds can be much lower than the paths of the secondary electrons produced by them. In the experiments on the thickness dependence, the CsI was sputtered on aluminum substrates. The test results show that at low thicknesses, all the absorption events are converted into photoemission, and that with increasing thickness the number of registered photoemission events becomes smaller

Card 1/2

ACC NR: AP7005342

than that of the absorption events. The absolute values of the quantum yields for a number of alkali-halide compounds are summarized for quantum energies ranging from 1200 to 8070 ev. The authors thank A. A. Lebedev for a discussion of the results. Orig. art. has: 1 figure and 1 table.

SUB CODE: 20/ SUBM DATE: 10Jun66/ ORIG REF: 005/ OTH REF: 002

Card 2/2

[illegible], V.N.; RUMSH, M.A.

Use of the X-ray photoemission method in studying the passage of medium-energy electrons through material media. Vest. LGU 20 no.16:69-73 '65. (MIRA 18:9)

RUMSH, M.A.; KONOROV, P.P.; LYUBITTS, K.

Structure of epitaxial germanium films obtained in a vacuum by spraying into oriented backings. Vest. LGU 20 no.10:52-59 '65. (MIRA 18:7)

SHCHEMELEV, V.N.; YELISEYENKO, L.G.; DENISOV, Ye.P.; RUNSH, M.A.

Measuring X-ray photoemission from metals by means of open type secondary-electron multipliers. Prib. i tekh. eksp. 9 no.6:114-118 N-D '64. (MIRA 18:3)

1. Leningradskiy gosudarstvennyy universitet.

~~EWP(m)/EWP(i)/EWP(t)/EWP(b)~~ ~~IJP(c)~~ JD

ACCESSION NR: AP5017099 UR/0054/65/000/002/0052/0059

AUTHOR: Rumsh, M. A.; Konorov, P. P.; Lyubitts, K.

TITLE: Structure of epitaxial layers of germanium vacuum-deposited on orienting substrates

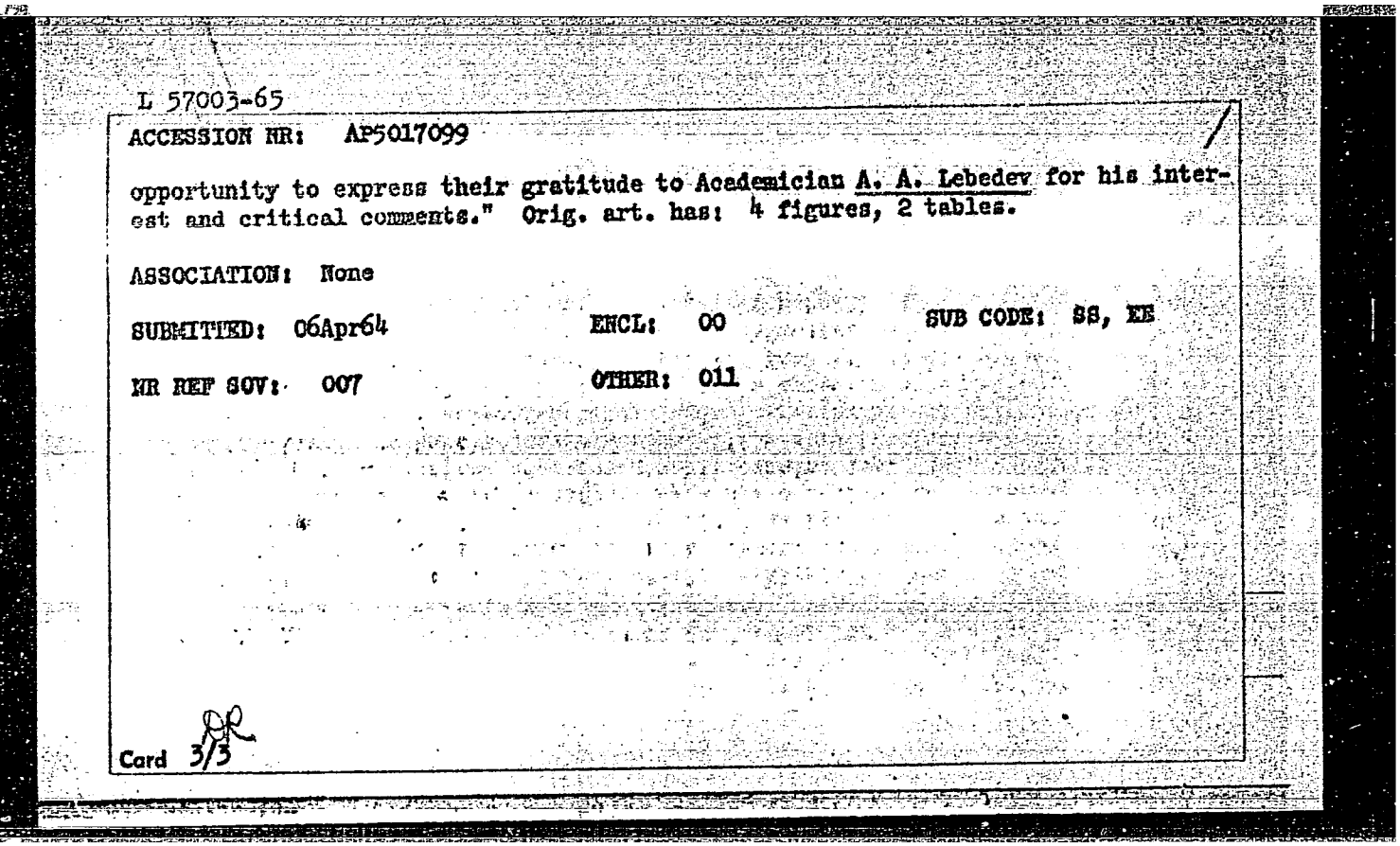
SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 2, 1965, 52-59

TOPIC TAGS: epitaxial layer, quasimonocrystalline germanium, vacuum deposition, twinning orientation, orienting substrate, nucleation twin, electronographic structure, hole concentration

ABSTRACT: So far the causes of the twinning orientation found to be present in monocrystalline germanium layers vacuum-deposited on crystal substrates have not been traced. (Orientation of this kind is accompanied by a high concentration of holes and low mobility in layers of this type.) To fill this gap, in view of the considerable interest currently shown in the properties of "monocrystalline" layers of germanium, the authors performed a detailed analysis of electronograms of these layers with the object of uncovering the possible mechanism of twinning and the de-

Card 1/3

gree of their development. "Mononcrystalline" layers of germanium were obtained by deposition on chips of natural fluorite, the latter having a temperature of 600°C, in the presence of a pressure of 5×10^{-5} mm Hg. The layers of germanium were then separated from the substrate by a HCl solution and collected on a mesh and subjected to a detailed electronographic examination. This examination revealed the layers to have a quasimonocrystalline structure which involves the appearance of twinning (nucleation twins) and a large number of defects in the junction region. As a result of the twinning there appear 6 orientations of primary twins and 24 orientations of secondary twins. Each of the six primary twins physically adjoins over the lattice planes only one nucleation twin and three secondary twins, while the secondary twins themselves normally adjoin only one primary twin. All this indicates that in the process of formation of the Ge layer, owing to the branched twinning, defects must appear in the boundary regions of the contacting twins, and these defects may be present in concentrations similar to those present in polycrystalline Ge layers. This apparently is the reason why the electrical properties of epitaxially grown Ge resemble the properties of polycrystalline Ge layers and thus their practical applications are restricted. It is thus concluded that it is possible to obtain layers with a small number of defects by modifying the techniques for their preparation (degree of vacuum, temperature of substrate, evaporation rate) so as to eliminate twinning. "The authors take this



L 57003-65

ACCESSION NR: AP5017099

opportunity to express their gratitude to Academician A. A. Lebedev for his interest and critical comments." Orig. art. has: 4 figures, 2 tables.

ASSOCIATION: None

SUBMITTED: 06Apr64 ENCL: 00 SUB CODE: SS, EE

NR REF SOV: 007 OTHER: 011

Card 3/3

RUMSH, M.A.; LYUBITTS, K.; KONOROV, P.F.

Interpretation of electron diffraction pictures of multimacled crystals. Kristallografiia 9 no.6:799 804 N-D '64.
(MIRA 18:2)

YELISEYENKO, L.G.; SHCHEMELEV, V.N.; RUMSH, M.A.

Spectral variation of the X-ray photoeffect and the use of its regular features in determining the constants according to the Planck law. Fiz. tver. tela 6 no.12:3711-3712 D '64
(MIRA 18:2)

1. Leningradskiy gosudarstvennyy universitet.

L 12645-65 EWA(k)/EWT(1)/EPA(s)-2/EWG(k)/EWT(m)/T/EEC(t)/EPR/EWP(b) Pz-6/
Ps-4/Pt-10 IJP(c) JD/JG/AT

ACCESSION NR: AP4044922 S/0181/64/006/009/2569/2573

AUTHORS: Denisov, Ye. P.; Shchemelev, V. N.; Mezhevich, A. N.; Rumsh, M. A.

B

TITLE: Analysis of the energy composition of x-ray photoemission from a bulky cathode

SOURCE: Fizika tverdogo tela, v. 6, no. 9, 1964, 2569-2573

TOPIC TAGS: x ray emission, x ray spectrum, photoemission, cathode, K band, L band

ABSTRACT: The purpose of the investigation was to separate the parts connected with the K, L, Auger, and secondary electrons from the total photoemission, and to compare the relative number of electrons in each group with the corresponding coefficients in the formula for the quantum yield. To this end, the method of spherical capacitor was used to study the energy composition of the x-ray pho-

Card 1/2

L 12645-65

ACCESSION NR: AP4044922

toemission for aluminum, chromium, titanium, and iron photocathodes. The setup used was described by two of the authors (Rumsh and Shchemelev, FTT v. 5, 71, 1963). A graphic procedure for separating the various components is described. The results confirm the validity of the equation derived previously by the Rumsh and Shchemelev (ZhETF v. 42, 727, 1962) for the quantum yield of the external photoeffect. "The authors thank Academician A. A. Lebedev for interest in the work and for a discussion of the results." Orig. art. has: 3 figures, 1 formula, and 1 table.

ASSOCIATION: Leningradskiy gosudarstvenny*y universitet (Leningrad State University)

SUBMITTED: 28Nov63 ENCL: 00

SUB CODE: OP, SS NR REF SOV: 008 OTHER: 000

Card 2/2

L 12640-65 EWA(k)/EWT(l)/EWG(k)/EWT(m)/EPA(sp)-2/EPF(n)-2/EPA(w)-2/
EEC(t)/T/EWP(t)/EWA/EWP(b) Pz-6/Pab-10/Pu-4 IJP(c) AT/RWH/JD

ACCESSION NR: AP4044923 S/0181/64/006/009/2574/2579

AUTHORS: Shchemelev, V. N.; Yeliseyenko, L. G.; Denisov, Ye. P.; Rumsh, M. A.

TITLE: Current and pulse measurements of x-ray photoemission of a bulky cathode

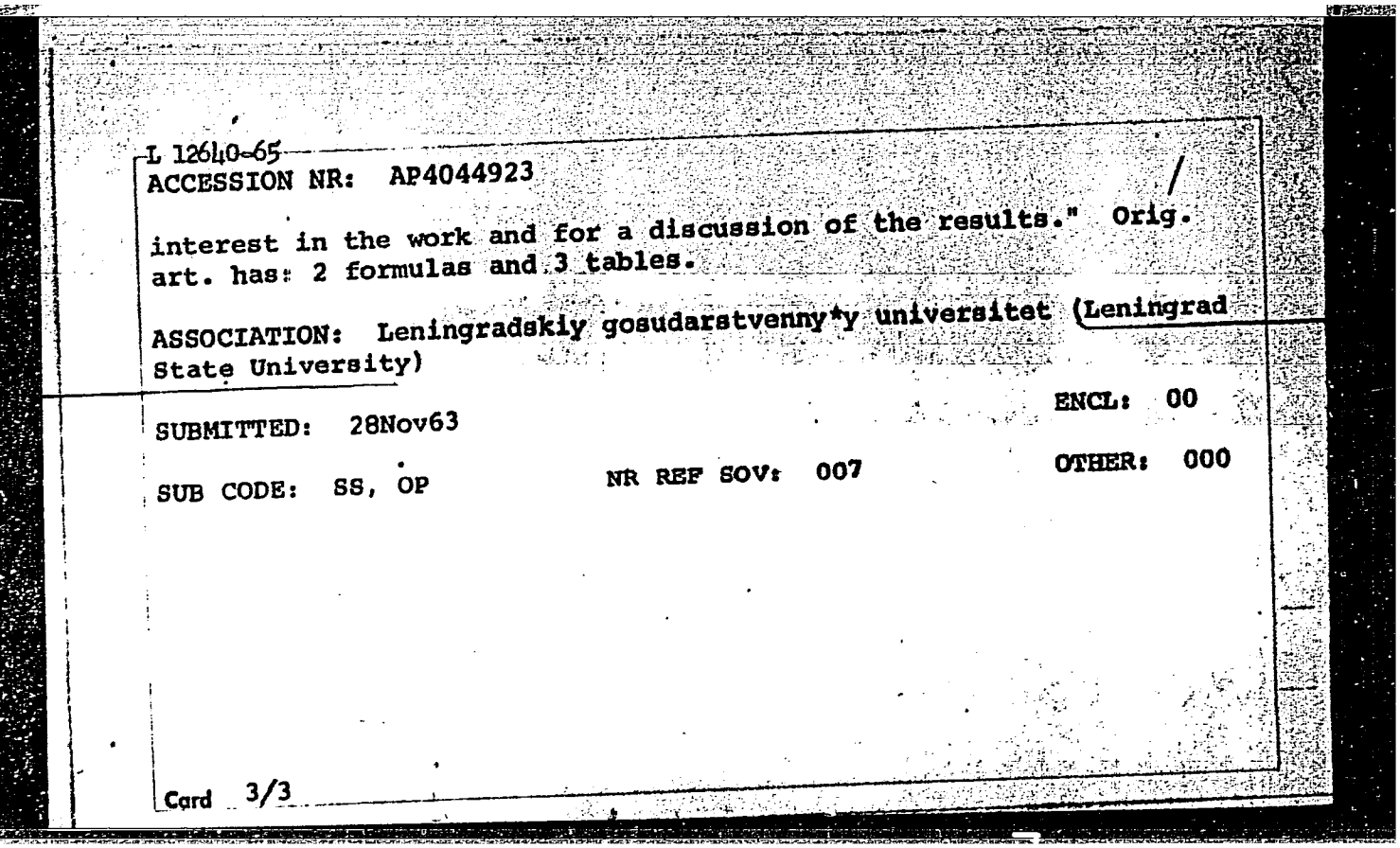
SOURCE: Fizika tverdogo tela, v. 6, no. 9, 1964, 2574-2579

TOPIC TAGS: x ray emission, photoemission, cathode, metallic photocathode, dielectric photocathode, electron multiplier, secondary electron multiplier

ABSTRACT: It is shown, after reviewing the earlier literature and the various measurement methods, that the discrepancies in the results obtained from metals and dielectrics are due to certain peculiarities in emission from these substances. Metallic photocathodes are characterized by emission of fast x-ray electrons unaccompanied

Card 1/3

by slow truly secondary satellites, so that measurement of emission with the aid of secondary-electron multipliers of the open type fails to record an appreciable part of this emission. In the case of dielectric photocathodes, an appreciable fraction of the emission acts consists of purely secondary events, the number of which increases as the thicknesses for the yield of x-ray and secondary electrons become equalized and as the secondary emissivity of the dielectric medium increases. It is therefore possible to explain the discrepancy between the number of x-ray electrons emitted into vacuum from a dielectric and the number of produced x-ray electrons in dielectrics without resorting to an additional emission mechanism. Experimental data are presented for the average number of electrons per emission act. The corresponding emission coefficients and frequencies of emission acts are tabulated for various dielectrics (NaCl, KCl, KBr, CsCl, CsI) and metals (Al, Ti, Cr, Fe, Co, Sn, Au, Pb, and Bi). The effect of coating metals with dielectrics is also briefly discussed. "The authors thank Academician A. A. Lebedev for



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ACCESSION NR: AP4044923

interest in the work and for a discussion of the results." Orig. art. has: 2 formulas and 3 tables.

ASSOCIATION: Leningradskiy gosudarstvenny*y universitet (Leningrad State University)

SUBMITTED: 28Nov63 ENCL: 00

SUB CODE: SS, OP NR REF SOV: 007 OTHER: 000

Card 3/3

ACCESSION NR: AP4019841 S/0181/64/006/003/0796/0800

AUTHORS: Shkol'nikov, Ye. V.; Rumsh, M. A.; Myuller, R. L.

TITLE: X ray study of crystallization of semiconductor glasses of the type $AsSe_xGe_y$

SOURCE: Fizika tverdogo tela, v. 6, no. 3, 1964, 796-800

TOPIC TAGS: semiconductor, semiconductor glass, crystallization, electric conductivity

ABSTRACT: The authors have synthesized several compounds with the general formula $AsSe_xGe_y$ by a method described previously (R. L. Myuller and Ye. V. Shkol'nikov, Vestn. LGU, 22, 119, 1962). They have compared the x-ray method of determining completeness of vitrification with previously used methods (density and low-temperature dependence of electrical conductivity). This comparison is summarized in Fig. 1 on the Enclosure. The comparison shows agreement, and the authors conclude that the process of crystallization may be satisfactorily described by measurements

Card 1/3

ACCESSION NR: AP4019841

of density and low-temperature dependence of electrical conductivity. Orig. art. has: 1 figure and 3 tables.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: 11Sep63 DATE ACQ: 31Mar64 ENCL: 01

SUB CODE: SS, OP NO REF SOV: 004 OTHER: 000

Card 2/3

ACCESSION NR: AP4019841

ENCLOSURE: 01

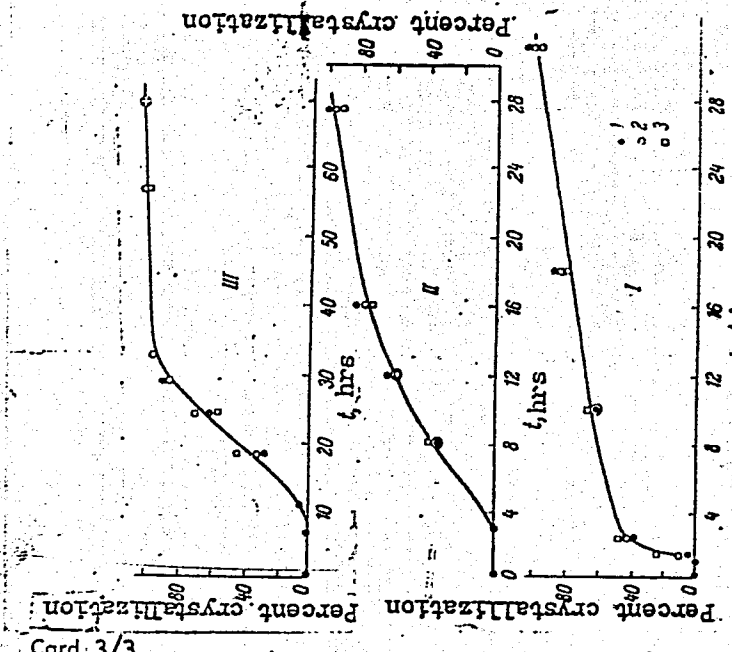

Fig. 1. Isotherms for percent of completeness of the crystallization process in compounds of compositions I, II, and III, determined by different methods. I - $AsSe_5Ge_4$ annealed at 400 ± 4 C; II - $AsSe_3Ge_{2.66}$ annealed at 450 ± 4 C; III - As_2Se_3 annealed at 270 ± 2 C; 1 - determined by quantitative x-ray analysis; 2 - determined by density measurements; 3 - determined by measurements of low-temperature dependence of electrical conductivity.

Card 3/3

ACCESSION NR: AP4009988 S/0109/64/009/001/0148/0154

AUTHOR: Rumsh, M. A.; Tyutikov, A. M.; Shchemelev, V. N.

TITLE: X-ray photoelectric effect of a multilayer cathode

SOURCE: Radiotekhnika i elektronika, v. 9, no. 1, 1964, 148-154

TOPIC TAGS: secondary electron multiplier, multilayer cathode, photoelectric effect, x-ray photoelectric effect, BeO cathode coating, MgO cathode coating

ABSTRACT: An experimental investigation of the effect of the thickness of MgO and BeO passivating layers upon the quantum yield of the photoelectric effect (or the efficiency of a secondary-electron multiplier) is reported. Wedge-type (from tens Å to 7,000 Å) MgO and BeO coatings on Au, Cr, Al, and SrF_2 backings were tested. It was found that: (1) The above effect is not a monotonous function: thickness curves may have maxima and minima; (2) The changing shape of the thickness curves can be explained by (a) groups of electrons with different

Card 1/2

ACCESSION NR: AP4009988

energies which appear in both the coating and the backing, (b) reflection of the coating electrons by the backing, and (c) photoabsorption of the backing fluorescence by the coating substance; (3) The cathode passivating against ultraviolet radiation slightly affects the sensitivity of the secondary-electron multiplier to x-rays; for the purpose of absolute measurement, passivated cathodes should be calibrated for each wavelength. Orig. art. has: 6 figures and 1 formula.

ASSOCIATION: none

SUBMITTED: 03Dec62 DATE ACQ: 10Feb64 ENCL: 00

SUB CODE: GE NO REF SOV: 010 OTHER: 001

Card 2/2

RUMSH, M.A.; TYUTIKOV, A.M.; SHCHEMELEV, V.N.

X-ray photoeffect of a laminated cathode. Radiotekh. i elektron. 9 no.1:148-154 Ja '64. (MIRA 17:3)

NOVIK, F.T.; RUMSH, M.A.; ZIMKINA, T.M.

Structure of CdTe layers grown by sublimation on the natural cleavage of NaCl, KCl, and KBr single crystals. Kristallografiia 8 no.3:378-381 My-Je '63. (MIRA 16:9)

1. Leningradskiy gosudarstvennyy universitet.

RUMSH, M.A.; SHCHEMELEV, V.N.

Determining X-ray fluorescence yields from the abrupt variations in X-ray photoemission. Izv. AN SSSR. Ser. fiz. 27 no.6:821-828 Je '63. (MIRA 16:7)

1. Fizicheskiy fakul'tet Leningradskogo gosudarstvennogo universiteta im. A.A.Zhdanova.
(X-ray spectroscopy) (Quantum theory)

LUKIMSKIY, A.P.; RUMSH, M.A.; KARPOVICH, I.A.

Geiger counters for recording soft and ultrasoft X-radiation.
Zav.lab. 29 no.4:495-496 '63. (MIRA 16:5)

1. Leningradskiy gosudarstvennyy universitet im. A.A.Zhdanova.
(X rays) (Geiger-Müller counters)

LUKIRSKIY, A.P.; RUMSH, M.A.; KARPOVICH, I.A.

Measurement of the intensity of soft X rays with the aid of secondary electron multipliers. Zav.lab. 29 no.4:456-459 '63. (MIRA 16:5)

1. Leningradskiy gosudarstvenny, universitet im. A.A.Zhdanova.
(X rays--Industrial applications) (Photoelectric multipliers)

RUMSH, M.A.; SHCHEMELEV, V.N.

Using the laws governing the X-ray photoelectric effect in a solid photocathode in determining the yields of "K"-fluorescence of the elements composing the photocathode. Vest.LGU 17 no.22: 63-71 '62. (MIRA 15:12)

SHCHEMELEV, V. N.; RUMSH, M. A.

X-ray photoeffect of dielectric cathodes. Fiz. tver. tela 5 no.1:66-70 Ja '63. (MIRA 16:1)

1. Leningradskiy gosudarstvennyy universitet.

(Photoelectricity) (Cathodes)

RUMSH, M.A.; NOVIK, F.T.; ZIMKINA, T.M.

Structural characteristics of monocrystalline CdTe films. Kristallografiia 7 no.6:873-877 N-D '62. (MIRA 16:4)

1. Leningradskiy gosudarstvennyy universitet.
(Cadmium telluride crystals)

RUMSH, M.A.; SHCHEMELEV, V.N.

Determining the yields of the Auger effect from the K-shell for chlorine and potassium, taking as a basis the fluctuations in the quantum yield of the X-ray photoeffect of a massive KCl cathode. Fiz. tver. tela 4 no.8:2281-2282 Ag '62. (MIRA 15:11)

1. Leningradskiy gosudarstvennyy universitet.
(Auger effect) (Potassium chloride) (Quantum theory)

SHCHEMELEV, V.N.; RUMSH, M.A.

Studying the elementary act of the X-ray photoeffect by analyzing the output pulse height distribution in a secondary-electron multiplier. Fiz.tver.tela 4 no.10:2795-2801 O '62. (MIRA 15:12)

1. Leningradskiy gosudarstvennyy universitet.
(Photoelectric multipliers)

RUMSH, M. A.; SHCHEMELEV, V. N.

Role of secondary emission phenomena in the X-ray photoeffect from metal cathodes. Fiz. tver. tela 5 no.1:71-77 Ja '63. (MIRA 16:1)

1. Leningradskiy gosudarstvennyy universitet.

(Photoelectricity) (Secondary electron emission) (Cathodes)

S/032/63/029/004/014/016
A004/A127

AUTHORS: Lukirskiy, A.P., Rumsh, M.A., Karpovich, I.A.

TITLE: Geiger counters for recording soft and ultrasoft x-radiation

PERIODICAL: Zavodskaya laboratoriya, no. 4, 1963, 495 - 496

TEXT: The authors describe their design of special Geiger counters for the recording of radiation of a wave length in the ranges of 23.6 -280 Å and 1.5 - 18.3 Å. The counters are of a coaxial design with a narrow lateral window located on the generatrix. Such an arrangement of the inlet window precludes the phenomenon of a counter "dead zone". The counter cathode is made of red copper and pickled in the nitric acid. By two hoses the counters are connected to a special layout ensuring a forced circulation of the gas mixture in the counter, which results in a considerable reduction of the setup time of the stationary counter characteristics. The counters are filled with an argon-alcohol mixture. The efficiency-wave length of the Geiger counter is given. There are 3 figures.

ASSOCIATION: Leningradskiy gosudarstvenny universitet im. A.A. Zhdanova (Leningrad State University im. A.A. Zhdanov)

Card 1/1

L 10183-63 EWT(1)/BDS—AFFTC/ASD/SSD

ACCESSION NR: AP3001362 S/0048/63/027/006/0821/0828

AUTHOR: Rumsh, M. A.; Shchemelev, V. N. 54 52

TITLE: Determination of x-ray fluorescence yields from the jump-like discontinuities in x-ray photoemission

SOURCE: AN SSSR. Izv. Seriya fizicheskaya, v. 27, no. 6, 1963, 821-828

TOPIC TAGS: k-fluorescence yields, massive-cathode method, x-rays

ABSTRACT: A method developed by the authors (Fiz. tver. tela, 4, 69, 1962; ZhETF, 42, 727, 1962) for obtaining the k-fluorescence yields of elements by measuring the x-ray photoeffect of a massive cathode is reviewed. On the basis of an unsuccessful attempt to determine the k-fluorescence yields of Mg, Al, and Si it is concluded that this method can be used only if a photocathode can be made of the element under investigation in such a manner as to contain an insignificant amount of impurities. It cannot be used if impurities with a higher atomic number than the element whose fluorescence yield is being determined are present or if the impurities are concentrated near the surface. Although the technique of

Card 1/2

determining the fluorescence yields of elements forming binary compounds was also worked out earlier, the analysis conducted in the present article shows it to be much less reliable than in the case of pure elements. "The authors express thanks to Academician A. A. Lebedev for his interest in the work and a discussion of the results." Orig. art. has: 9 formulas, 3 tables, and 2 figures.

ASSOCIATION: Fizicheskiy fakul'tet Leningradskogo gos. universiteta im. A. A. Zhdanova (Physics Faculty, Leningrad State University)

SUBMITTED: 00 DATE ACQ: 01Jul63 ENCL: 00

SUB CODE: 00 NO REF SOV: 007 OTHER: 003

jk/ae

S/181/63/005/004/026/047
B102/B186

AUTHORS: Shchemelev, V. N., Rumsh, M. A., and Denisov, Ye. P.

TITLE: Determination of thickness and efficiency of the yield zone of true secondary electron emission based on an investigation of the energy spectrum of X-ray photoemission

PERIODICAL: Fizika tverdogo tela, v. 5, no. 4, 1963, 1132 - 1137

TEXT: The X-ray photoemission energy spectrum of NaCl, KCl and KBr photocathodes, condensed in vacuo onto Al or Au substrata were analyzed in order to determine the thickness of the yield zone l and its efficiency $S=\nu-1$, where ν is the mean number of electrons contained in the wave packet (cf. FTT, 4, 2795, 1962), $\nu = I/i_r$, I being the total current in the case of zero delay, and i_r the current due to X-ray photoelectrons. The layer thicknesses investigated were between several tens and several thousands of Å about ten different cathodes were measured for each pair substratum-salt, placed in a spherical capacitor. The electrometer used had a sensitivity of 10^{-14}a so that $\nu = I/i_r$ obtained from the volt-amperc characteristics was

Card 1/3

Determination of thickness and...

very accurate. The results were found to be affected by an additional mechanism of emission which had to be taken into account when determining S. The current due to this mechanism was calculated using the relation $i_{add} = \frac{\kappa_i - \kappa_r}{\kappa_r} i_r$, where κ_i is the quantum yield determined by the ratio number of emission events/ number of absorbed quanta; κ_r is the X-ray quantum yield, the ratio number of X-ray electrons emitted into vacuum/number of quanta. For metals $\kappa_i = \kappa_r$, but for dielectrics $\kappa_i > \kappa_r$. The additional mechanism most probably becomes apparent only when besides irradiation also an electric field acts on the cathode; in the present case this field was ~1 kv/cm. The following results were obtained:

	l	v	S	S'	
NaCl	1000±100 Å	22	21	18	$S = (I-i_r)/i_r$
KCl	600±100 Å	18	17	15	$S' = (I-i_{add}-i_r)/i_r$
KBr	500±100 Å	24	23	21	

Card 2/3

Determination of thickness and...

Only if the salt layer thickness is smaller than the Debye radius, S depends on the substratum properties. There are 5 figures and 1 table.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: November 21, 1962

Card 3/3

L 12800-63 EWP(q)/EWT(m)/BDS AFFTC/ASD JD
ACCESSION NR: AP3000770 S/0070/63/008/003/0378/0381

AUTHOR: Novik, F. T.; Rumsh, M. A.; Zimkina, T. M. 58

TITLE: Structure of CdTe layers sublimated on natural cleavage planes of NaCl, KCl, and KBr crystals

SOURCE: Kristallografiya, v. 8, no. 3, 1963, 378-381

TOPIC TAGS: electron diffraction pattern, photovoltaic effect, CdTe, NaCl, KCl, K

ABSTRACT: This study was made because of the importance of photovoltaic properties in CdTe. Electron diffraction patterns were obtained from "monocrystalline" layers of CdTe, which had been deposited by sublimation in a vacuum on the cleavage faces of NaCl, KCl, and KBr. In addition to reflections of the hk0 type, these diffraction patterns show supplementary reflections, resulting from the coexistence of cubic and hexagonal modifications of the CdTe, interlayered along planes of dense packing. Such coexisting phases are found on the coatings of all the investigated crystals but most commonly on KCl. "The authors thank Academician A. A. Lebedev for the interest he has shown in this work." Orig. art. has: 5 figures and 1 table.

ASSOCIATION: Leningradskiy gosudarstvenny*y universitet (Leningrad State Universi

Card 1/1

RUMSH, M.A.; SHCHEMELEV, V.N.

Dependence of the quantum yield of the X-ray photoeffect from a massive cathode on the X-ray polarization state. Fiz. tver. tela 4 no.8:2050-2058 Ag '62. (MIRA 15:11)

1. Leningradskiy gosudarstvennyy universitet.
(Photoelectricity) (X rays) (Quantum theory)

L 16339-65 EWA(k)/EWT(1)/EWG(k)/EEC(t) Pz-6 IJP(c)/ESD(t)/ESD(gs)/ASD(a)-5/AS(mp)-2 AT

ACCESSION NR: AP5000678 S/0181/64/006/012/3711/3712

AUTHORS: Yeliseyenko, L. G.; Shchemelev, V. N.; Rumsh, M. A. B

TITLE: Spectral variation of the x-ray photoeffect and determination of the laws governing the Lenard constants on its basis

SOURCE: Fizika tverdogo tela, v. 6, no. 12, 1964, 3711-3712

TOPIC TAGS: x ray effect, photoeffect, photocathode, electron emission

ABSTRACT: By plotting the experimental spectrum of the x-ray photoeffect from a titanium photocathode and comparing the plot with the theoretical values, it is shown that the Lenard equation $1/\alpha = C_2E^2$ (α -- coefficient of linear attention of the electrons by the cathode material, C -- constant) should be replaced by the formula $1/\alpha = C_2E^n$, with $n < 2$. The experimental data were obtained with an instrument previously described by some of the authors (PTE, No. 5,

Card 1/2

L 16339-65

ACCESSION NR: AP5000678

67, 1960) by a procedure described elsewhere (FTT v. 6, 2574, 1964). For Al, Ti, Fe, Ni, and Cu the respective values of n are 1.3, 1.3, 1.4, 1.35, and 1.44 and the values of C_2 are 100, 65, 42, 43, and 36. The values obtained for n agree well with the exponents obtained in the energy dependence of the mean free paths of the materials. It is shown that a formula previously proposed by two of the authors (Rumsh and Shchemelev, ZhETF, v. 42, 727, 1962) does not agree with the experimental data, owing to the use of the original Lenard formula in the latter case. Orig. art. has: 1 figure, 1 table, and 4 formulas.

ASSOCIATION: Leningradskiy gosudarstvenny*y universitet (Leningrad State University)

SUBMITTED: 06Jul64 ENCL: 00

SUB CODE: SS,OP NR REF SOV: 007 OTHER: 002

Card 2/2

L 16572-65 EWT(l)/EWT(m)/T/EWP(t)/EEC(b)-2/EWP(b) ESD(gs)/ESD(t)/ESD(dp)/
SSD/AFWL/ASD(a)-5/AS(mp)-2/IJP(c) JD

ACCESSION NR: AP5000285 S/0070/64/009/006/0799/0806

AUTHORS: Rumsh, M. A.; Lyubitts, K.; Konorov, P. P. B

TITLE: Interpretation of electron diffraction patterns of multiply twinned crystals 21

SOURCE: Kristallografiya, v. 9, no. 6, 1964, 799-806

TOPIC TAGS: germanium, thin film, epitaxial growing, twinning, electron diffraction

ABSTRACT: Although the structure of germanium films epitaxially grown on the (111) plane of fluorite has been the subject of extensive study, no detailed interpretation of the electron diffraction patterns of such films, which are extensively used in semiconductor electronics, has been made before. The authors therefore studied the patterns of germanium layers sputtered on naturally cleaved fluorite heated to 600C in vacuum of 5 x 10^{-5} mm Hg. The films were then

Card 1/3

transferred to an electronograph and examined in vertical transmission. The structural analysis has shown the presence of a complex twin structure of the film wherein primary and secondary growth twins are produced during the growth process, besides the twin orientations which appear during the start of the film growth. The relative numbers of nuclei crystallized in the two possible twin orientations are determined from the intensity of the reflections of the secondary twins. A method is proposed for predicting the location of the reflections due to the primary and secondary twins, and for determining their indices. The electron diffraction pattern shows also that the occurrence of multiple orientations as a result of twinning during the growth terminates with the stage of secondary twinning, since the very small dimensions of the latter make the appearance of tertiary twins physically impossible. The complicated twin structure of such films is apparently the reason for the high concentration of defects responsible for the low mobility and high concentration of the holes, regardless of the type of conductivity

L 16572-65
ACCESSION NR: AP5000285

of the initial material. "The authors thank A. A. Lebedev for interest in the work and for a discussion." Orig. art. has: 4 figures, 2 formulas, and 6 tables.

ASSOCIATION: None

SUBMITTED: 06Jan64 ENCL: 00

SUB CODE: SS, NP NR REF SOV: 06Jan64 OTHER: 007

Card 3/3

S/181/62/004/0
B108/B104

AUTHORS: Shchemelev, V. N., and Rumah, M. A.

TITLE: Study of the elementary process of the X-ray photoeffect by the analysis of pulse-height distribution at the output of a secondary electron multiplier

PERIODICAL: Fizika tverdogo tela, v. 4, no. 10, 1962, 2795 - 2801

TEXT: A primary electron released in the X-ray photoeffect will release a bunch of secondary electrons. The mean number of electrons in such a bunch is determined here by means of an open secondary-electron multiplier. The mean number of electron in a bunch, i.e., of those released in one elementary process of the X-ray photoeffect, is the ratio which the mean amplitude of the pulses produced by the bunch on the photocathode to be examined bears to the mean amplitude of the pulses produced by one electron in the multiplier. Experiments were made with photocathodes of Al, Cu, Au, NaCl, KCl, MgO, LiF. In X-ray photoemission, the photoelectron is accompanied by a group of secondary electrons which differ considerably for metallic and nonmetallic photocathodes. For metal photocathodes, the mean

Card 1/2

S/181/62/004/010/023/063
B108/B104

number of electrons in a group is 2 - 3, for nonmetallic it amounts to 4 - 7. This number increases when the wavelength of the primary X-radiation increases. This increase, however, ceases as soon as the absorption edge is reached. The pulses coming from NaCl and KCl photocathodes are indicative of two different groups of electrons. These are associated with the surface layer acquiring a charge and consequently auto-emitting electrons. There are 3 figures and 1 table.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: May 22, 1962

S/181/63/005/001/011/064
B102/B186

AUTHORS: Rumsh, M. A., and Shchemelev, V. N.

TITLE: Part played by the secondary emission phenomena in the X-ray photoeffect of metallic cathodes

PERIODICAL: Fizika tverdogo tela, v. 5, no. 1, 1963, 71-77

TEXT: Earlier, the authors have shown (FTT, 4,2795,1962) that in the case of X-ray induced photoemission not one but several electrons are emitted per absorbed quantum, this being due to secondary emission. Two quantum yields are distinguished. One, designated as pulse quantum yield, is the ratio between emission events and quantum number ($\varkappa_p = n/N$). The other, called current quantum yield, is given by $\varkappa_c = n\bar{\nu}/N$ where $\bar{\nu}$ is the mean number of electrons emitted per event. A special instrument was developed for measuring $\varkappa_c$ consisting in principle of a quasispherical capacitor with a central plane cathode. A spherical molybdenum grid with a nickel cylinder is used as collector. The entire system is contained in a steel vacuum chamber with two windows closed by beryllium plates for

Card 1/3

Part played by the secondary ...

the exit and the entrance of the X-rays. The operating pressure in the chamber is not higher than $5 \cdot 10^{-6}$ mm Hg. The current was determined by measuring a compensation current, with an accuracy of 10^{-14}a. The studies were made with Cu-K_α radiation from a БСВ-И (BSV-I) X-ray tube.

Numerous experiments showed that reproducible results were obtained only when metals were vacuum-sputtered onto polished glass plates. The following results were obtained:

Photocathodes	Bi	Pb	Au	Sn	Te	Cu	Co	Cr	Al
κ_n, %	-	3.0	2.5	2.4	2.4	-	-	1	0.3
κ_e, %	7.4	6.5	7.5	6.7	5.5	1.2	5.0	3.8	0.7
$\bar{v}$	-	2.2	3.0	2.8	2.3	-	-	3.7	2.3

In addition the energy spectrum of the X-ray induced electron emission was investigated. The course of the volt-ampere characteristics of these metals is typical. With positive voltages the current is constant and of the order of $\sim 10^{-13}$a, at zero voltage it is steeper and decreases almost step-wise, at -40 to -50v the current becomes constant again. It remains

Part played by the secondary ...

unchanged down to -4000v. There are 1 figure and 1 table.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: July 16, 1962

Card 3/3

S/181/63/005/001/010/064
B102/B186

AUTHORS: Shchemelev, V. N., and Rumsh, M. A.

TITLE: X-ray photo effect of dielectric cathodes

PERIODICAL: Fizika tverdogo tela, v. 5, no. 1, 1963, 66-70

TEXT: An apparatus for determining the quantum yield of the X-ray photo effect is described in a connected paper (Ref. 1: FTT,5,1,71,1963); here the same method is used to study dielectric photocathodes made of NaCl, KCl, MgF_2, CaF_2, SrF_2 and MgO. To prepare the first five of these the substance was volatilized in vacuo and deposited on small aluminized glass plates in thicknesses of 3-4000 Å. Mg was burnt in air, and the particles of MgO-smoke were also deposited on such plates. The volt-ampere characteristics of the first four photocathodes were very similar: they all showed a step at about zero potential, i.e. the current was constant at $6 \cdot 10^{-12}$a for positive voltages, fell sharply at V=0, and reached a value less than $1 \cdot 10^{-12}$a at minus 10-15 v, this value remaining constant in the negative voltage range measured down to -160v. The shape

Card 1/3

X-ray photo effect of ...

of the curve is explained by assuming that the X-ray electrons are emitted from a depth equal to the X-ray penetration depth, and that an additional electron mechanism exists furnishing slow electrons. If the results of the analysis of the volt-ampere delay curves are compared with the pulse values (definitions cf Ref. 1) of the quantum yield, which can exceed 100% for some dielectrics, then it is possible to determine the contribution of this additional mechanism to the total effect and to calculate the number of electrons emitted per X-ray photo-emission event. These numbers for NaCl, KCl, MgF_2 and CaF_2 worked out at 13.2, 11.4, 2.55 and 5.7. The X-ray quantum yields $\gamma_r = i_r/Ne$ amounted to 0.57, 0.77, 0.18 and 0.44 (in the same sequence); i_r is the current of the X-ray electrons, e the electron charge and N the number of quanta; the quantum yields of the additional mechanism were 2.07, 2.63, 0.17 and 0.86. It can be shown that the multi-electron effects are connected with secondary emission effects. There are 2 figures and 2 tables.

Card 2/3

X-ray photo effect of ...

S/181/63/005/001/010/064
B102/B186

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: July 16, 1962

Card 3/3

S/054/62/000/004/004/017
B104/B186

AUTHORS: Rumsh, M. A., Shchemelev, V. N.

TITLE: X-ray photoeffect of a massive photocathode and determination of the rules governing the K fluorescence yields of the elements in the photocathode

PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 4, 1962, 65 - 71

TEXT: A previous paper (M. A. Rumsh, V. N. Shchemelev, ZhETF, 42, no. 3, 727, 1962) dealt with determining the fluorescence yield from a study of the jump of the quantum yield of the extrinsic photoeffect caused by X-rays falling on a massive photocathode consisting of one element. For a photocathode of a two-component compound AB it is assumed that $\mu = \mu_a + \mu_b$ holds for the X-ray attenuation factor. On this assumption the X-ray quanta and fluorescence quanta absorbed by the components A and B are calculated by a method of M. A. Rumsh et al. (DAN SSSR, 135, no. 1, 55, 1960).

Card 1/4 NOT SUBMITTED FOR EVALUATION

X-ray photoeffect ...

$$\varkappa=\frac{1}{2\sin\theta}\left\{\frac{\mu_a}{\alpha_1}\frac{s_{ka}-1}{s_{ka}}+\frac{\mu_a}{\alpha_2}\frac{s_{ka}-1}{s_{ka}}w_{ea}+\frac{\mu_a}{\alpha_3}\frac{1}{s_{ka}}+\frac{\mu_b}{\alpha_4}\frac{s_{kb}-1}{s_{kb}}+\right.$$
$$+\frac{\mu_b}{\alpha_5}\frac{s_{kb}-1}{s_{kb}}w_{eb}+\frac{\mu_b}{\alpha_6 s_{kb}}+(1-w_{ea})\gamma_a^{(A)}\frac{1}{\alpha_7}+(1-w_{ea})\gamma_b^{(A)}\left[\frac{s_{kb}-1}{s_{kb}}\frac{1}{\alpha_8}+\right. \qquad (6)$$
$$\left.\left.+\frac{s_{kb}-1}{s_{kb}}w_{eb}\frac{1}{\alpha_9}+\frac{1}{s_{kb}}\frac{1}{\alpha_{10}}\right]+\gamma_a^{(B)}\frac{(1-w_{eb})}{\alpha_{11}}+\gamma_b^{(B)}\frac{(1-w_{eb})}{\alpha_{12}}\right\},$$

is obtained for the quantum yield. s_k is the ratio between the total absorption by an atom and the absorption by all its shells other than the K shell. The indices a and b refer to the components A and B. w_{ei} (i=a,b) is the Auger yield; $\gamma_i^{(K)}$ is a function of the angle of incidence and the attenuation factor. $\varkappa$ shows a jump

$$\sigma_k^B=\frac{\frac{\mu_a}{s_{ka}}E_3^2+\frac{\mu_b(s_{kb}-1)}{s_{kb}}E_4^2+\frac{\mu_b(s_{kb}-1)w_{eb}}{s_{kb}}E_5^2+\frac{\mu_b}{s_{kb}}E_6^2+\gamma_a^{(B)}(1-w_{eb})E_{11}^2}{\frac{\mu_a}{s_{ka}}E_3^2+\frac{\mu_b}{s_{kb}}E_6^2}+$$
$$+\frac{+\gamma_b^{(B)}(1-w_{eb})E_{12}^2}{\frac{\mu_a}{s_{ka}}E_3^2+\frac{\mu_b}{s_{kb}}E_6^2}. \qquad (7)$$

Card 2/4

X-ray photoeffect ...

at each absorption edge. From this jump

$$w_{eb}=\frac{\left(\sigma_k^{(B)}-1\right)\left(\frac{\mu_a}{s_{ka}}E_3^2+\frac{\mu_b}{s_{kb}}E_6^2\right)-\gamma_a^{(B)}E_{11}^2-\gamma_b^{(B)}E_{12}^2}{\frac{\mu_b(s_{kb}-1)}{s_{kb}}E_5^2-\gamma_a^{(B)}E_{11}^2-\gamma_b^{(B)}E_{12}^2}. \quad (8), \qquad w_{ea}=\frac{\left(\sigma_k^{(A)}-1\right)F+\sigma_k^{(A)}G-G'-H}{\mu_a\frac{s_{ka}-1}{s_{ka}}E_2^2-H}$$

$$\left.\begin{aligned} F&=\frac{\mu_a}{s_{ka}}E_3^2+\frac{\mu_b(s_{kb}-1)}{s_{kb}}E_4^2+\frac{\mu_b(s_{kb}-1)}{s_{kb}}w_{eb}E_5^2+\frac{\mu_b}{s_{kb}}E_6^2,\\ H&=\gamma_a^{(A)}E_7^2+\gamma_b^{(A)}\left(\frac{s_{kb}-1}{s_{kb}}E_8^2+\frac{s_{kb}-1}{s_{kb}}w_{eb}E_9^2+\frac{1}{s_{kb}}E_{10}^2\right),\\ \left.\begin{matrix}G'\\G\end{matrix}\right\}&=(1-w_{eb})\left(\gamma_a^{(B)}E_{11}^2+\gamma_b^{(B)}E_{12}^2\right), \end{aligned}\right\} \qquad (9)$$

are obtained for the Auger yields. $w_{eCl} = 0.896\pm0.017$ and $w_{eK} = 0.870\pm0.41$ is obtained for the Auger yield from the experimentally determined jumps $\sigma_k^K = 2.23\pm0.05$ and $\sigma_k^{Cl} = 3.91\pm0.05$ of the quantum yield of a K and Cl photocathode. The linear X-ray attenuation factors were determined according to Johnson. If they are determined with the aid of a formula of

M. A. Blokhin (Fizika rentgenovskikh luchey - X-ray Physics, Gostekhizdat, 1953) then $w_{eCl} = 0.906 \pm 0.018$ and $w_{eK} = 0.887 \pm 0.042$ is obtained for the Auger yield. Hence, the accuracy of the Auger yields is not governed by the accuracy of the quantum yield jump determination but by the inaccuracies of the linear absorption factors. There is 1 figure.

SUBMITTED: May 22, 1962

S/070/62/007/006/007/020
E132/E435

AUTHORS: Rumsh, M.A., Novik, F.T., Zimkina, T.M.

TITLE: The structural characteristics of single crystal layers of CdTe

PERIODICAL: Kristallografiya, v.7, no.6, 1962, 873-877

TEXT: CdTe was sublimed on to crystals of NaCl, cut to expose the (111) faces and heated to 200 - 300°C. S.A.Semiletov (Kristallogr. v.1, no.3, 1956, 306-310) had earlier shown that CdTe can exist in the sphalerite and wurtzite modifications. Since the two phases can coexist by having their close packed planes parallel to the 111 of the NaCl substrate the preparations could not be said to be two-phase. Nevertheless, there were anomalies in the electron diffraction pattern in the form of extra reflexions and streaks. The metal film was stripped from the NaCl and examined by transmission. The electron beam passed in the direction of the cubic [111] direction, hence reflexions for which $h + k + l = 0$ fell in the Ewald sphere for the cubic form. For the hexagonal form reflexions with $h - k = 3n$ coincide with those from the cubic form. Cubic reflexions $20\bar{2}$ etc had six spikes extending about one third of the way to the next reflexions associated with

Card 1/2

them. It was shown, and confirmed by tilting the specimen, that these spikes are the traces of lines of density in reciprocal space radiating in the octahedral directions from the common reciprocal lattice points in the [111] directions. The effects are caused by the stacking of the layers, sometimes in the cubic sequence and sometimes in the hexagonal. However, some extra spots may occur when the hexagonal basal plane coincides with other of the octahedral planes of the cubic form than that parallel to the substrate. There are 5 figures and 1 table.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet
(Leningrad State University)

SUBMITTED: March 5, 1962

RUMSH, M.A.; SHCHEMELEV, V.N.; PROYS, Kh.

Determining the absorption coefficients for an electron stream in a solid on the basis of regular features of the X-ray photoemission from a massive photocathode. Fiz. tver. tela 4 no.1: 63-68 Ja '62. (MIRA 15:2)

1. Leningradskiy gosudarstvennyy universitet.
(Cathode rays) (Electrons--Capture)
(Photoelectricity)

RUMSH, M.A.; SHCHEMELEV, V.N.; PROYS, Kh.

Mechanism of the external photoeffect emanating from massive photocathodes under the action of X rays. Fiz. tver. tela 4 no.1:69-73 Ja '62. (MIRA 15:2)

1. Leningradskiy gosudarstvennyy universitet.
(Cathode rays)
(Photoelectricity)

RUMSH, M.A.; SHCHEMELEV, V.N.

Determining the fluorescence yield by measuring the extrinsic X-ray photoeffect on a massive cathode. Zhur.eksp.i teor.fiz. 42 no.3:727-735 Mr '62. (MIRA 15:4)

1. Leningradskiy gosudarstvennyy universitet.
(Fluorescence) (Photonuclear reactions) (X rays)

S/181/62/004/008/039/041
B108/B102

AUTHORS: Rumsh, M. A., and Shchemelev, V. N.

TITLE: The Auger effect yield from the chlorine and potassium K-shells and its determination from the quantum yield jumps of the x-ray photoeffect in a massive KCl cathode

PERIODICAL: Fizika tverdogo tela, v. 4, no. 8, 1962, 2281 - 2282

TEXT: In previous work (ZhETF, 42, 727, 1962) the authors have established a theory of determining the Auger effect yields w_e from the quantum yield jumps in the x-ray photoeffect of elemental photocathodes. This theory is expanded to compound photocathodes, in particular to KCl. The quantum yield jump corresponding to the K absorption edge of chlorine involves only one unknown, namely the Auger effect yield $w_e^{(Cl)}$ from the chlorine K-shell. In the case of potassium, this jump involves two unknowns: $w_e^{(Cl)}$ and $w_e^{(K)}$. Thus, $w_e^{(Cl)}$ can be determined from the measured quantum yield jump in chlorine, and $w_e^{(K)}$ can be calculated from $w_e^{(Cl)}$ and from the

Card 1/2

The Auger effect ...

measured quantum yield jump in potassium. Such measurements showed that $w_e^{(K)} = 0.906 \pm 0.018$ and $w_e^{(Cl)} = 0.887 \pm 0.042$. There is 1 figure.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: February 27, 1962 (initially),
May 4, 1962 (after revision)

Card 2/2

39565
S/181/62/004/008/008/041
B125/B104

AUTHORS: Rumsh, M. A., and Shchemelev, V. N.

TITLE: The dependence of the quantum yield of the X-ray photoeffect in a solid cathode on the X-ray polarization

PERIODICAL: Fizika tverdogo tela, v. 4, no. 8, 1962, 2050-2058

TEXT: The influence exerted by the directivity of photoelectrons on the quantum yield is studied by observing the variation in the quantum yield caused by a change in X-ray polarization. N quanta of a monochromatic and partly polarized radiation are assumed to hit a photocathode at an angle ϑ. The range of angles $(\varphi, \varphi + d\varphi)$ characterizes the state of polarization relative to the plane of incidence. Then, allowing for the emission caused by photoelectrons and Auger electrons, the expression

$$\alpha = \frac{\mu L \operatorname{ctg}\theta}{\pi}\Phi(2\vartheta) + \frac{1}{2}\left(\frac{\mu}{\alpha_1 \sin\theta}\frac{1}{1+\frac{\mu}{\alpha_1\sin\theta}} + \frac{S_k-1}{S_k}w_e\frac{\mu}{\alpha_2\sin\theta}\cdot\frac{1}{1+\frac{\mu}{\alpha_2\sin\theta}}\right), \quad (11)$$

Card 1/3

The dependence of the quantum...

is obtained for the quantum yield. Here, $\varkappa_1$ and $\varkappa_2$ are the attenuation factors of electron currents with the energy of photoelectrons and Auger electrons, respectively; S_k is the K-absorption edge of the photocathode material; ω_1 is the Auger yield of the K-shell. At $2\vartheta = 90^\circ$, $\varkappa$ reaches its minimum value $\varkappa_{min}$, and $\varkappa = \varkappa_{min} + \frac{\mu L \cos\theta}{\pi} \varphi(2\vartheta)$ is valid instead of (11). $\varphi(2\vartheta)$ describes the effect of polarization of the incident radiation. (11) is to be replaced by a more general formula if the wavelength of the incident radiation is shorter than that of the K-absorption edge of the photocathode material. After determining the first and n-th order reflection quantum yields $\varkappa_1$ and $\varkappa_n$, respectively, the tabulated slowing-down lengths $\bar{L}$ and the mean photoelectron energies are obtained with the aid of the expression

$$\Delta H = \frac{\mu \bar{L} \operatorname{ctg}\theta}{\pi} [\Phi(2\vartheta_1) - \Phi(2\vartheta_n)], \qquad (15)$$

Card 2/3

The dependence of the quantum...

for the difference in the quantum yields of 1-st and n-th orders. Any change in the polarization of photoelectrons will change the emission from the photocathode. If the photoeffect is produced chiefly by Auger electrons, the quantum yield will be virtually independent of the X-ray polarization. There are 4 figures and 1 table.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: February 27, 1962

Table. Measured and calculated data.

(1) Материал фотокатода	(2) Излучение	$\tau_1 \cdot 10^2$	$\frac{\tau_1}{\tau_n}$	$\Delta\varepsilon \cdot 10^3$	L, Å	ε, эв
Ti	Fe K_α	0.90	1.12±0.07	10±6	80±50	1400
	Ti K_α	0.35	1.05±0.02	2±0.7	50±20	4070
Cr	Fe K_α	1.35	1.007±0.000	0	0	430
	Ti K_α	0.45	1.11±0.06	5±2.5	60±30	3800

Legend: (1) material of photocathode; (2) radiation.

Card 3/3

LUKIRSKIY, A.P.; RUMSH, M.A.

Efficiency of X-ray radiation registration with industrial Geiger counters. Prib.i tekh.eksp. 6 no.5:176-177 S-O '61.
(MIRA 14:10)

1. Leningradskiy gosudarstvennyy universitet.
(Geiger-Miller counters—Testing)

RUMSH, M.A.; LUKIRSKIY, A.P.; SHCHEMELEV, V.N.

Using secondary-electron amplifiers for studying soft X-ray spectra. Izv. AN SSSR. Ser. fiz. 25 no.8:1060-1065 Ag '61. (MIRA 14:8)

1. Fizicheskiy fakul'tet Leningradskogo gosudarstvennogo universiteta im. A.A. Zhdanova.
(X-ray spectroscopy)
(Amplifiers(Electronics))

RUMSH, M.A.; SHCHEMELEV, V.N.; LUKIRSKIY, A.P.

Quantum sensitivity of photographic materials to X rays ranging from 1.54 to 113 °. Izv. AN SSSR. Ser. fiz. 25 no.8:1066-1068 Ag '61. (MIRA 14:8)

1. Fizicheskiy fakul'tet Leningradskogo gosudarstvennogo universiteta im. A.A. Zhdanova.
(Photographic sensitometry)
(X rays)

RUMSH, M.A.; SHUVALOV, Yu.N.; SMIRNOV, L.A.

Effect of illumination on the intensity of X-ray reflections from cadmium sulfide crystals. Fiz. tver. tela 2 no.2:369-370 F '60. (MIRA 14:8)

1. Leningradskiy gosudarstvennyy universitet imeni A.A. Zhdanova i Nauchno-issledovatel'skiy fizicheskiy institut.
(Cadmium sulfide crystals) (X rays)

S/056/62/042/003/014/049
B104/B102

AUTHORS: Rumsh, M. A., Shchemelev, V. N.

TITLE: Determination of the fluorescence yield by measuring the extrinsic X-ray photoeffect on a massive cathode

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 3, 1962, 727 - 735

TEXT: The various groups of photoelectrons in the extrinsic X-ray photoeffect of a massive cathode are analyzed. The role of the various groups of electrons changes with the X-ray wavelength. When the wavelength of the X-ray emission passes the wavelength of the K-absorption edge, the contribution of certain electron groups to the extrinsic emission vanishes, and the quantum yield changes discretely. It is shown experimentally that the discontinuous change of the quantum yield is directly related to the yield of the Auger effect, and that by measuring the quantum yield jump of the extrinsic photoeffect it is possible to calculate the Auger effect yield or the fluorescence yield. By an example it is shown that the Auger effect yield of Cr, Ti, V, and Mn, or the fluorescence yield, are in good agreement with the experimental data;

Card 1/2

Determination of the...

Element	K jump of absorption	K jump of quantum yield	Fluorescence yield
Ti	9.2	5.9	0.22
V	9.1	5.75	0.24
Cr	8.9	5.55	0.26
Mn	8.8	5.36	0.28

These data are given in the units as stated in the experimental investigations (F. Susor, G. Charpak, J. Phys. et Radium, 20, 462, 1959; W. F. Frey et al., Phys. Rev., 113, 1057, 1959; H. Hagedorn, T. Konijn, Physica, 23, 1069, 1957; A. A. Konstantinov, Tezisy X Vsesoyuznogo soveshchaniya po yadernoy spektroskopii, M., Izd. AN SSSR, 1960). Academician A. A. Lebedev is thanked for his interest. There are 5 figures, 1 table, and 14 references: 8 Soviet and 6 non-Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: October 21, 1961

Card 2/2

33343
S/181/62/004/001/010/052
B102/B138

24.2600 (1043, 1147, 1482)

AUTHORS: Rumsh, M. A., Shchemelev, V. N., and Proys, Kh.

TITLE: Determination of the absorption coefficients of an electron flux in a solid from the regularities of X-ray photoemission of a massive photocathode

PERIODICAL: Fizika tverdogo tela, v. 4, no. 1, 1962, 62 - 68

TEXT: In a previous paper (DAN SSSR, 135, 55, 1960) the authors have shown that X-ray induced external photoeffect may be described by

$$\chi = \frac{n}{N_0} = \frac{[1-R(\theta)]hc}{2\varepsilon\lambda}\,\frac{\mu}{\alpha\sin\theta}\,\frac{1}{1+\frac{\mu}{\alpha\sin\theta}}, \qquad (1)$$

where χ is the quantum yield, which is equal to the ratio between the number n of X-ray photoelectrons emitted into vacuum and number N of incident quanta; $R(\theta)$ is the reflection coefficient which is nonvanishing only for small θ, μ is the linear absorption coefficient for X-rays, ε is the mean energy necessary for release of one electron, λ - X-ray

Card 1/4

Determination of the absorption...

wavelength and α - linear attenuation factor of the electron flux. For $R(\theta) = 0$, $\varkappa\sin\theta = K/(1 + \mu/\alpha\sin\theta)$, where K joins all angle-independent quantities. α can be determined by two independent ways: (a) $\varkappa$ is measured for θ_1 and θ_2, then $\alpha = \mu \frac{\frac{A}{\sin\theta_1} - \frac{1}{\sin\theta_2}}{1 - A}$, $A = \varkappa_1\sin\theta_1/\varkappa_2\sin\theta_2$.

(b) A photocathode is used consisting of a piece of substance II coated with a layer, x thick, of substance I. If $\varkappa_{\infty}^{II} \ll \varkappa_{\infty}^{I}$ ($\varkappa_{\infty}^{I}$ and $\varkappa_{\infty}^{II}$ are the quantum yields for massive photocathodes of I and II, respectively),

$$\varkappa = \varkappa_{\infty}^{I}\left(1 - e^{-\left(\frac{\mu}{\sin\theta} + \alpha\right)x}\right). \qquad (4a)$$

$$\ln\left(1 - \frac{\varkappa_x}{\varkappa_{\infty}^{I}}\right) = \left(\frac{\mu}{\sin\theta} + \alpha\right)x, \qquad (4б)$$

$\ln(1-\varkappa_x/\varkappa_{\infty})$ can be plotted as a function of x from the results, and a straight line is obtained whose angle with the X-axis, φ, is characteristic for α: $\alpha = -\tan\varphi - \mu/\sin\theta$. Advantages and disadvantages of these

Card 2/4

Determination of the absorption...

variants are discussed. They were tested when determining α for electrons of various energies excited in gold by different radiations. For the second method-gold was vacuum evaporated to a backing of small $\varkappa$, e. g. amorphous carbon on glass. The curves $\varkappa(\lambda)$ and $\log(1-\varkappa/\varkappa_\infty) = f(x)$ were almost straight lines. α was found to increase monotonically with λ, i. e. the mean energy of mobile electrons decreases monotonically. The first method was used to determine α for a 3000-Å layer of Au, which may be taken as being infinitely thick. The α-values determined by this method were higher by ~ 30%, the $\alpha(\lambda)$-curves ran in parallel for both methods. It is then shown that Eq. (1) should be replaced by

$$\varkappa = \frac{\lambda_\infty [1 - R(\theta)]}{2\pi\lambda} \frac{\mu}{\alpha \sin\theta} \frac{1}{1 + \frac{\mu}{\alpha \sin\theta}} \nu(\theta). \qquad (6)$$

and A should be replaced by

$$A' = \frac{\varkappa_1 \sin\theta_1 \nu(\theta_2)}{\varkappa_2 \sin\theta_2 \nu(\theta_1)} = \frac{\nu(\theta_2)}{\nu(\theta_1)} A. \qquad (7)$$

Card 3/4

Determination of the absorption...

Academician A. A. Lebedev is thanked for discussions. There are 4 figures and 7 references: 4 Soviet and 3 non-Soviet. The two references to English-language publications read as follows: D. E. Bradly. Brit. J. Appl. Phys., 5, 65, 1954; Tolanski. Multiple Beams Interferometry, London, 1948.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: July 10, 1961

Card 4/4

33345 S/181/62/004/001/011/052
B102/B138

24,2600 (1043, 1147, 1482)

AUTHORS: Rumsh, M. A., Shchemelev, V. N., and Proys, Kh.

TITLE: Mechanism of external photoeffect with massive photocathodes under the action of X-rays

PERIODICAL: Fizika tverdogo tela, v. 4, no. 1, 1962, 69 - 73

TEXT:

$$\varkappa = \frac{n}{N_0} = \frac{hc\,[1 - R(\theta)]}{2\varepsilon\lambda} \cdot \frac{\mu}{\alpha \sin\theta} \cdot \frac{1}{1 + \frac{\mu}{\alpha \sin\theta}}, \quad (1)$$

A formula earlier derived (DAN SSSR, 135, 55, 1960) is evaluated. It holds for the quantum yield $\varkappa$ obtained from a massive photocathode irradiated by X-rays. It was derived on the assumption that the radiation energy absorbed in a layer of thickness dx is dissipated in the production of dn free electrons; ϵ is the energy absorbed per electron, n electrons are emitted when N_0 quanta are incident, their wavelength being λ. In exact presentation, the electrons emitted per sec from dx can be divided

Card 1/4

Mechanism of external...

into several groups: $dn = dN(1+P_1+P_2+P_3+\ldots)$, the terms denoting photoelectrons of the first kind, primary Auger electrons (P_1), secondary Auger electrons (P_2) and so on. Then

$$\varkappa = \frac{[1-R(\theta)]}{2}\left[\frac{\frac{\mu}{\alpha_0 \sin\theta}}{1+\frac{\mu}{\alpha_0 \sin\theta}} + P_1\frac{\frac{\mu}{\alpha_1 \sin\theta}}{1+\frac{\mu}{\alpha_1 \sin\theta}} + P_2\frac{\frac{\mu}{\alpha_2 \sin\theta}}{1+\frac{\mu}{\alpha_2 \sin\theta}} + \ldots\right]. \quad (2)$$

holds, or, if only photoelectrons and primary Auger electrons are taken into account,

$$\varkappa = \frac{[1-R(\theta)]}{2}\frac{\mu}{\sin\theta}\left[\frac{\frac{1}{\alpha_0}}{1+\frac{\mu}{\alpha_0 \sin\theta}} + \frac{\frac{P_1}{\alpha_1}}{1+\frac{\mu}{\alpha_1 \sin\theta}}\right]. \quad (3).$$

If α is determined for a wavelength for which $h\nu - W_i = E_{Auger}$, $\alpha_0 = \alpha_1$, and Eq. (3) simplified to

$$\varkappa = \frac{[1-R(\theta)]}{2}\frac{\mu}{\alpha \sin\theta}\frac{1}{1+\frac{\mu}{\alpha \sin\theta}}(1+P_1)$$

Card 2/4

Mechanism of external...

If an effective value, $\bar{\alpha}$, defined by

$$\frac{\frac{\mu_0}{\alpha_0 \sin\theta}}{1+\frac{\mu}{\alpha_0 \sin\theta}} + P_1 \frac{\frac{\mu}{\alpha_1 \sin\theta}}{1+\frac{\mu}{\alpha_1 \sin\theta}} = \frac{\frac{\mu}{\bar{\alpha} \sin\theta}}{1+\frac{\mu}{\bar{\alpha} \sin\theta}},$$

is used,

$$x = \frac{[1-R(\theta)]}{2} \frac{\mu}{\bar{\alpha} \sin\theta} \frac{1}{1+\frac{\mu}{\bar{\alpha} \sin\theta}}. \qquad (4)$$

holds for any wavelength. The probability for an emission of one electron (photoelectron or primary Auger electron) per absorbed quantum is given by $e^{-\alpha x}$, for an emission of one photoelectron and one primary Auger electron per absorbed quantum it is $\frac{1}{4}e^{-2\alpha x}$. x denotes the depth from which emission occurs. Averaged over the whole layer thickness, these probabilities are $1/\alpha$, and $1/8\alpha$, respectively, i. e. less than 11% electron pairs are emitted. Academician A. A. Lebedev is thanked for dis-

Card 3/4

cussions. A. S. Ganeyev and I. M. Izrailev (ZhTF, XXXI, 376, 1961) are mentioned. There are 2 figures and 8 references: 7 Soviet and 1 non-Soviet.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: July 10, 1961

Card 4/4

RUMSH, M. N.

USSR/Nuclear Physics -- Gamma Rays Nov/Dec 48
Nuclear Physics -- Electrons

"Inner Conversion of Gamma-Radiation of R_aC': II, Determining the Multipolarity of Lines," V. V. Gey, G. D. Latyshev, M. N. Rumsh, Physicotech Inst, Acad Sci USSR, 2 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XII, No 6

Determines multipolarity of gamma-lines as a function of the ratio of the coefficient of conversion with pair-production to the coefficient of conversion in K-electrons.

PA 25/49T82

L 22280-66 EWT(d)/T/EWP(l) IJP(c)

ACC NR: AR6005180 SOURCE CODE: UR/0058/65/000/009/B003/B003

SOURCE: Ref. zh. Fizika, Abs. 9B32

47
B

AUTHORS: Rumshas, P. D.; Matulis, V. A.; Yutsis, A. P.

TITLE: Study of 3nj coefficients with an electronic digital computer

REF SOURCE: Lit. fiz. sb., v. 4, no. 4, 1964, 447-455

TOPIC TAGS: quantum mechanics, matrix function, quantum number, computer application, digital computer/ BESM-2M digital computer

TRANSLATION: A method is proposed for studying the 3nj coefficients, based on all possible connections of any of 2n points to three other points in such a way as to make the resultant diagram not cut by less than four lines. The corresponding program for computation with the BESM-2M digital computer is compiled. All 84 21j coefficients, specified by the arrangement of diagonals in a 14-side polygon, and classified in accordance with the polygon conditions, are presented. The concept of the matrix of common lines between polygons is introduced and is used to present an additional characteristic for 18j and 21j coefficients.

SUB CODE: 20

Card 1/1 nst

RUMSHEVICH, P. V.

27828. Rumshevich, P. V. selektsiya khlopchatnika na ferganskoy zonal'noy stantsii soyuz NIKHL. Sots. sel. Khoz-vo uzbekistana, 1949, No. 2, s. 36-43

SO: Letopis' Zhurnal'nykh Statey, Vol. 37, 1949