"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

MARTSISHEV[illegible], E.I.

Treatment of iron-deficiency anemia in patients with gynecologic diseases. Akush. i ginek. [illegible]

([illegible])

1. [illegible] imeni S.[illegible] ([illegible] - dotsent Yu.G. Antonov; nauchnyy [illegible] - prof. Ye.A.Kost), Moska.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

SAZONOV, Anatoliy Yefimovich, doktor tekhn. nauk; FILIPPOV, Yuriy Markovich, kand. tekhn. nauk. Prinimali uchastiye: BREKHOV, A.M., inzh.; ANTONOV, Yu.G., kand. tekhn. nauk; DENISOV, K.N., kand. tekhn. nauk; MESHKOV, O.I., red.

[Mathematical principles of the automation of ship navigation] Matematicheskie osnovy avtomatizatsii sudovozhdeniia. Moskva, Izd-vo "Transport," 1964. 175 p. (MIRA 17:5)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

AUTHOR: ANTONOV, YU.N., VAVILOV, YU.N., ZATSEPIN, G.T., KUTUZOV, A.A., SKVORTSOV, YU.V., KHRISTIANSEN, G.B.

PA - 2665

TITLE: Structure of the Periphery of Extensive Atmospheric Cosmic Ray Showers. (Struktura periferii shirokikh atmosfernykh livney kosmicheskikh luchey, Russian).

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 2, pp 227-240, Russian)

Received: 5 / 1957 Reviewed: 6 / 1957

ABSTRACT: The present paper investigates the spatial distribution of the different components of a broad atmospheric cosmic ray shower at great distances from its axis (200 - 800 m). For a detailed study of this problem the Pamir-Expedition of the Academy of Science of the U.S.S.R. (summer and autumn 1950 and 1951) used a new method: In different places of the observation plain the flux density of all charged particles (and separate from it that of penetrating particles) was simultanously determined with hodoscopic devices. (Method of correlated hodoscopes).

Summary of results: The shower domain investigated here consists of an electron-photon component and of a penetrating component (apparently myons). With increasing distance from the shower axis the relative share of the penetrating component increases considerably and at a distance r = 800 m the flux density of penetrating particles and of electrons is equal. The spatial distribution of the

Card 1/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Structure of the Periphery of Extensive Atmo-- PA - 2665
spheric Cosmic Ray Showers.

total flux density of electrons and of penetrating particles is determined by the formula $\rho(r) \sim 1/r^n$ with $n \sim 2,0$. On account of the relatively slow decrease of flux densities of shower particles the periphery of the shower plays an essential part in the general balance of the flux of the shower particles. The mechanism of the transition of electrons to the periphery of the shower is reduced to the Coulomb scattering of these electrons by the nuclei of air atoms. The transition of Myons to the periphery of the shower is effected by their Coulomb scattering and also apparently at the expense of the emission angle in the elementary acts of the nucleus cascade process of the positive and negative myons producing these myons. Finally, data on the intensity of primary cosmic particles with extremely high energies of 10^{16} up to 10^{17} eV are given. (10 illustrations)

ASSOCIATION: Physical Institute "P.N.Lebedev" of the Academy of Science of the U.S.S.R.

PRESENTED BY:

SUBMITTED:

AVAILABLE: Library of Congress.

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

DOIL'NITSYN, Yo.F.; ANTONOV, Yu.N.

Double radio-frequency mass spectrometer for the simultaneous analysis of multicomponent gas. [Trudy] Inst.geol.i geofiz.Sib. otd. AN SSSR no.32:75-85 '65. (MIRA 18:9)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.N.; DOBRYNITSYN, Ye.F.; KLYAROVSKIY, V.M.

Device for the quantitative determination of radiogenic argon in rocks and minerals. Geol. i geofiz. no.3:175-183 '65. (MIRA 18:6)

1. Institut geologii i geofiziki Sibirskogo otdeleniya AN SSSR, Novosibirsk.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.N.; ZINOV'YEV, L.P.; KOZHUKHOV, I.V.; RASHEVSKIY, V.P.; SARANTSEV, V.P.; CHZHAN Chzhun-mu [Chang Chung-mu].

[Focusing and adjusting the injector beam of a linear accelerator] Fokusirovka i iustirovka puchka inzhektora lineinogo uskoritelia. Dubna, Ob"edinennyi in-t iadernykh issl., 1961. 19 p. (MIRA 15:1)

(Particle accelerators)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.P.

Justification of requirements to specific electrical characteristics in insulating materials (solid dielectrics) used in electrical mine equipment with voltages reaching 700 v. Trudy MakNII 9 no.2:72-93 '59. (MIRA 12:8)
(Electricity in mining) (Insulating materials)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu. P. Cand Tech Sci — (diss) "Conditons Guaranteeing the Safety of Mining Electrical Equipment, Determined by the Properties of the Electrical Insulating Materials (Plastics)," Moscow, 1960, 25 pp, 200 copies (Moscow Mining Institute im I. V. Stalin) (KL, 46/60, 125)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.P.

Results of studying the condition of the insulation of electric mine equipment. Trudy MakNII 11.Vop.gor.elektromekh.no.3:10-21 '60.

(MIRA 16:5)

(Electric machinery—Maintenance and repair)
(Mining machinery—Electric driving)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.P.

Analysis of conditions for insuring maximum safety with leakage in mine cable networks. Trudy MakNII 11.Vop.gor.elektromekh.no.3: 22-39 '60.

(MIRA 16:5)

(Electricity in mining--Safety measures)
(Electric power distribution)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

IKHNO, A.G.; ANTONOV, Yu.P.

Discussion of V.A.Khorunshii and IU.M. Ribas' article "Proposed regulations for the manufacturing of explosion-proof electric equipment". Prom.energ. 15 no.5:41-45 My '60. (MIRA 13:7)

1. Makeyevskiy nauchno-issledovatel'skiy institut po bezopasnosti gornykh rabot.
(Electric apparatus and appliances)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.P.; SHURIN, E.S.; LADOKHIN, S.V.

Study of the possibility of using stone casting as an insulating material. Trudy MakNII 14. Vop. gor. elektromekh. no.5:10-12 '62. (MIRA 16:6)

(Stone) (Electric insulators and insulation)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.P.; SHURIN, E.S.

Developing methods for testing electric mining equipment with voltage ratings up to 660 v. under high humidity conditions. Trudy MakNII 14. Vop. gor. elektromekh. no.5:13-35 '62. (MIRA 16:6)

(Electric machinery--Testing)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.P.

Testing new non-arcing plastics to be used in electric mining equipment. Trudy MakNII 14. Vop. gor. elektromekh. no.5:36-40 '62. (MIRA 16:6)

(Plastics—Testing) (Electric insulators and insulation)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.P.

Hygienic evaluation of vibration in the manufacturing of ships' screw propellers. Trudy LSGMI 75:138-143 '63. (MIRA 17:4)

1. Kafedra gigiyeny truda s klinikoy professional'nykh zabolevaniy (zav. kafedroy - prof. Ye.TS. Andreyeva-Galanina) Leningradskogo sanitarno-gigiyenicheskogo meditsinskogo instituta.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.P.

Vibration during the hand finishing of ship propellers and its effect on the human body. Sudostroenie 29 no.6:42-44 Je '63. (MIRA 16:7)

(Vibration--Physiological effect) (Shipfitting)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV, Yu.S., kapitan meditsinskoy slushby.

Immediate results of pneumoperitoneum for treating pulmonary tuberculosis. Voen.-med. zhur.no.9:25-30 S '51. (MLRA 9:9)
(TUBERCULOSIS) (PNEUMOPERITONEUM, ARTIFICIAL)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

MIKHAYLOV, F.A.; ANTONOV, Yu.V.

Pulmonary contractibility and its significance in respiration. Klin. med., Moskva 30 no.8:18-21 Aug 1952. (CIML 23:2)

1. Professor for Mikhaylov. 2. Of Moscow Municipal Scientific-Research Tuberculosis Institute (Director -- Prof. V. L. Rynis) and of Ryazan' Medical Institute imeni Academician I. P. Pavlov.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

29095
S/597/60/000/001/005/005
B102/B138

9,6000 (1089,1139)

AUTHORS: Bukatov, V. A., Antonov-Antinov, Yu. N.

TITLE: A generator of pulse "packets" in the millimicrosecond range

PERIODICAL: Apparatura dlya yadernoy spektrometrii, no. 1, 1960, 126-132

TEXT: The pulse packets generator described has a pulse repetition frequency of 10 Mc/sec, as it was originally designed for a 256-channel analyzer with this frequency. Other parameters are as follows: Pulse packets repetition frequency: $2 \cdot 10^3$ cps; range of pulse repetition frequencies within a packets: $3 \cdot 75 - 10.25 \cdot 10^6$ cps; pulse height in a packets generator outlet: 0 - 30 v; pulse duration in a packets: $25 \cdot 10^{-9}$ sec; number of pulses in a packets: 0 - 300. The pulse heights in a packets are constant to 0.5%. The pulse repetition frequency is kept constant by means of a quartz stabilizer. The block diagram is the following:

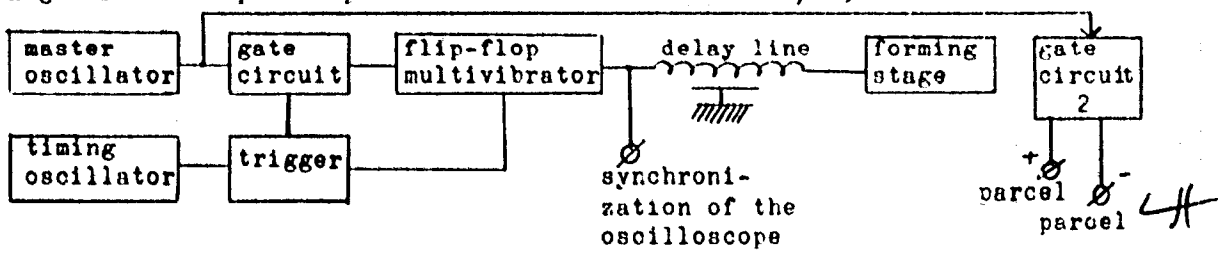
Card 1/3

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

29095
S/597/60/000/001/005/005
B102/B138

A generator of pulse "packets"...



The master oscillator consists of two sinusoidal oscillators and an amplifier-limiter tube. The first of its oscillators operates at 10 Mc and in accordance with B. K. Shembel's design, has quartz stabilization on the tube $Л_1$ (Fig 3) which is of the type 6П14П(6P14P). The second oscillator of the master device works at $3.75 \cdot 10^6$ - $10.25 \cdot 10^6$ cps with a 6P14P tube ($Л_2$ in Fig 3), the amplifier-limiter with a ГУ-29(GU-29) tube ($Л_3$) with a + 150 - v supply. Both generators are supplied by pulse transformers with ОК-1000(OK-1000) cores. The timing oscillator consists of a blocking oscillator with a 6Н3П(6N3P) tube ($Л_8$); its pulses have a duration of

Card 2/4

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

KISELEV, I.M.; ANTONOV-ROGACHEV, V.K.; CHERNYSHEV, V.I., redaktor; YUDZON, D.N., tekhnicheskiy redaktor

[Bibliography of works issued by the Railroad Transportation Publishing House (1935-1949)] Bibliograficheskii spravochnik izdanii Transzheldorizdata (1935-1949 gg.). Moskva, Gos. transp.zhel-dor.izd-vo, 1950. 377 p. (MIRA 10:7)

1. Russia (1923- U.S.S.R.) Gosudarstvennoye transportnoye zheleznodorozhnoye izdatel'stvo
(Bibliography--Railroads)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

1a

3

Application of a hyperbolic function to the representation of the extinction of phosphides. V. L. Levshin and V. V. Antonov-Romanovskii. *Compt. rend. acad. sci. U. R. S. S.* [N. S.], 1933, 205 (in French 206-7). The extinction of the phosphorescence of Zn and Zn-Cd phosphides by infra-red rays is due to auto-excitation of the phosphide and is given by $I = At^{-n}$. F. H. R.

ASM SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

BC

UII 3

Photography in the infra-red region of the spectrum by the method of extinction of phosphorescent screens. V. L. Levitin, V. V. Antonov-Romanovskii, and L. A. Tomasian (Compt. rend. Acad. Sci. U.R.S.S., 1938, 278—279).—Quant. photometric measurements of the diminution of the phosphorence of screens (*S*) coated with Zn, Zn-Cd, and Ca phosphors indicate that, in general, this method is as efficient as that using sensitised plates for the region to 1·1 μ, and is preferable to the latter method at 1·1—1·5 μ. The drawbacks are the limited length of exposure which is possible (>30 min. for Zn phosphor) and the coarseness of the image, arising from the coarseness of grain of *S*.

J. W. S.

ASB-ILA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Natural decrease of the zinc phosphors in single crystals. V. V. Antonov-Romanovskii. *Compt. rend. acad. sci. U. R. S. S.* 3, 433-3 (in German 433-5) (1934). -The influence of crystal size and temp. on the intensity of the light obtained from 4 Zn phosphors was investigated. The decrease of luminescence of the largest crystals follows exactly the conditions of a bimol. reaction. Neither change in temp. nor intensity of excitation affects the character of this decrease in luminescence. The smaller the crystals the greater the deviation from a bimol. type of extinction. For two of the phosphors the extinction throughout the time interval measured is of the type $I = At^{-\alpha}$ ($t > 0.005$), where t = time in min., A = intensity at $t = 1$ and $0 < \alpha \leq 2$. Here the rapidity of the extinction is characterized by the value of α. Since luminescence is a surface phenomenon and with the small crystals a sp. surface effect causes a change in the type of extinction, it is suggested that the change of extinction with crystal size is a complicated function of some statistical process connected in some manner with the elementary processes of luminescence. H. A. Smith

METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Investigations on phosphorescence. I. The hyperbolic law of decay of phosphorescence. V. L. Levshin and V. V. Antonov-Romanovskii. *Physik. Z. Sowjetunion* 5, 790-810(1934). The Becquerel equation for the rate of decay of phosphorescence, which holds for only very short time intervals, is transformed to the hyperbolic function $I = At^{-\alpha}$, where I is the emitted light intensity, A is a const. numerically equal to I when the time $t = 1$, and α a const. characteristic of the rate of decay. Results of measurements with a series of Zn phosphors, in which the relative intensities were varied 3000 fold, show the equation to hold over long time intervals during which 75% of the total light stored up in the phosphor is emitted. Self-excitation decreases decay of phosphorescence, the decrease being greater with thicker phosphor layers. II. **The quenching of phosphorescence by infra-red rays and its application to photography in the infra-red region of the spectrum.** V. L. Levshin, V. V. Antonov-Romanovskii and L. A. Tumerman. *Ibid.* 811-37. The quenching of phosphorescence produced by exposing phosphors to infra-red light of wave length 0.45-18 μ is studied. The reciprocity law of Bunsen and Roscoe is shown to hold, the quenching effect being const. provided the product of the intensity of the quenching infra-red rays and the time of exposure is const. The hyperbolic law of decay of phosphorescence (cf. above) holds for moderate quenching at various wave lengths. The factors influencing quenching which are investigated include: effect of wave length, independence of quenching coeff. and the total light energy of quenching at any one wave length, the relation of the total energy of the quenching light to the quenching, and the relation between the total phosphorescent light emitted and the total quenching light. The quenching coeffs. of 4 phosphors at various wave lengths are plotted to give sensitivity curves resembling those of photographic plates. The application to photography in the infra-red, giving a positive directly, is indicated and photographs taken with 45 sec. exposures at an av. wave length of about 1.0 μ are shown. E. O. W.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

SA

1053

4503. Phosphorescence. Part II. W. L. Lewschin, W. W. Antonow-Romanowsky and L. A. Tumerman. *Phys. Zeits. d. Sowjetunion*, 5 6 pp. 811-827, 1934. *In German.*—The quenching effect of infra-red has been studied. There is no effect on the total light output nor is the law of decay altered in character. It is found that for quenched regions of decay and for not too great a degree of quenching, the law $L\phi = Ae^{-Kr}$ holds, where $L\phi$ is the remaining light sum in the phosphor and r the light sum of the quenching radiation. K, the quenching constant is a function of the wave-length of the quenching radiation. The decrease of blackening of a photographic plate produced by the quenching light L' follows the ordinary photographic law of blackening. This offers a possibility of quantitative as well as qualitative infra-red photography. [See preceding Abstract.] J. K.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKY, V.

11-51

3422. Decay of Phosphors. W. W. Antonow-Romanowsky. *Comptes Rendus de l'Acad. des Sciences, U.S.S.R.* 2, pp. 105-111, *April* 11, 1938. *In German.*—Simple assumptions based on the Lenard theory of phosphorescence lead to the decay equation $I = I_0 a^2/(a + t)^2$. This does not agree with the facts. The author develops new equations based on the assumption that the probability of recombination of an electron with an ion depends on the distance between them. These equations are $I = I_0 a^n/(a + t)^n$; $I_0 = n_0^2 P$; $a = 1/n_0 P$, where I_0 = the initial intensity and the constants a and n depend on the crystal radius, and n is the initial number of ions or electrons and P is the probability of recombination. The value of a is calculated for different crystal radii, the latter being expressed as multiples of the sphere of action of the ions. These values are compared with the way in which a varies experimentally with different size crystals from 10μ to 60μ. The theoretical value of a is between 1·76

2K

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

BC

A-1

Fading of zinc phosphors in single crystals. III. V. V. ANTONOV-ROMANOVSKI. (Physikal. Z. Sovietunion, 1935, 7, 366—379; cf. A., 1934, 1290).—The rate of decay of large crystals obeys a bimol. relationship. O. J. W.

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

A 5 3
2

3144. **Direct Evidence of the Bimolecular Scheme of Phosphorescent Decay.**—V. Antonov-Romanovskij. (*Compte Rendus (Doklady) de l'Acad. des Sciences, U.S.S.R.* 2, 3, *pp.* 97–100, 1936. *In German.*) In the simplest case the bimolecular theory gives the decay rate as $I = I_0 (1 + \beta n_0 t)^{-1}$, $I_0 = \beta \cdot n_0^2$, where t is the time, n_0 the concentration of ions or electrons at the start, and β is the probability of recombination of ions and electrons. It has been objected that often the decay of a phosphor does not follow this law. It can be shown, however, that with very general and simple assumptions based still on the bimolecular theory, this formula may give way to others. For, the probability of recombination will actually become smaller with time, since if it is assumed that the probability is greater for ions and electrons close together, the number of close neighbours will fall off with time and the rate of decay will actually be slower, and slower than the above formula gives with constant β. It is shown that it follows from the bimolecular theory that the initial intensity with momentary illumination is proportional to the square of the illumination. This has been confirmed with a number of ZnS(Cu) phosphors. I. E.

METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKII, V.

680. Decay of Phosphorescence of ZnS at Various Temperatures. V. Antonov-Romanovskii. *Comptes Rendus (Doklady) de l'Acad. des Sciences, U.S.S.R.* 17, N. 7, pp. 93–98, 1937. *In French.*—Continuing previous work (see Abstract 3144 (1936)) with individual small crystals of ZnS. It has been shown that *from* 25° to 100° C. the decay follows the law $I = A/(a + t)^a$ where A, *a* and are constant, depending on the phosphor. Over this range *a* is equal to 1·9 but above 147° C. the rate is greater and after a curve in the log *I*/log *t* line the value of *a* becomes 2. These results are not explicable on a simple bimolecular recombination of electrons and ions. As previously explained, however, the simple recombination would be affected by an impoverishment of ions which are nearest to electrons and by a variation of recombination probability with distance between ions and electrons. A study of the curves at the higher temperatures is taken to indicate that the probability of recombination depends on temperature according to $p_t = p_0 \cdot e^{-\epsilon/kT}$. An attempt is made to criticise Muto's theory of phosphorescence.

J. E.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

BC

A-1

Influence of temperature on extinction of phosphors. V. Antonov-Romanovski. (Compt. rend. Acad. Sci. U.R.S.S., 1936, 20, 361—364).—The hypothesis that the temp.-dependence of the extinction of phosphors at low and moderate temp. is due solely to variation of the magnitude $\omega_p = e^{-\alpha/T}$ where ω_p is the probability of an electron being free is considered and compared with observed results.

F. J. G.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

BC

Decay of alkali halide phosphors activated by thallium. V. Antonov-Romanovski and G. Kotschergin (Compt. rend. Acad. Sci. U.R.S.S., 1939, 24, 430—432).—The exponential decay of phosphorescence in KCl-Tl phosphors is not regarded as proof that the process is unimol. A theoretical relationship is deduced for the decay of luminescence.

H. J. E.

P. N. Lebedev. Phys. Inst.; Mbr. AS, Moscow

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Materials & Subsidiary Techniques

537.311.33 1817

Mechanism of Luminescence of Alkali-Halogen Phosphors.—V. V. Antonov Romanovskii. (*Bull. Acad. Sci. U.R.S.S., str. phys.*, 1941, Vol. 5, Nos. 4/5, pp. 523-531. In Russian with English summary.) Discussion of decay phenomena leads to the conclusion that the Bloch-Wilson representation of semiconductors, if applied to phosphorescence, must take account of the interaction between the electron and the ionized centre, long before their recombination, and also of the fact that the average displacement of the thermal electron in the time interval between captures is relatively small.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

B. 2b

[illegible] V. Antonov-Romanov [illegible] —The [illegible] has been investigated for [illegible] The decay of the fully excited [illegible] and the mechanism of the luminescence [illegible] rather than a metastable one. [illegible] is unimol. and later [illegible] of the initial stage is probably due to [illegible] the average distance of [illegible] the phosphorescence centre is < the [illegible] so that each electron recombines with its own centre. The bimol. law is followed when the electrons become well "mixed" by diffusion. This theory is supported by experiments with red light. The mechanism of phosphorescence proposed makes it possible to explain the decay curve both qualitatively and quantitatively. The electron diffusion const. has been calc. from the decay curve.

A. J. M.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

PROCESSES AND PROPERTIES INDEX

2945

535.376

The mechanism of luminescence of phosphors. I II.

ANTONOV-ROMANOVSKII, V. V. *J. Phys. USSR*, 6, 3-4, pp. 120-140, 1942, *ibid* 7, 4, pp. 153-167, 1943. — It is shown that the luminescence of a phosphor KCl + Tl is of a recombination character, the decay preceding in the later stages according to a simple bimolecular reaction and the intensity of the luminescence diminishing according to the law $J = \mu n_0^2(1 + \mu n_0 t)^{-2}$. A detailed analysis of the decay mechanism is carried out. The theory is based on the small magnitude (of the order of the lattice constant) of the displacement of a thermal electron of the phosphor between 2 consecutive trappings. The shape of the decay curve and its dependence on conditions of excitation and decay are explained. An estimate is made of the diffusion coefficient and the mobility of the electrons. The possibility of a monomolecular decay process and of spontaneous radiation in the initial stages of the process are shown. The proposed theory differs essentially from previous theories based on the Bloch-Wilson model of a semiconductor [Abstr. 2759 (1937)]. I. S. U.

P. N. Lebedev Phys. Inst., AS USSR Moscow.

METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Luminescence of phosphors at the moment of excitation. A. A. Antonov-Romanovski (Compt. rend. Acad. Sci. U. R. S. S., 1952, 85, 125-129).—On the cessation of $CdSiO_3$ and CdH_2O powders activated by Mn falls at once to ~0. The luminescence increases quite smoothly from 0, so that the fall is not explicable by the presence of fluorescence. The kinetics of phosphorescence are examined; the simple biomol. theory can account for these results. A limited general comparison with experimental data is given, but this is hindered by experimental difficulties such as the (unknown) quenching properties of the exciting light. J. G. A.

* of excitation the intensity of luminescence

Inst. of Physics im. P. N. Lebedev, Acad. Sci.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

CA

3

Mechanism of the luminescence of phosphors. II. V. V. Antonov-Romanovskii. *J. Physics* (U. S. S. R.) 7, No. 4, 133-67(1943)(in English); cf. C. A. 37, 833[4]; 38, 4194[1].—Theoretical math. A theory of recombination luminescence based on the demonstratedly small magnitude (of the order of the lattice constant) of the displacement of a thermal electron in a KCl + Tl phosphor between two consecutive trappings is developed, and the shape of the decay curve and its dependence on the conditions of excitation are explained. The magnitude of the diffusion coefficient and of the mobility of electrons is estd. It is shown that a unimolecular decay process and spontaneous radiation in the initial stages are possible. In the KCl-Tl phosphors the luminescence centers are pictured as satd. complexes. Excitation raises the electron to a higher level and the center passes to a new state of equil. The energy then released is sufficient to produce complete ionization of the center. Luminescence in the alkali halide phosphors is due to a luminescence center, in the CaS-Sm phosphors to electron transitions from Sm^{+++} levels, in the Zn silicate-Mn phosphors also due to electron transition; in no case is luminescence due to the lattice of the bulk substance, which can influence only the width and shift of the spectrum. F. H. Rathmann

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Increase of phosphorescence during excitation. V. V. Antonov-Romanovski (*Compt. rend. Acad. Sci. U.R.S.S.*, 1943, 39, 299—302).—It is shown that the lumol. scheme of phosphor luminescence affords a satisfactory qual. and partly quant. interpretation of the phenomena observed in the excitation of phosphors. J. F. H.

P. N. Lebedev Phys. Inst.; AS

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

W E.

Subsidiary apparatus & materials

[illegible] Screens with Uneven Surfaces [Analysis (with Experimental Confirmation) of the Brightness of a Surface covered with Cone-like Depressions. (i) illuminated with Visible Light. (ii) Self-Luminescent and (iii) Phosphor luminescent under Action of "Red" Light. Mean Brightness may be Many Times that of a Plane Screen] Antonov Romanovsky. (Comptes Rendus (Doklady) de l'Acad. des Sci. de l'URSS, [illegible] Nov. [illegible] Vol. [illegible], No. [illegible] pp. [illegible] in English.)

P. N. Lebedev Phys. Inst., AS

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Mechanism of phosphorescence. V. V. Antonov-Romanovskii. *Bull. acad. sci. U.R.S.S., Ser. phys.* 9, [illegible] 88 (1945).—The initial intensity of the emitted light is proportional to the square of the intensity of absorbed light. In the systems $CdSiO_3$ Mn and CdB_2O_3 Mn the time to reach the max. emission depends on the intensity of the exciting light, another proof of recombination. The decay in the system KCl + Tl was studied after excitation for 0.8 sec. at variable intensities of exciting light; it is unimol. at the start and bimol. in the later stages. Contrary to the quantum mechanical theory, the electron does not need to be located at defects in the lattice, the mean free path of the "optical" electron being small. ZnS and alk. earth phosphors have decays of different character, attributed to their microcryst. structure and the inhomogeneity of the activator concn. In silicate phosphors the first radiation has an exponential decay independent of temp. or the intensity of exciting light. This is due to the facility with which the electrons arrive at recombination distance from the ions. ZnS-Cu, ZnS-Ag, ZnS-CdS-Ag have hyperbolic decay from the start. ZnS-MnS-Cu emits orange light, which changes to green if the phosphor is irradiated with red light in early stages of decay. This is caused by the presence of independent Mn and Cu centers. The light emission during excitation is increased. 47 references. S. P.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

USSR/Phosphorescence May 194

"Recombination Phosphorescence," V. V. Antonov-Romanovskiy, 10 pp

"Izv Ak Nauk Ser Fiz" Vol X, No 5/6

Six graphs showing the relationship between temperature and intensity for various substances Theoretical derivation of relationship between intensity and temperature.

12780

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

3

Phosphors sensitive to red light. V. V. Antonov-Romanovskii, V. L. Levshin, Z. I. Morgenstern, and Z. A. Trapezniikova. *Compt. rend. acad. sci. U.R.S.S.* 54, 19-22 (1946) (in English). A graphic study of some properties of alk. earth sulfides with two activators, Sm and Ce, or Sm and Eu the emission spectrum varies according to the basic material. [CaS Sm, Ce] emits in the orange range; [SrS/Sm, Ce] emits in the blue range; with Eu as second activator the emission shifts to the red end of the spectrum with increased Sr content. M. M. Lutwak

P. N. Lebedev Phys. Inst., AS

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

3

Samarium as a flash sensitizer in the alkaline earth phosphors. V. V. Antonov-Romanovskii (Lebedev Phys. Inst.). *Compt. rend. acad. sci. U.R.S.S.* 54, 775-8 (1946)(in English).—Published data on the sensitization of CaS and SrS phosphors by Sm and Ce are reviewed. The bright flash of two-activator phosphors is explained by the ability of Sm to transfer the absorbed energy to the bound electrons. 10 references. M. L. Nielsen

Lebedev Phys. Inst., AS

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

CA

3

Special properties of new alkaline earth phosphors sensitive to infrared radiation. A. A. Antonov, Romanovskii Doklady Akad. Nauk S.S.S.R. 58, 771-4(1947), cf. ibid. 30, 1.08(1942), 54, 10(1946). Phosphors SrS + Eu and CaS.SrS + Cr,Sm are examined from the theoretical point of view. These phosphors show a noncorrespondence in time between the rise of emission during excitation and the increase of ability to start emission. The total light summation of the phosphors with optical excitation (infrared) is several times greater than that caused by thermal treatment. The light sum from ultraviolet excitation is [illegible] of that achieved with infrared, the effect can be explained by a smaller share of action by thermal electrons which participate in excitation. G. M. Kosolapoff

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

1A

4

Measurement of the absolute efficiency of phosphorescence flashes induced by "red" light. V. V. Antonov-Romanovskii (Acad. Sci., U.S.S.R., Moscow). *J. Exptl. Theoret. Phys.* (U.S.S.R.) 17, 708-10(1947)(in Russian); cf. *C.A.* 40, 4297[4]; 41, 4039a.—The energy absorbed (Q_λ) and emitted (R_λ) and the visual brightness of the emission (B_λ) are expressed by $Q_\lambda = (1-p_\lambda)\alpha E_\lambda$, $R_\lambda = \beta \int_0^\infty I_{\lambda'}\, d\lambda'$, and $B_\lambda = \gamma\beta \int_0^\infty v_\lambda I_\lambda d\lambda'$, resp., where p_λ = coeff. of scattering of light of wave length λ by the phosphorescent screen, E_λ = incident energy, I_λ = relative energy distribution in the flash spectrum, $v_{\lambda'}$ = sensitivity of the eye for λ'; the unknown coeffs. α, β, and γ are eliminated by measuring the brightness B_0 of the screen illuminated by visible light of the same wave length λ_0 as that of the phosphorescence; combination of the above 3 equations with $B_0 = \gamma p_0 \alpha E_0 v_0$ leads to the expression for abs. energy yield $\eta_\lambda = R_\lambda/Q_\lambda = [p_0/(1-p_0)] \cdot v_0 E_0 B_\lambda / v E_\lambda B_0$, where $\bar{v} = \int_0^\infty v_{\lambda'} I_{\lambda'} d\lambda' / \int_0^\infty I_{\lambda'} d\lambda'$ is the "effective sensitiveness of the eye" to the color of the flash. For alk. earth phosphors, the unknown p_λ was estd. by measuring their phosphorescence, first, under monochromatic light scattered from the same but non-activated phosphor, then under the same beam scattered from MgO; from the identity of the emissions over the whole spectrum, it was concluded that the phosphor had the same p_λ as MgO, namely ~0.90. Owing to the smallness of $(1-p_\lambda)$, the error in η_λ with respect to the absorbed energy Q_λ is considerable; it is much less if η_λ is expressed with respect to the incident energy E_λ. The latter error was estd. by measuring the brightness B' of the flash of the activated phosphor under a light beam of known E_λ passed through an infrared-transmitting glass filter of transmission coeff. k_λ and the brightness B of a spot obtained on a white paper sheet of coeff. of reflectivity p ~0.8 by a parallel beam from the same source passed through a filter transmitting light of the same color as that of the flash (coeff. k'_λ); the divergence between B'/B measured and the value calcd. by $B'/B = \bar{v} \int_0^\infty E_\lambda k'_\lambda v_\lambda \cdot d\lambda / p \int_0^\infty v_\lambda E_\lambda k_\lambda d\lambda$ was about 20%. The method described is valid for Lambertian scattering.

N. Thon

Lebedev Physical Inst., AS USSR

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

PROCESSES AND PROPERTIES INDEX

Mechanism of the flash in SrS phosphors activated by rare earth activators and the interaction of activators. V. V. Antonov-Romanovskii, V. L. Levshin, Z. L. Morgenshtern, and Z. A. Trapesnikova. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 13, 75-80(1949); cf. *C.A.* 43, 4142b. Curves of the intensity of stimulated fluorescence as a function of the temp. in SrS activated with Cr, Sm, Eu, Ce + Sm, Eu + Sm show that the max. of 2-activator combinations do not correspond to the curves of 1-activator phosphors and are not linear combinations of single activator systems. Two activators have complex centers contg. both ingredients; thus because of the small concn. chem. forces binding both activators must be postulated. Curves of the spectral emission of these above-named combinations during excitation, decay, and stimulation (flash) show that the sharp Sm lines are absent in stimulation spectra. Some radiation belongs to SrS itself and it is present only in excitation spectra. Stimulation and excitation spectra show at all temps. the characteristic 2-max. curve of Ce; the decay spectra, the 3-max. spectrum of Sm. Fluorescence during excitation of Sm-Eu combinations at different concns. of Sm + Eu show that the spectrum of Eu does not appear until its concn. reaches 10^{-5}; from then on it appears and the spectrum is modified. In Ce-Sm combinations Ce spectra appear at concns. of 10^{-5}-10^{-4}, the Sm spectrum is modified and new lines appear. In stimulated spectra a max. at 1 μ can be attributed to Sm, a second max. at 0.6 μ to Ce. This choice is confirmed by the study of phosphors with a single activator. Therefore the stimulation spectrum has a character of additivity (observed also on a SrS-Eu, Ce phosphor). The intensity of decay spectra was measured on single and double combinations shown above at temps. of −120° to +240° and they show the storage of light energy on deep local levels at low temp. and its liberation even with short-wave excitation radiation. The temp. has a considerable influence on the intensity of stimulated radiation because some thermal energy is necessary for the emission of this radiation. The combined centers have a triple function of being centers of emission, of electron localization, and of absorption of the stimulating radiation.

S. Pakswer

ASD-SLA METALLURGICAL LITERATURE CLASSIFICATION

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

USSR/Physics Nov 1947

Phosphors, Infrared
Illumination

"Unique Properties of New Alkali Earth Phosphors, Sensitive to Infrared Rays," V. V. Antonov-Romanovskiy, Physics Institute imeni P. N. Lebedev, Academy of Sciences of the USSR, 4 pp

"Dok Ak Nauk" Vol LVIII, No 5

In experiments in 1943 it was discovered that ultraviolet light not only excites phosphors but in the case of phosphors of $ZnSiO_4$+Mn actually speeds up the illumination. This phenomenon was helpful in solving one of many paradoxes. Author discusses this phenome-

38198

USSR/Physics (Contd) Nov 1947

non of speeding up the action of illumination and explains four variations of the theory. Submitted by Academician S. I. Vavilov, 28 May 1947.

38198

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

A

Alkaline earth phosphors, characterized by a high sensitivity to infrared rays. V. L. Levskin, V. V. Antonov-Romanovskii, Z. I. Morgenshtern, and Z. A. Trapeznikova. *Zhur. Eksptl. Teoret. Fiz.* 17, 940-61(1947).—Absorption spectra of phosphors of CaS (1) + SrS (87%), without activator (I), with Sm (II), with Ce (III), with Eu (IV), with Ce + Sm (V), and with Eu + Sm (VI), show that Sm alone causes only a slight shift of the long-wave edge of the absorption band of I to longer waves, only at very high concns. of Sm, 0.01 g./g., does one observe narrow absorption bands in the visible. In contrast thereto, Ce gives rise to a new sharp band at 420 mμ, Eu to continuous absorption beginning at 580 mμ and extending to shorter waves. V and VI give, resp., the same absorption spectra as III and IV. Consequently, in V and VI, it is Ce or Eu, resp., which is responsible for the absorption. The luminescence spectrum of V has max. at 500 and 530 mμ, that of VI at 625 mμ. Variation of the ratio Sr:Ca causes only shifts in the position and height of the max., without changing the character of the spectrum. Excitation with light absorbed by the host crystal produces all 3 types of emission, namely fluorescence, long-lived phosphorescence, and the flash on irradiation with infrared. If V is excited by light absorbed by the activator (violet), it shows only fluorescence, excitation of VI by the green light absorbed by Eu produces both fluorescence, phosphorescence, and the infrared-stimulated flash. Whereas Ce and Eu can be termed main activators, Sm plays no significant role in either the absorption leading to excitation or in emission; it decreases

3

the intensity of the phosphorescence, and, on the other hand, it increases considerably the brightness of the flash. The spectral curve of the yield η of the infrared-stimulated flash of V and VI, defined by the ratio of the energy emitted and the infrared energy absorbed, and detd. by a procedure taking into account the scattering coeff. and the effective visual sensitivity of the eye, is detd. by the host crystal and by Sm, and does not depend on the main activators Ce and Eu. It may mean that the stimulating infrared is absorbed by Sm centers, then the energy transmitted by resonance to electrons at local levels, and emission is produced by recombination of the liberated electrons with ionized centers Ce and Eu. The recombination character of the flash is confirmed by the validity of the hyperbolic decay law $I \sim 1/\theta$, and by the parabolic dependence of its initial brightness I_0 on the length θ of the preliminary excitation, $I_0 \sim k\theta^2$, where θ is proportional to the no. of ionized centers. The decay curves of the flash emission of V, after 30 min., and 20 and 120 hrs. from the excitation, in log I (log t) coordinates, are parallel and very close to each other. From these curves, the energy stored in V decreases only by 40% on standing at about 20° during the 1st 5 days, then the decrease becomes even slower. The curve of temp.-stimulated emission of V, between 20 and 200°, has only 1 max., at about 70°, which indicates one single band of deep trapping levels. In contrast to other infrared-sensitive phosphors described in the literature, the total output of the infrared-stimulated emission of V is about 5 n times greater than the temp.-stimulated output. The observed facts lead to the conclusion that the stimulating infrared radiation is primarily absorbed, not by the trapped electrons, but rather by Sm centers. From detns. of the

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

quantum yield of infrared stimulation, attaining [illegible], and over, the no. of repeated trappings of electrons, limited by 1/q, cannot exceed a very few. The difference of the total output in infrared and in thermal stimulation may mean that, in the 1st case, electrons fall on the top of the cond. zone, in the 2nd case, on its bottom. N. Thon

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANSKIY, V. V.

PA 36/49T89

USSR/Physics Jan/Feb 49
Phosphors
Luminescence

"The Flash Mechanism in SrS Phosphors as Effected by Rare-Earth Activators, and the Interactivity of Activators," V. V. Antonov-Romanskiy, V. L. Levshin, Z. L. Morgenshtern, Z. A. Trapeznikova, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 16 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XIII, No 1

States that basic result of the study is that, in phosphors with two rare-earth activators, these activators situate themselves in systematic and

36/49T89

USSR/Physics (Contd) Jan/Feb 49

orderly manner, thus forming a complex center of luminescence due to certain chemical forces. Bases this conclusion on three independent series of investigations with single-activated and double-activated phosphors, i. e., studies of temperature radiation of excited phosphors, luminescence spectra, and spectral sensitivity of the flash.

36/49T89

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V.

PA 36/49T90

USSR/Physics
Phosphors
Phosphorescence

Jan/Feb 49

"The Radiating Action of Exciting Light on Phosphors," V. V. Antonov-Romanovskiy, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 10 pp

"Iz Ak Nauk SSSR, Ser Fiz" Vol XIII, No 1

Experimental data has shown that exciting light also has radiating (and sometimes even extinguishing) action and, therefore, that boundary concentration of stored light-sum is function of wave length of the exciting light. Author establishes

[redacted]

36/49T90

USSR/Physics (Contd)

Jan/Feb 49

this fact for wide class of phosphors, showing that radiating action of exciting light is widespread phenomenon.

[redacted]

36/49T90

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

CA

Analysis of decay curves of phosphor powders. V. V. Antonov-Romanovskii and R. S. Krylova. *Zhur. Eksptl. Teoret. Fiz.* 19, 63-73(1949).—The proportionality between the initial brightness I_0 and the intensity of excitation E, over a range of 10^3 fold variation E, remains valid for a layer of ZnS + Cu in the form of powder. This indicates that the linear relation $I_0 = aE$ holds also within each individual grain. In the same range of variation of E, the total light stored, n_0, in a thick (0.5 mm.) layer of powder, is proportional to $\sqrt{E}$ at lower E, but increases progressively slower than $\sqrt{E}$ as E increases. In that layer, the proportionality $n_0 = b\sqrt{E}$ holds only at the very lowest E, and deviation begins at a very early point. That in a thicker layer this occurs only at substantially higher E, is due to the fact that the light reaching deeper layers is considerably weakened. At low E, the relation $I_0 = p_0 n_0^2$, where $p_0 = a/b^2$, characteristic of the bimol. recombination process, remains valid for the powder. However, the kinetic decay curve, I as a function of time t, is not a simple 2nd-order hyperbola, but follows, empirically, a law $I = (a + bt)^{-\alpha}$, where $\alpha < 1.5$. This does not, however, contradict the validity of the 2nd-order hyperbolic decay law for each ith elementary vol. of the powder. Even if the law does hold for each elementary vol., the overall law, $I = \sum_i p_0 n_0^2 (1 + p_0 n_0 t)^{-2}$, may be different from a 2nd order hyperbola. The exptl. confirmation thereof is provided by the fact that a change of E from E_1 to E_2 shifts the decay curve along the axis of ordinates by $\Delta \log I = \log(E_2/E_1)$, and along the axis of abscissas by $\Delta \log t = -0.5 \log (E_2/E_1)$, i.e. $\Delta \log I = 2\Delta \log t$. The simple bimol. scheme ceases to be valid at strong E. The rapid slowing down of the increase of n_0 with further increasing E indicates in the absence of quenching or satn., an increase with E of the recombination probability p, and its decrease with time to a const. p_0. With p variable, the law of decay for an elementary vol. is no more a 2nd-order hyperbola, but follows $I = p n_0^2 (1 + n_0 \int_0^t p\,dt)^{-2}$. In a general way, relations found with powders may, but need not necessarily, reflect laws valid for an individual elementary microvol. If one excludes improbable or coincidental compensations, this will be the case only when the property considered is additive. Identification of an overall decay law observed on a powder, with the true decay law, may be misleading. N. Thon

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

TK 30/49 D2

Jan 49

USSR/Physics
Phosphors
Luminescence

"An Analysis of Extinguishing Curves for Powdery Phosphors," V. V. Antonov-Romanovskiy, Ye. S. Krylova, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 10½ pp

"Zhur Eksper i Teoret Fiz" Vol XIX. No 1

Shows that in a weakly activated ZnS + Cu phosphor the brightness of luminescence of elementary volume decreases according to a second order hyperbola. This is proved by considering one invariant property of the shape of the extinguishing curve which occurs if the luminescence

30/49T92

Jan 49

USSR/Physics (Contd)

process follows the simple bimolecular reaction scheme. Submitted 14 Jul 48.

30/49T92

ANTONOV-ROMANOVSKIY, V. V.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

3

Measurement of the absolute yield of luminescence of powdered phosphors. V. V. Antonov-Romanovskii and G. I. Epshtein. *Doklady Akad. Nauk S.S.S.R.* 64, 481-6 (1949). A space of 2 mm. thickness between the walls of 2 concentric quartz spheres of about 30 mm. diam. is filled with the powd. phosphor. Two openings in the sphere, of surface areas s_1 and s_2, resp., disposed at right angles to each other, serve, resp., to admit the exciting radiation and to observe the emitted light. The energy, Q, absorbed at a given wave length λ, is $Q = s_1E_0 - sE$, where $s = s_1 + s_2$, and E_0 and E, resp., the il. of the incident and the outgoing radiation. Of these, E_0 is measured directly with a thermopile. E is more conveniently detd. by comparing the brightnesses B_0 and B of a luminescent layer placed, first, before the slit of the monochromator, then in the plane of the exit opening of the sphere. With $E/E_0 = B/B_0$, one has $Q = s_1E_0[1 - (s/s_1)(B/B_0)]$. The emitted energy P is detd. by $P/E_{\lambda\varphi} = s\lambda B_0/\tau_0B_0'$, where B_0' and B_0 are the photometric brightnesses of a ground glass placed in the plane of the exit opening, and τ_λ and τ_0, resp., are the visibility coeffs. of light of the wave length λ and the mean visibility coeff. of the fluorescent light. The final expression is $\varphi = P/Q = [s\lambda B_0/E_0s_1)(\tau_0B_0'/\tau_\lambda)][1 - (s/s_1)(B/B_0)]$, and the abs. quantum yield $\varphi = \rho\lambda_0/\lambda$, where λ_0 = mean wave length of the luminescence band. Detns. on ZnS Cu (I) and Zn_2SiO_4 Mn (II) show lack of constancy of φ, as a function of λ, over the whole Stokes range of excitation. For I, φ has a max. about 0.9, at about 300 mu. In the case of II, φ increases, from 0.10 to 200 mu, from almost 0 to 0.6 and then appears to remain const. down to 250 mu. The detns. of abs. yield can be simplified if the incident light is chosen to be of the same λ as that of the phosphor, which results in $\tau_\lambda = \tau_0$, and if the openings are made small enough to render the fraction of outgoing excitation radiation negligible, i.e., so that $s_1B \ll s_1B_0$. In that case, the formula simplifies to $\varphi = B_0E_0\tau_0B_0'/B_0'E_0$, because $E_\lambda = E_0$ and $B_\lambda' = B_0$. N. Thon

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

PA 27/49T99

ANTONOV-ROMANOVSKIY, V. V.

Feb 49

USSR/Physics
Luminescence
Phosphors

"Measuring the Absolute Luminescence Total of Powder-like Phosphors," V. V. Antonov-Romanovskiy, M. I. Epshteyn, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 4 pp

"Dok Ak Nauk SSSR" Vol LXIV, No 4

Describes method to measure absolute luminescence total by using a sphere, the inside face of which, unlike the customary photometric spheres, is covered with the material to be investigated (in this case, the phosphors). Submitted 3 Dec 48.

27/49T99

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V.

PA 149T93

USSR/Physics - Luminescence
Phosphors

21 Sep 49

"Temperature Luminescence of Phosphors," V. V. Antonov-Romanovskiy, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 3½ pp

"Dok Ak Nauk SSSR" Vol LXVIII, No 3

Equations describing kinetics of storing the light sum during excitation show that concentration of electrons at shallow levels should become relatively less than at deep levels, total number, of course, increasing. However, effect discovered in experiment cannot be reconciled with these equations. Obtains equation with

149T93

USSR/Physics - Luminescence (Contd) 21 Sep 49

consideration for luminescent action of the exciting light which, in agreement with experiment, shows that number of electrons at shallow levels increases rapidly while number at deep levels remains constant or even decreases with cooling of the phosphor. Submitted by Acad S. I. Vavilov 21 Jul 49.

149T93

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

CA

3

Temperature emission of phosphors. V. V. Antonov-Romanovskii (Acad. Sci. U.S.S.R., Moscow). *Doklady Akad. Nauk S.S.S.R.* 68, 487-90(1949).—The observation that, on heating to higher temps., emission peaks corresponding to the shallower local levels (and appearing at lower temps.) are absent, is usually interpreted on the basis that at higher temps., owing to thermal motion, electrons do not stay at the shallower levels, and, consequently, the light stored in this state is practically zero. This interpretation is erroneous. In a phosphor with 2 kinds of local levels, shallow and deep (subscripts 1 and 2, resp.), with n = concn. of ionized centers (electrons), N = concn. of all centers (ionized or unionized), n_i = concn. of levels, σ = proportional to the effective cross section of recombination, σ_i = proportional to the cross section of trapping at a local level, E = intensity of the exciting light, w_i = probability of liberation of a trapped electron, the kinetics of excitation, on the assumption that $n \ll N$ and $n_i \ll n_i$ (i.e. electrons fill only a small fraction of the levels) are given by $dn/dt = -\sigma n n_0 + EN$ and $dn_i/dt = -w_i n_i + \sigma_i n_i n_0$ ($i = 1, 2$), with $n = n_0 + n_1 + n_2 = n_1 + n_2$ ($n_0 \ll n_1 + n_2$). For full excitation (stationary state) $\sigma n n_0 = EN$ and $\sigma_i n_i n_0 = w_i n_i$, hence $n_1/n_2 = (\sigma_1 n_1/\sigma_2 n_2)(w_2/w_1)$. If the liberation of electrons is purely thermal, w_i is independent of E, and $w_i = w_{i0} e^{-\epsilon_i/kT}$, where ϵ_i = energy of trapping at the local level. It follows that with decreasing temp. the no. n_1 of electrons at shallow levels becomes smaller than the no. n_2 at deep levels. That, however, is the exact reverse of the commonly made assumption. Consequently, the exptl. observation referred to at the outset cannot be accounted for by a purely thermal mechanism of liberation of electrons. Rather, it must be admitted that the absorbed exciting light not only is spent in ionization of light centers, but plays also a role in the liberation of trapped electrons. The probability of optical liberation of an electron is smaller, the shorter the mean thermal life of the electron at that level. Consequently, at room temp., the probability of thermal liberation is predominant at the shallow levels, whereas at the deeper levels the liberation is predominantly optical, and, consequently, independent of T, and proportional to the exciting light intensity, $w_i = \alpha E$. This gives $n_1/n_2 = w_{10} e^{-\epsilon_1/kT}/\alpha E$, i.e. n_1 increases rapidly with decreasing temp., in agreement with exptl., whereas n_2 may either remain const. or even decrease. If the shallow levels are more numerous than the deep ones, they may store more electrons, i.e. it is possible n_1 may be larger than n_2. N. Thon

1951

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V.

USSR/Physics - Phosphors Luminescence

"Study of the Variations in Absorption During the Excitation of Phosphors," L. I. Anikina, V. V. Antonov-Romanovskiy, Phys Inst imeni P. N. Lebedev, Acad Sci USSR, 4 pp

"Dok Ak Nauk SSSR" Vol LXVIII, No 4

Investigated alkaline earth phosphors activated by rare earth elements SrS, CaS-Ce, Sm; SrS-Ce, Sm; and SrS-Eu, Sm. Graph shows relative transparency D/D_0 is the transparency during non-excitation). Spectral sensitivity to flash ("flare-ups") corresponds to the spectral behavior of supplementary ("after") absorption: where there is no noticeable absorption there is practically no flash. Closest correspondence for all three phosphors was in the region of 1 micron wave length. Submitted by Acad S. I. Vavilov 21 Jul 49.

PA 150T77

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

CA

Change of absorption on excitation of phosphors. L. I. Anikina and V. V. Antonov-Romanovskii. *Doklady Akad. Nauk S.S.S.R.* 66, 609-12(1949).—Excited SrS-CaS:Ce, Sm (II), SrS-Ce, Sm (II), and SrS-Eu, Sm (III), in thin layers (50-1 mm.), show increased absorption not only in the form of a relatively sharp additional band at about 1000 mμ, but also in a broad short-wave region. Thus, the transmittance of excited I is only 70% of that of the unexcited phosphor in the whole range 300-550 mμ; II has only 80% transmittance between 300 and 500 mμ. The increased absorption extends almost over the whole visible region. It behaves as a whole, i.e., the relative change of the absorption, as compared with the unexcited state, is the same in the visible as in the infrared. The dependence of the relative excess absorption on the total light stored n, investigated for II in 365 mμ, is roughly linear. This finding provides a rigorous substantiation for the previously established law (*C.A.* 37, 4659[9]) for the rate of emission, $-dn/dt = (p + nE)n^2 + EN$, where n = concn. of ionized centers (or photoelectrons), N = concn. of unexcited nonionized centers, E = intensity of the exciting radiation, p = probability of recombination per unit time at $n = 1$. The extra term nEn^2, without which (i.e. for $n = 0$) the law would go over into a simple 2nd-order bimol. equation, finds a natural interpretation as representing the addit. electrons set free by the excess absorption in the excited state. Comparison of the spectral distribution of the addit. absorption with the normal absorption spectrum shows absence of any relation between them; this proves that N remains practically unchanged on excitation, and confirms the inequality $n \ll N$. The latter means that even on max. excitation, only an insignificant fraction of deep levels is filled with electrons. Spectral similarity to a flash goes parallel with the excess absorption. Particularly in the infrared region, at about 1 μ, only the excess absorption accounts for the flash effect; the normal absorption is inactive in that respect.

P. N. Lebedev Physics Inst., USSR AS

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V.

PA 165T89

USSR/Physics - Phosphors 21 Mar 50
Absorption, Light

"Variation of Absorption in ZnS-Cu, Co Phosphor During Excitation," V. V. Antonov-Romanovskiy, I. P. Shchukin, Phys Inst imeni Lebedev, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXI, No 3, pp 445-446

Shows relative decrease $(D_0-D)/D_0$ in transparency D (0-17%) vs wave length (0.4-1.6 microns). Also, relative decrease in transparency D vs thickness d (0-0.5 mm) of layer for various wave lengths (550-1,300 milimicrons). Submitted 27 Jan 50 by Acad S. I. Vavilov.

[redacted]

165T89

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V. PA 175T74

USSR/Physics - Phosphors 1 Apr 50

"Influence of Irregular Excitation Upon the 'Ignition' Properties of Phosphors Sensitive to Infrared Rays," L. I. Anikina, V. V. Antonov-Romanovskiy, Phys Inst imeni Lebedev, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol LXXI, No 4, pp 637-640

Aim is to clarify under simplest conditions what influence irregularity of excitation has upon effect of so-called hysteresis in phenomenon of ignition (flashes). Graphs of I vs n ("light-sums"). Submitted 27 Jan 50 by Acad S. I. Vavilov.

175T74

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

CA

Effect of nonuniformity of excitation on the flash properties of infrared sensitive phosphors. L. I. Arakina and V. V. Antonov-Romanovskii (Acad. Sci. U.S.S.R.). *Doklady Akad. Nauk S.S.S.R.* 71, 637-40(1950); cf. *C.A.* 44, 938g.—The hysteresis consisting in a lag of the intensity I observed in the flash produced by exposure to infrared, along the branch of decreasing stored light n, behind the I observed at the same n along the branch of increasing n, i.e. in the course of excitation, may be due to both microheterogeneity of the phosphor, consisting in the presence of centers of different sensitivity to infrared, and to macroheterogeneity, resulting in particular in uneven excitation of different parts of the phosphor. The latter effect was observed on SrS, Cu, Sm, with the optimum concn. of activator. A thick prepn. showed very broad hysteresis, with I of the flash along the branch of descending n very much smaller than along the branch of increasing n. The breadth of the hysteresis loop decreases very markedly in thinner layers, of the order of 0.15-0.20 mm., and is narrowed down still further if the phosphor is excited by illumination with diffuse light from both sides. Under these conditions, the hysteresis all but disappears with a layer ~ 0.01 mm. thick. A simple calcn. shows that nonuniform excitation can result in hysteresis only owing to the nonlinearity of the relation between I and n, namely, $I \sim pn^2$, i.e., because of $I = -dn/dt$, $I \sim pn_0^2/(1 + pn_0t)^2$. There would be no hysteresis if the law were linear. N. Thon

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

1. BLOKHINTSEV, D. I.; ANTONOV-ROMANOVSKIY, V. V.

2. USSR (600)

4. Physics and Mathematics

7. Some Problems in the Theory of Luminescence of Crystals, E. I. Adirovich. (Moscow-Leningrad, State Technical Press, 1951). Reviewed by D. I. Blokhintsev, V. V. Antonov-Romanovskiy, Sov. Kniga, No. 1, 1953.

9. [redacted] Report U-3081, 16 Jan. 1953, Unclassified.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

1. [illegible], [illegible].

2. USSR (600)

4. Phosphors

7. Boosting and quenching influence of the exciting light on crystal phosphors, Izv. AN SSSR, Ser. fiz. 15 No. 5, 1951.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

USSR/Physics - Luminescence, Gamma [illegible] Feb 52
Excitation

"Peculiarities of Gamma-Luminescence of Phosphori," V. V. Antonov-Romanovskiy, Phys Inst imeni Lebedev, Acad Sci USSR

"Zhur Eksper i Teoret Fiz" Vol XXI, No 2, pp 269-274

Comparison of extinguishment curves of phosphorus ZnS-Pb, Cu excited by gamma-rays and photoexcitation revealed that peculiarities of gamma-luminescence are due to irregular distribution of ionized

LC 180T103

USSR/Physics - Luminescence, Gamma Excitation (Contd) Feb 51

glowing centers. Author concludes that ionized glowing centers and addnl electrons appear along path of high-energy electrons generated by gamma-rays and assumes space filled by electrons to exceed that of glowing centers.

LC 180T103

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

CA

3

Particularities of the γ luminescence of phosphors. V. V. Antonov-Rodionovskii (P.N. Lebedev Phys. Inst. Acad. Sci. U.S.S.R., Moscow). *Zhur. Eksptl. Teoret. Fiz.* 21, 269-73(1951).—The green-luminescent phosphor ZnS Pb, Cu, in a layer 1 mm. thick, was excited by γ-rays from Ra (about 50 millicurie) at 10 cm. Growth of the luminescence starts not from zero but from a finite intensity I_0, and the stationary brightness I_∞ is attained in about 6000 sec. On removal of the source, luminescence falls immediately to a low ε_0 which is the initial brightness of the afterglow phosphorescence. As $I_\infty - \varepsilon_0$ is considerably greater than I_0, the excess must be due to practically instantaneous recombination of the high energy electrons which subsist only as long as the γ-excitation is maintained. The total light emitted in natural decay is much smaller than the light stored on 2nd excitation with γ-rays; consequently, in the natural decay, the emission appears to be detd. by recombination of thermal electrons only. Irradiation with infrared, in the presence of the γ-source, produces a flash decaying to a stationary brightness I'_∞; if, at that stage, the γ-source alone is removed, the brightness falls discontinuously to approx. one half. The stationary brightness I'_∞ is a little greater than I_∞, and the light stored in the 1st long excitation with γ-rays, N, is a little smaller than the light, N', emitted in the infrared flash in the absence of, but after preliminary excitation with, γ-rays; $N' = N'_1 + n'_1$, the sum of the light emitted in the infrared flash in the presence of the γ-source, and the light emitted after its removal. Evidently, in excitation with γ-rays alone, the light stored is very much greater than in simultaneous exposure to γ-rays and infrared ($N' \gg n'_1$), and the fraction of thermal electrons taking part in recombination is much greater, hence $I_\infty < I'_\infty$. The kinetics of the decay of I were detd., at different lengths of excitation θ, both in excitation with γ-rays and with light of an intensity so chosen that the brightness of the infrared flash was approx. the same as on excitation with γ-rays of the same duration of θ min. In photo-excitation, doubling θ from 0.5 to 1 min. and from 1 to 2 min. doubles the brightness, which indicates unimol. recombination; between $\theta = 2$ and 4 min., the brightness increases faster than linearly with θ, particularly in the initial stages, which corresponds to a bimol. mechanism, and on further increase of θ satn. sets in. A similar behavior is observed in excitation with γ-rays, except that the curves of log I as a function of log t are steeper. The fact that in the range of longer θ where the recombination is predominantly bimol., the (log I, log t) curves for photo- and γ-ray excitation do not coincide, but intersect, is attributed to uneven vol. distribution of the ionization centers in γ-ray excitation. The difference lies in the capacity of a γ-quantum to ionize a large no. of centers wherever it falls; as a result, ionization centers will be densely distributed along the path of the γ-ray and be absent in the spaces between such channels. At low θ, liberated electrons will also be disposed along discrete nonoverlapping channels, the no. of which will be proportional to θ. Further increase of θ brings about increasing overlapping of the electron channels, and the recombination will increasingly involve more remote electrons diffusing towards the ionization centers from regions where the latter are absent. One should then expect the sharp difference between the curves of photo- and of γ-ray excitation to vanish increasingly at very long θ, where the regions of ionization centers, too, begin to overlap. This was actually observed for very long θ. In this range, $I = At^{-1}$, i.e. in both photo- and γ-ray excitation, the recombination is purely and simply bimol., as could be expected from an increasing uniformity of the vol. distribution of the ionization centers on intense γ-excitation.

N. Thon

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

USSR/Physics - Phosphorescence Kinetics 21 Jul 52

"Concerning the Kinetics of Phosphorescence," V. V. Antonov-Romanovskiy, Phys Inst imeni Lebedev, Acad Sci USSR

"Dok Ak Nauk SSSR" Vol 85, No 3, pp 517-520

States that the main cause for divergence in the views of various authors on the problem of phosphorescence kinetics, as earlier, is the sharp discrepancy in most cases in the forms of exptl curves of extinction, both theoretical and computed on the basis of the simple scheme of bimol reaction according to $dn/dt = -pn^2$, where n is concn of ionized light centers. Discusses the generalized soln of this simple eq. Submitted by Acad G. S. Landsberg 21 May 52.

235T85

235T85

ANTONOV-ROMANOVSKIY, V. V.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

1. ANTONOV-ROMANOVSKIY, V. V.; BLOKHINTSEV, D. I.

2. USSR (600)

4. Crystallography

7. "Problems in the theory of the luminescence of crystals." Ye. I. Adirovich. Reviewed by V. V. Antonov-Romanovskiy, D. I. Blokhintsev. Sov.knigs, no. 1, 1953.

9. Monthly List of Russian Accessions, Library of Congress, April 1953, Uncl.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V.

USSR

Quenching of zinc sulfide phosphors activated by means of cobalt and nickel. V. V. Antonov-Romanovskii, B. B. Bukke, and L. A. Vinokurov. *Zhur. Eksper. i Teoret. Fiz.* 23, 745-8(1953).--The introduction of 10^{-4}-10^{-6} parts Co or Ni activators into ZnS phosphors leads to the appearance of new absorption bands in the red (700-800 mμ) and infrared. The intensities of these new bands depend not only on the concns. of the Co or Ni, but also on the quantity of a 2nd activator, Cu or Ag, in similar amts. The life of the excited state is of the order of 2×10^{-3} sec. F. H. R.

62

1

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V.

USSR/Physics - Luminescence

Card : 1/1

Authors : Alentsev, M. N., Antonov-Romanovskiy, V. V. and Vinokurov, L. A.

Title : Relation between the green luminescence discharge of ZnS-Cu phosphorus and the excitation intensity

Periodical : Dokl. AN SSSR, 96, Ed. 6, 1133 - 1134, June 1954

Abstract : A study of the relation between green luminescence intensity of ZnS-Cu phosphorus and the intensity of the exciting light revealed two types of deviations from the proportionality between these two values. The luminescence intensity during weak excitation increases more rapidly than the proportional intensity of the exciting light. Proportionality exists at a certain interval and further excitation amplification decreases the luminescence intensity of the phosphorus in ratio to the intensity of the exciting light. Four references. Graphs.

Institute : Acad. of S. USSR, The P. N. Lebedev Physics Institute

Presented by : Academician G. S. Landsberg, March 12, 1954

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V.

535.37 535.341 3237

Determination of the Absorption Coefficient of Phosphor Powder. V. V. Antonov-Romanovskiy [illegible] Apr 1954 Vol 26 No 4 [illegible]

[illegible] absorption coefficient is [illegible] the diffuse reflection coefficient, which is defined, and the known linear dimensions of the crystallites and the bulk material refraction coefficient. The theory based on that by Z. Bodó (*Acta phys. hungarica* 1951 Vol 1 No 2 pp 135-150) treats the phosphor layer as a pile of plane parallel homogeneous layers, and is developed for crystals of regular and of irregular form, i.e. one in which total internal reflection can occur. The calculated and experimentally determined results are compared and discussed in detail, actual phosphor layers include crystals of both regular and irregular shape.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

[illegible], V. V., [illegible], M. A., [illegible], I. B., and [illegible], M. S.

"Dosimetry of Ionizing Radiations with the aid of Infrared Stimulable Phosphors".

Physics Institute imeni Lebedev, Academy of Sciences USSR

Report appearing in 1st Volume of "Session of the Academy of Sciences USSR on the Peaceful Use of Atomic Energy, 1-5 July 1955", Publishing House of Academy of Sciences USSR, 1955,

SO: Sum 728, 28 Nov 1955.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V.V.

The dosimetry of radioactive radiations by aid of flashing phosphors. V. V. Antonov-Romanovskii, I. B. Keirim-Markus, M. S. Potoshina, and Z. A. Trapezniková. *Sessiya Akad. Nauk S.S.S.R. po Mirnomu Ispol'zovaniyu Atomnoi Energii, Zasedaniya Otdel. Fiz.-Mat. Nauk* 1955, 342-61 (English summary).—A method of γ-dosimetry is given in which infrared-stimulated phosphors are used, e.g. ZnS-Cu,Pb; SrS-Ce, Sm; SrS-Eu,Sm (I). I was most suitable, therefore it was used to construct a sturdy, portable instrument for the dosage of thermal neutrons, β- and γ-radiation. The work was done mostly with γ-radiation, where the dose was detd. by the brightness of the flash of γ-ray excitation, after the luminescence had been induced with infrared. I showed deep-trap levels and good excitability by hard radiation. This deep-trap level caused a long-time light-sum accumulation up to 10^8, which was the reason why I was selected. The doses registered were between 0.005 and 1000 r. For doses of more than 0.5 r., 2-3 readings were taken. Each reading took about 1/3 min., and there was no relaxation time (delay); the instrument responded spontaneously. The precision was ± 15%; thus this was not an instrument for research but rather for control. For measurements of β-radiation and of thermal neutron flux the instrument must be shielded with Cd envelopes. W. L.

3

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV - ROMANOVSKIY, V.V.

USSR/Optics - Physical Optics.

Abs Jour : Referat Zhur - Fizika, No 3, 1957, 7748 K-5

Author : Antonov - Romanovskiy, V.V., Stepanov, B.I., Fok, M.V., Khamlyuk, A.P.

Inst : Physics Institute, Academy of Sciences, USSR., Physico-Technical Institute of the Academy of Sciences of the Byelorussian.

Title : Luminescence Yield From a System with Three Energy Levels

Orig Pub : Dokl. AN SSSR, 1955, 105, No 1, 50-53

Abstract : The luminescence yield of a system with three energy levels is calculated and it permits resolving the fundamental problem of whether the value of the energy yield φ can exceed unity. Attempts found in the literature of a thermodynamic proof of the impossibility of $\varphi > 1$ are not satisfactory. The energy yield of luminescence of a system with three levels (Pringsheim model) (Pringsheim, P., Journal of Physics, 1949, 10, 495) is calculated

Card 1/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

USSR/Optics - Physical Optics. K-5

Abs Jour : Referat Zhur - Fizika, No 3, 195[illegible], 7748

in detail with allowance for the available thermal radiation in the same way as in the workd listed for a system with two energy levels (Referat Zhur Fizika, 1956, 17898, 23129). A rarefied thin layer of luminescent gas is considered, to make it possible to disregard the reverse reaction of the luminescence on the electron transitions of the radiating systems. It is shown that in the anti-Stokes region ϱ can be greater than unity and that this does not contradict the second law of thermodynamics. The energy of a luminescent body together with the excitation energy is transferred to the surrounding medium, the temperature of which is lower than the temperature of the exciting body. This, as indicated by Pringsheim, is analogous to the action of refrigerator. It is shown that it is possible to have "negative" luminescence, i.e., not an excess above the background of thermal radiation, but a deficiency of radiation, having a finite duration.

Card 2/2 - 44 -

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

USSR/Physical Chemistry - Atom. B-3

Abs Jour : Referat Zhur - Khimiya, No 6, 25 March 1957, 18110

Author : Alentsev, M.N., Antonov-Romanovskiy, V.V., Stepanov, B.I. and Fok, M.V.

Title : Production of Resonance Fluorescence of Atoms.

Orig Pub : Zh. Eksperim. i teor. fiziki, 1955, 28, No 2, 253-254

Abstract : Production of photoluminescense is given by the expression: $q = [(A + Bu_0)n_2 - Bu_0 n_1] / Bs(n_1 - n_2)$, where s is density of energy of exciting light, $(A + Bu_0)n_2$ is complete number of quanta radiated in unit of time, $Bu_0 n_1$ is the number of quanta of black radiation absorbed by the system in unit of time. Denominator shows absorbed surplus of radiation over the background of black radiation. For the quantum production of fluorescence we obtain the expression:
$q = 1/\{1 + (d_0/A)[1 - \exp(-h\nu/kT)]\}$. Quantum production

Card 1/2 - 9 -

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

USSR/Physics - Phosphors FD-3254

Card 1/1 Pub. 146 - 13/44

Author : Antonov-Romanovskiy, V. V.; Vinokurov, L. A.

Title : Decrease in the illumination yield of phosphors during intense excitation

Periodical : Zhur. eksp. i teor. fiz., 29, No 6(12), Dec 1955, 830-833

Abstract : A demonstration that the decrease in the illumination yield of phosphors ZnS-Cu and ZnS-Cu,Co during intense excitation is due in considerable degree to the light-eliciting action of the exciting light and to the fact that recombination of optical electrons or "holes" leads to radiatorless transitions. The authors show that the same causes lead to the fact that the light sum determined from the curve of illumination growth turns out to be considerably less than the light sum determined from the curve of extinguishing. They conclude that the causes for the decrease in the light yield of the phosphor ZnS-Cu,Co outside the region of the so-called plateau are the same as for the phosphor ZnS-Cu, and that for small intensities of the exciting light this decrease is caused by the increase in the role of external extinguishing, while for large intensities it is due to the light-eliciting action of the exciting light. The authors remark that incorrect interpretations of results in studies of extinguishing of ZnS-Cu phosphors by ferrous elements are caused by neglect of phenomena connected with the light-eliciting action of the exciting light. Five references.

Institution : Physical Institute im. P. N. Lebedev, Acad. Sci. USSR

Submitted : June 11, 1955

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV- ROMANOVSKIY, V.V.

Dosimetry of radioactive radiation by aid of flashing phosphors. V. V. Antonov-Romanovskii, I. B. Kvirin-Marcus, M. S. Poroshina, and Z. A. Trapeznikova. Conf. Acad. Sci. U.S.S.R. on Peaceful Uses of Atomic Energy. Session Div. Phys. Math. Sci. 1955, 250-19(Pub. 1956) (Engl. translation).—See C.A. 50, 3114g. B. M. R.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY V.V.

USSR/Physical Chemistry - Crystals B-5

Abs Jour : Referat Zhur - Khimiya, No 2, 1957, 3597

Author : Antonov-Romanovskiy V.V., Vinokurov L.A.

Title : Nature of Luminescence Losses of ZnS-Cu, Co Phosphor in the Region where Output is Independent of Exciting Light Intensity.

Orig Pub : Optika i spektroskopiya, 1956, 1, No 1, 66-70

Abstract : Investigation of correlation between quantum yield q, of ZnS-(Cu, Co) phosphor, and the intensity E of exciting light. The results are analogous to those obtained with pure ZnS-Cu phosphors (RZhKhim, 1955, 23171) with the difference that in the "plateau" region $q \ll 1$, whereas in the case of ZnS-Cu $q \approx 1$. It was found that decrease of q in the presence of Co is due to recombination of free holes with localized electrons. The relative proportion of these recombinations increases sharply after ionization due to the formation of deep electron traps by the cobalt.

Card 1/1 - 38 -

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V.V.

Category : USSR/Optics - Physical optics K-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2362

Author : Antonov-Romanovskiy, V.V., Vinokurov, L.A.
Inst : Physics Inst., Acad. of Sciences USSR

Title : Kinetics of the Glow of the ZhS-Cu, Co Phosphor in the Region where the Glow Yield is Independent of the Intensity of the Exciting Light.

Orig Pub : Optika i spektroskopiya, 1956, 1, No 1, 71-76

Abstract : Continuing their work, (see Abstract 2361), the authors show that the inequality of the light sums, computed from the curves for the flareup and extinction of the glow, observed in the region where the glow yield is independent of the intensity of the exciting light ("plateau" region) for the ZnS-Cu, Co phosphor, is caused by the change in the distribution of electrons and the holes over capture levels of various depths, occurring during the time of the flareup. The temperature shift of the "plateau" region was used to estimate approximately the depth of the deepest electron and hole traps ε^- and ε^+. The results were: $\varepsilon^-_{Cu} \approx \varepsilon^+_{Cu} \approx 0.33$ ev, $\varepsilon^+_{Cu,Co} \approx 0.35$ ev, $\varepsilon^-_{Cu,Co} \approx 0.44$ ev. Since $\varepsilon^+_{Cu,Co} \approx \varepsilon^+_{Cu}$, the deepest hole-capture levels are the same in the ZnS-Cu and ZnS-(Cu,Co) phosphors. Apparently these levels are the unionized glow centers of Cu. The reduction in the luminescence yield outside the "plateau" in the case of weak excitation is attributed to the increase in the role of the relatively small amount of particularly deep electron and hole traps, which increase sharply the fraction of the non-radiating recombinations.

Card : 1/1

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V.V.

313, 300, and 435 mμ was identical with the luminescence spectrum and contained 2 bands, 654 and 652 mμ. After an excitation [illegible] the afterglow spectrum of I was obtained with a phosphoroscope in intervals of 0.01 and 0.1 sec. [illegible]

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY V.V.

Drop in luminescence efficiency of phosphors on intensive excitation

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V.V.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Antonov-Romanovskiy, V.

51-4-18/26

AUTHORS: Antonov-Romanovskiy, V. V. and Galanin, M. D.

TITLE: On a Theoretical Derivation of the Decay Law of Luminescence for the Case of Resonance Quenching. (O teoreticheskom vyvode zakona zatukhaniya lyuminestsentsii pri rezonansnom tushenii.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr.4. pp.389-391. (USSR)

ABSTRACT: B. Ya. Sveshnikov (Ref.1) criticised a theoretical derivation of the decay law of luminescence in the case of concentration (or more generally, resonance) quenching given in Refs. 2, 3 by Förster and Galanin respectively. These criticisms of Sveshnikov are based on a misunderstanding. The present authors derive the decay law in greater detail. The present derivation is based on a method proposed by one of the authors (Ref.4). It is assumed here that luminescent quenching in solution occurs due to induction-resonance transfer of the excitation energy from the excited to non-excited molecules. If viscosity of the medium is sufficiently great to neglect

Card 1/4

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

51-4-16/26

On a Theoretical Derivation of the Decay Law of Luminescence for the Case of Resonance Quenching.

decay law - (Eq.6 on p. 390)

$$n(t) = n_0 e^{-\frac{t}{\tau_0} - 2q\sqrt{\frac{t}{\tau_0}}},$$

where q is a constant which depends on R_0, and R_0 is a constant which depends on the properties of interacting molecules; τ_0 is the average lifetime of the excited state in absence of quenching. The decay law quoted above (Eq.6 on p.390) is identical with that obtained by Förster (Ref.2). The authors deal also with Sveshnikov's criticisms of Förster's work. In particular the authors show that Sveshnikov's formula given by Eq.8 in the present paper is identical with Förster's formula, given by Eq.7 on p.391, when the number of excited molecules at zero time is sufficiently large. There are 4 references, 3 of which are Slavic.

Card 3/4

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V.V.; FOK, M.V.

On E.I. Adirovich's "On the theory of luminescence of crystals." Opt. i spektr. 3 no.4:407-408 O '57. (MIRA 10:11)

1. Fizicheskiy institut im. P. N. Lebedeva AN SSSR.
(Luminescence)
(Crystal--Optical properties)
(Adirovich, E.I.)

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V.V.

51-6-7/25

AUTHOR: Antonov-Romanovskiy, V. V.

TITLE: On the Diffusion Theory of Phosphorescence. (O diffuzionnoy teorii fosforestsentsii.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr. 6, pp.592-601. (USSR)

ABSTRACT: A theoretical paper. The present author has shown earlier (Refs.1,2) that, if the mean free path of an electron in the conduction band is of the same order as the lattice constant, then the kinetics of phosphorescence decay may be described by a linear diffusion equation (Eq.2 on p.592) which takes into account attraction of electrons by ionized centres. The author applies this equation to the case of a phosphor which has electron traps of only one type (one depth), when the probability of repeated capture of electrons is much higher than the probability of their recombination, and only a small proportion of traps is filled with electrons. This case is mathematically equivalent to the case when traps of several types are present but the electron distribution in them does not change during phosphorescence decay.

Card 1/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

Antonov-Romanovskiy V.V.

SUBJECT: USSR/Luminescence 48-4-3/48

AUTHOR: Antonov-Romanovskiy V.V.

TITLE: New Results in the Field of Phosphorescence Investigations (Novyye rezul'taty v oblasti issledovaniya fosforestsentsii)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21, #4, pp 484-493 (USSR)

ABSTRACT: There are three main lines of investigations in the study of luminescence of crystallophosphors:

1. The study of the nature of luminescence and capture centers.
2. The study of luminescence kinetics, and
3. The study of energy balance.

The nature of luminescence and capture centers.

Krivoglaz (2) investigated the shape and temperature-dependence of absorption bands and luminescence of impurity centers. Theoretical results agree well with experimental data.

Two directions in studying the nature of luminescent centers are developed in the Soviet Union: the first, founded by

Card 1/4

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

48-4-3/48

TITLE: New Results in the Field of Phosphorescence Investigations (Novyye rezul'taty v oblasti issledovaniya fosforestsentsii)

haloid phosphors by the author (17).

There are new results in determination of localization energy of electrons and holes. Lushchik (4) developed a new method of thermal decolorization.

Bohun and Lepper (19) discovered independently a close connection between the course of thermal emission and the course of thermal de-luminescence curve. Peaks in one curve correspond to peaks in the other under uniform heating of the phosphors.

Eliashberg (21) showed that the curves of brightness fading differ in shape from the second-order hyperbolas, especially in the beginning.

Energy balance in luminescence.

The yield q in recombination luminescence as a rule depends on the intensity E of exciting light. Alentsev et al. (22) found for the ZnS-Cu-phosphor that q is constant for medium E and has a maximum value which then falls off to both sides.

Card 3/4 Similar experiments were carried out by Vinokurov and

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

48-4-3/48

TITLE: New Results in the Field of Phosphorescence Investigations (Novyye rezul'taty v oblasti issledovaniya fosforestsentsii)

author (23) for the ZnS-Cu, Co-phosphor at various temperatures.

Vinokurov and Fok (25) showed for ZnS-Cu and ZnS-Cu, Co phosphors that some regularities in yield reduction at a decrease of exciting light intensity could be explained by the mechanism of external quenching.

The problem of sensitization of luminescence is closely connected with the yield problem. Some results secured by Shchukin (26) in his experiments indicate the existence of sensitization process.

The bibliography lists 29 references, of which 20 are Slavic.

INSTITUTION: Physical Institute im. Lebedev of the USSR Academy of Sciences

PRESENTED BY:

SUBMITTED: No date indicated

AVAILABLE: At the Library of Congress.

Card 4/4

ABSTRACT: In his introductory speech to the subsequent reports on electroluminescence the author outlined briefly the history of the discovery and development of the electroluminescence phenomenon.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

[illegible]ting search on this subject;

1. The application for investigations of the brightness waves of luminescence not only sinusoidal pulses of voltage, but also square pulses. The latter have an advantage in that they make it possible to separate the influence of the magnitude of voltage from the influence of its time derivative.

2. In the theoretical analysis of the action of electrons and holes, the qualitative difference between energy-dependence of recombination probability and probability of capturing

Card 1/2

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

48-5-37/56

TITLE: Introductory Speech (Vstupitel'noye slovo)

electrons (or holes) is taken into consideration. This dependence follows directly from the diffusion theory of phosphorescence decay.

Three references are cited, of which 1 is Russian.

INSTITUTION: Not indicated

PRESENTED BY:

SUBMITTED: No date indicated

AVAILABLE: At the Library of Congress

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

ANTONOV-ROMANOVSKIY, V. V.

"Some Experimental Results on Electroluminescent Zinc sulphide Powders and Single Crystal.

paper presented at the Intl. Conf. on Solid State Physics in Electronics and Telecommunications, Brussels, 2-7 June 1958.

Physical Inst., Acad. Sci. USSR, Moscow.

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

SOV/51-5-4-21/21

AUTHOR: Antonov-Romanovskiy, V.V.

TITLE: On the Paper of F.I. Vergunas and L.R. Krasovskaya (Po povodu stat'i F.I. Vergunas i L.R. Krasovskoy)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 4, p 484 (USSR)

ABSTRACT: Complete translation. F.I. Vergunas and L.R. Krasovskaya state in their paper "Decay of afterglow of ZnS-Cu phosphors in log I, log t, and log I, log (1 + pt) coordinates" that my criticism (Ref 1) of E.I. Adirovich's decay theory (Ref 2) is unfounded. These authors write: "comparison of theory with experiment, made in Ref 2 (i.e. in my critical note - V.V. A.-R.) is not correct". In my criticism of Adirovich's book I used only those experimental results which were used by Adirovich himself to show that his calculations were correct. I showed, in the same way as it was done by Vergunas and Krasovskaya, that comparison given by Adirovich is incorrect. Vergunas and Krasovskaya also say: "in experiments one should use, if possible, an "ideal model" for which this law was obtained". I did show in my criticism that Adirovich's error consists in his statement that his calculations are applicable to real phosphors which are not

Card 1/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

On the Paper of F.I. Vorgunas and L.R. Krasovskaya SOV/51-5-4-21/21

special cases. I conclude that Vorgunas and Krasovskaya came finally to the same conclusion which I reached several years ago. It is not clear, however, why they apply their criticisms to me and not to Adirovich (the decay formula of Adirovich was also deduced by Allickson and Parker (Ref 3)) References: (1) V.V. Antonov-Romanovskiy, "Soviet book", Vol I, 16 (1953); (2) E.I. Adirovich, "Certain Problems of the Theory of Luminescence of Crystals", Gostekhizdat, Moscow-Leningrad (1951); (3) R.T. Ellickson and W.L. Parker, Phys. Rev. Vol 70, 290, (1946).

Card 2/2 1. Phosphorescent decay--Theory 2. Phosphors--Properties

USCOMM-DC-55896

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

5(0),24(0)

AUTHOR: Antonov-Romanovskiy, V. V. SOV/30-59-10-22/51

TITLE: News in Brief. International Conference on the Physics and Chemistry of Crystal Phosphors

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 10, p 87 (USSR)

ABSTRACT: This conference was organised by the Subcommittee for Luminescence of the Department of Physical Sciences of the German Academy of Sciences in Berlin and the Institute of Physical Chemistry of E. M. Arndt University and held at Greifswald (Eastern Germany) from April 26 to April 29, 1959. Scientists from the Soviet Union, Hungary, Poland, Czechoslovakia, France and Switzerland participated. G. Witzmann and G. Ortmann and collaborators (Eastern Germany) reported on some properties of phosphors. K. B. Bär (Eastern Germany), V. Ye. Oranovskiy, B. A. Khmelinin (USSR) and Z. Bodo (Hungary) spoke about the electroluminescence of various monocrystals. A. Bohun (Czechoslovakia), Ch. B. Lushchik (USSR) dealt with alkalihaloid compounds of phosphors. Moreover, the reports by A. Balarin, K. Friedrich and L. Herfors (Eastern Germany) and P. Jaszczin (Poland) are mentioned here. The author of the present paper spoke on the kinetics of the annealing of phosphors under special conditions.

Card 1/1

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

SOV/51-6-2-16/39

AUTHOR: Antonov-Romanovskiy, V.V.

TITLE: On Relaxation of Electroluminescence After Small Departures From the Steady State (O relaksatsii elektrolyuminestsentsii pri malykh otkloneniyakh ot statsionarnogo sostoyaniya)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 2, pp 229-231 (USSR)

ABSTRACT: An electroluminescent system sooner or later relaxes to its steady state. For small initial departures of the system from its steady state the author calculates relaxation curves in their most general form, i.e. not considering the nature of the electroluminescent emission mechanism. He obtains, inter alia, a formula which gives the difference between the excited (n) and steady state (n_∞) electron densities.

$$\Delta n = n_t - n_\infty = \Delta n_0 e^{-\frac{t}{\mu\tau}} \qquad (7)$$

where $\Delta n_0 = \Delta n$ at time $t = o$, μ is a positive non-dimensional constant, and τ is the excited-state lifetime. Using Bukke, Vinokurov and Fok's data on electroluminescence relaxation in the ZnS-Cu,Cl phosphor (Ref 1), the author calculated, using his own theoretical formulae, the value of τ. This value was found to be 7-16 sec in the presence of an electrical field, compared with $\tau \sim 0.5$ sec measured directly during relaxation (no electric field) by Bukke et al. (Ref 1). This

Card 1/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

SOV/51-6-2-16/39

On Relaxation of Electroluminescence After Small Departures From the Steady State

discrepancy may be due to an increase of the electron energies produced by the applied electric field. The effective recombination cross-section of electrons decreases strongly with their energy and consequently the electron lifetime is lengthened. Acknowledgments are made to M.V. Fok for his advice. The paper is entirely theoretical. There are 3 Soviet references.

SUBMITTED: April 15, 1958

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

SOV/51-6-2-37/39

AUTHOR: Antonov-Romanovskiy, V.V.

TITLE: Papers on Luminescence Published in 1955-1958 in Collections "Trudy Instituta Fiziki i Astronomii Akademii Nauk Estonskoy SSR" (Nos. 1, 3, 4, 6 and 7). (Raboty po lyuminestsentsii, opublikovannyye v 1955-1958 gg. v sbornikakh "Trudy Instituta fiziki i astronomii Akademii nauk Estonskoy SSR" [NoNo 1, 3, 4, 6 i 7])

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 2, pp 269 (USSR)

ABSTRACT: "Trudy Instituta fiziki i astronomii Akademii nauk Estonskoy SSR" began to appear in 1955 in Tartu. Some of the issues of this serial deal exclusively with luminescence. The papers published in "Trudy" deal mainly with kinetics of phosphorescence, nature of emission and capture centres, structure of phosphors (chiefly alkali-halide phosphors) and experimental techniques. The papers deal also with additional absorption produced by excitation of phosphors and subsequent luminescence. A new technique of study of this phenomenon was described: a method of thermal bleaching which makes it possible to observe directly the change of concentration of localized charges with time. Structure of emission centres, mechanisms of excitation in which excitons were important and ionic processes were dealt with. Many

Card 1/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

SOV/51-6-2-37/39

Papers on Luminescence Published in 1955-1958 in Collection "Trudy Instituta Fiziki i Astronomii Akademii Nauk Estonskoy SSR" (Nos. 1, 3, 4, 6 and 7)

papers dealt with the structure, formation and activation of phosphors. Several papers reported studies of the effect of deformation of the lattice, hydrostatic pressure and infrared irradiation on luminescence. The papers also considered zinc sulphide, alkaline earth, ammonium halide and other phosphors. All these papers are of high scientific standard.

Card 2/2

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"

"APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5

SOV/51-7-3-14/21

AUTHOR: Antonov-Romanovskiy, V.V.

TITLE: The Initial Stages of Decay in Phosphors with Levels of Several Types

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 3, pp 376-383 (USSR)

ABSTRACT: The author considers decay of phosphorescence in the presence of levels of several types. The problem is very complex because of non-linearity of the corresponding kinetic equations. It is shown that, under certain conditions, the decay curve in the initial stages can be represented as a sum of exponentials provided that the probability of repeated capture of free charges is higher than the probability of their recombination with localised charges and provided there is no saturation. The paper is entirely theoretical. There are 3 Soviet references.

SUBMITTED: December 26, 1958.

Card 1/1

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000101810005-5"