

Seminar on the Automatic Control Theory in Leningrad.
(1955-1956)

103-10-9/10

On November 1, 1956, A.A.Voronov discussed a method of approximation for the determination of the stabilization process of self-oscillations in some linear systems.

On November 29, 1956, A.D.Maksimov discussed the "Precision of the First Approximation in the Case of a Linearizing Action of the Non-Linear Automatic Systems by Means of Vibration".

AVAILABLE: Library of Congress

Card 2/2

VOROSHILOV, Metislav Sergeevich; SOKOLOV, T.N., prof., doktor
tekhn. nauk, retsenzent; SOKOLOV, O.A., inzh., red.;
CHFAS, M.A., red.izd-va; SHCHETININA, L.V., tekhn. red.

[Elements of numerical program control systems for machine
tools] Elementy sistem tsifrovogo programmno upravleniia
metallorezhushchimi stankami. Moskva, Mashgiz, 1963. 243 p.
(MIRA 16:7)

(Machine tools--Numerical control)

SOKOLOV, T.P.

LENDKVIST, B.A., inzhener; SOKOLOV, T.P., inzhener.

Combining air-intake ducts with the construction elements of a
boiler room. Elek. sta. 26 no.1:48-49 Ja '55. (MIRA 8:3)
(Steam boilers)

PATRUSHEV, P.A., inzh.; SMIRNOV, L.A., inzh.; SOKOLOV, T.P.; SHUL'MAN, Ye.I.

Combining assembly and transportation of the blocks of a PK-33-83EF
boiler. Energ. stroi. no.20:114-120 '61. (MIRA 15:1)

1. Proyektnoye byuro Montazhnogo upravleniya "Uralenergmontazh"
(for Patrushev, Smirnov). 2. Montazhnoye upravleniye "Uralenergo-
montazh" (for Sokolov). 3. Moskovskiy filial instituta "Orgenergo-
stroy" (for Shul'man).

(Boilers)

TSIMBLER, I.V., prof., SOKOLOV, T.S., kand.med.nauk, KHOMITSKAYA, T.A.

Coli enteritis in nursing infants. [with summary in English]
Pediatria 36 no.5:3-10 My'58 (MIRA 11:6)

1. Iz kliniki patologii rannego detskogo vozrasta (zav. - prof.
I.V. TSimbler) Instituta pediatrii AMN SSSR (dir. - prof. O.D.
Sokolova-Ponomareva).

(INFANTS--DISEASES)
(INTESTINES--DISEASES)

SOKOLOV, V.

Conquerors of fire. Nauka i zhyttia 12 no.5:19-20 My '62.
(MIRA 15:7)

(Electric welding)

SAPOZHENKO, Yu.F.; SOKOLOV, V.

Winter ornithofauna of Repetek. Ornitologiya no.4:194-199 '62.
(MIRA 16:4)

(Repetek region--Birds)

SOKOLOV, V.

Production is the laboratory of science. Nauka i zhyttia 12 no.6:15-
17 Je '62. (MIRA 15:7)
(Ukraine--Agricultural research)

SOKOLOV, V., inzh.

Standardizing propellers and oil pipes. Rech. transp.
21 no.12:30-31 D '62. (MIRA 15:12)
(Propellers)

SOKOLOV, V. (UA3AKK)

Radio transmitter for operation on 28 and 144 mc. Radio no. 73
19-22 J1, '62. (MIRA 16:6)

(Radio Transmitters and transmission)

SOKOLOV, V. (UA3AKK)

Tuning of a shortwave superheterodyne receiver using a heterodyne
resonance indicating device. Radio no.4:22-24 Ap '64.
(MIRA 17:9)

SOKOLOV, V., inzh.-stroitel' (Kaluga)

Anchors adapted for settling. Zhil.-kom. khoz. 12 no.1:16
Ja '62. (MIRA 15:6)
(Concrete walls--Maintenance and repair)

SOKOLOV, V.; CHERNUSHKIN, A.

A severe climate is no hindrance. Okhr.truda i sots.strakh. 5
no.12:8-9 D '62. (MIRA 16:2)

1. Zaveduyushchiy otdelom sotsial'nogo strakhovaniya
Taymyrskogo okruzhnogo komiteta professional'nogo soyuza
rabochikh metallurgicheskoy promyshlennosti (for Sokolov).
2. Doverennyy vrach Krasnoyarskogo krayevogo soveta professional'
nykh soyuzov (for Chernushkin).
(Noril'sk--Industrial hygiene)

BELOV, A.; DIKHTYAR, G.; SOKOLOV, V.

"Trade economics." Reviewed by A. Belov. Vop.ekon. no.1:123-
128 Ja '63. (MIRA 16:2)
(Russia--Commerce)

SOKOLOV, V., kand.tekhn.nauk

Road-construction workers and innovators. Avt.dor. 25 no.8:9-10
Ag '62. (MIRA 16:2)
(Road construction--Technological innovations)

ВАРШАВСКАЯ [Warsaw, P.] 1949. V.

on scientific synchronization. Trudy BIA 17 no. 5:516-518 '64

1. Submitted by Corresponding Member [Nateva, V.]

SOKOLOV, V., agronom (Belorechenskiy rayon Krasnodarskogo kraya)

San José scale can be exterminated. Zashch. rast. ot vred. i bol.
10 no.1:43-44 '65. (MIRA 18:3)

SOKOLOV, V. (Voronezh)

Before putting on shoulder straps. Voen.-znan. 41
no.12:31 D '65. (MIRA 18:12)

BULGARIA

VARBANOVA, A., SOKOLOV, V., Institute of Physiology, Bulgarian Academy of Sciences

"The Afferent Background Vagal Impulses"

Sofia, Doklady Bolgarskoy Akademii Nauk, Vol 19, No 1, 1966, pp 73-76

Abstract [English article]: The problem of the spontaneous activity in the sense organs is one of the most interesting and at the same time least investigated ones. To study the problem more closely, the author carried out acute experiments with 35 cats immobilized with tricuran. The different activity passing through n.vagus was led over a silver electrode put on the distal end of one of the nerves in the region of the neck. A platinum electrode was placed for stimulation over the other (intact) n.vagus. Besides that, using a stereotaxic apparatus the authors introduced subcortical electrodes in nuc. ventralis post. lat. ed. med. thalami (specific thalamic representation for the stomach and n. vagus) and in form. reticularis mesenceph. Epidural silver electrodes were also placed in gyr. sygmoideus ant. et post. (cortical representation of the stomach). The leads were bipolar with 2 mm distance between the electrodes. The stomach was stimulated mechanically by the distention of a balloon introduced through the oesophagus. Results, presented in the form of numerous oscillograms indicate that 1) there

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ACC NR: AP6035990

thalami, gyr. sigmoides ant. et post.), as well as in form. reticularis mesenceph., nucl. ventr. ant. th., hypothal. ventromed., hippoc. and optic cortex. Continuous distention of the stomach of cats with a rubber balloon through Bassow's fistula with a pressure of 10 mm Hg leads to considerable changes in the background bioelectrical activity of the brain. Experimental results and the ensuing discussion show that by their nature and properties the interoceptive impulses are particularly adapted to take an active part in the formation of the background brain rhythm. This paper was presented by Corresponding Member D. Mateyev on 16 November 1964. Orig. art. has: 3 figures and 2 tables. [JPRS]

SUB CODE: 06 / SUBM DATE: 16Nov64 / ORIG REF: 001 / SOV REF: 003
OTH REF: 005

Card 2/2 *hh*

S. K. Lee, U.A.

23(0) PHASE I BOOK EXPLOITATION 80M/3065

Искусственные спутники земли, вып. 3 (Artificial Earth Satellites, No. 3) Moscow, Izdatvo Akademi nauk SSSR, 1959. 125 p. 5,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR.

Исп. ред.: Л.В. Курасова; Изд. of Publishing House: Л.В. Самосенко; Тех. ред.: Ю. Рылина.

PURPOSE: This collection of articles is the third in a series intended to disseminate data collected from artificial earth satellite investigations to scientists.

COVERAGE: This collection of articles deals with various problems arising in the operation of artificial satellites. The papers also cover the use of artificial satellites as scientific instruments for various types of geophysical investigations.

- 4. Бетраков, Ю.В., and Y.P. Prokhorin. On Perturbations in the Orbits of Artificial Satellites Caused by the Resistance of the Air 39
- 5. Vakhnin, V.M., and V.Y. Bol'shevik. Observation of Artificial Satellites Using the Anticipation Method (sered obitaniya) 47
- 6. El'yashovik, P.Ya. Secular Variations of Orbit Elements as a Function of the Resistance of the Air 54
- 7. Lavrent'yev, M.A. Problem of Fracture at Cosmic Speeds 61
- 8. Gribanovskiy, I.S., and Y.G. Khar'kov. Determination of the Density of the Atmosphere at an Altitude of 150 km by the Method of Sodium-vapor Diffusion 66
- 9. Jeyranlyan, L.H., and Ya.M. Shvarts. Methods of Preventing Interference Currents Arising at the Point of Impact of an Electrostatic Fluorometer During Operation in a Conductive Medium 77
- 10. Mikhnerich, V.E., R.S. Dvulin, A.I. Rogov, and V.A. Sokolov. Some Results in Determining the Structural Parameters of the Atmosphere With the Aid of the Third Soviet Sputnik 84
- 11. Istomin, V.O. Radio-frequency Mass Spectrometer for Investigation of the Ion Composition of the Upper Atmosphere 98
- 12. Ruchay, G.A. Manometer Error Caused by Small Leaks in the Envelope of an Artificial-Satellite 113
- 13. Zinov, J.B.V. On the Problem of Interaction of an Artificial Satellite and the Magnetic Field of the Earth 128

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29(2,5)

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S/025/60/000-03/004/045
D048/D002

AUTHOR: Sokolov, V.A., Engineer

TITLE: A Photograph from Space ²⁰

PERIODICAL: Nauka i zhizn', 1960, ²¹ Nr 3, pp 8 - 10 (USSR)

ABSTRACT: The author refers to the interplanetary ²¹ automatic station sent into space on 4 October 1959, which was able to transmit an image from a distance of 470,000 km to the Earth. He explains television in general and transmission under cosmic conditions in particular. A diagram shows a sweep system with a translucent tube which transformed the optic image into an electric signal. The process is described in detail. ²¹ The photographing of the invisible side of the Moon was performed upon command from Earth. This system is also called "flying spot system". In the TV transmission from the interplanetary station, a mixed sweep system was applied. The

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SOKOLOV, V.A. inzh.

Satellite space ship speaking. Nauka i zhizn' 27 no.8:4-9 ag
'60. (MIRA 13:9)
(Telecommunication) (Space flight)

SOKOLOV, V.A., nauchnyy sotrudnik

Milestones of a great journey. Nauka i zhizn' 28 m. 5:8-12 My '61.
(MIRA 14:6)

1. Akademiya nauk SSSR.
(Astronautics)

33616

S/025/62/000/002/001/002
D299/D304

6,3000

AUTHORS: Sokolov, V. A. and Ivanov, Yu. F., Scientific Associates, Academy of Sciences, USSR

TITLE: Starship calling Earth. Super-long distance communication with a spaceship

PERIODICAL: Nauka i zhizn', no. 2, 1962, 13-19

TEXT: The authors discuss the difficulties of long-distance communications in space, dictated by the immense distances involved and the background of radio-frequency emission from the stars. Space is least filled with radio waves with a length measured in tens of centimeters. Radio communication should, therefore, be based on this wavelength. Directional antennas of the parabolic reflector type should be used. An antenna of this type was installed on the automatic interplanetary station launched in the direction of Venus. For radio communication between Venus/Mars and Earth the radio waves must be concentrated into the tightest possible beam. The greater the relation of the antenna's mirror area to the wave-

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D299/D304

Starship calling Earth. ...

in late 1960, is given. This particular laser used ruby with an admixture of chrome as a light generator and amplifier. Lasers have also been built of calcium fluoride with an admixture of uranium or samarium. With a laser using potassium vapors at low pressure it is intended to create a light beam with a width of some ten-thousandths of a degree. In the near future it is intended to create a beam with a width of only a few hundred-thousandths of a degree. Due to the absence of moisture and dust particles in space - factors which scatter light - lasers would not have to be particularly powerful. For flights to Mars and Venus the whole space communications apparatus would be of pocket size and could be powered from the sun by a collector system. A beam of red light from a ruby laser could be trained on an artificial satellite and the considerable light pressure from this beam used to correct its orbit. Ruby lasers can also be used as light amplifiers. When illuminated with green light from a special lamp the chrome ions will eventually assume a stable medium energy level. Subsequent illumination with weak red light will cause an instantaneous red flash of greatly enhanced brilliance. Astronomers could use this for stu-

Card 3/4

SOKOLOV, V.A.; VYSOTSKIY, V.A.; KONDRATYUK, M.I.

Automatic system for the regulation of the temperature of
fermentation. Ferm. i spirit.prom. 30 no.4:26-30 '64.
(MIRA 18:12)

1. Pishchepromavtomatika (for Sokolov). 2. Andrushevskiy
spirtovoy zavod (for Vysotskiy, Kondratyuk).

SLAVIN, G.Yu., Inch.; SERGEEV, V.A., Inch.; GOLITSIN, L.A., Inch.;
USACHEN, M.G., Inch.

Compressor with graphite packing. Ekim. 1 left. mashinost. no.4:
7-9 0 164. (MIRA 17:12)

RODINOV, B.N.; SOKOLOV, V.A., prof., red.

[Conjugate or auto-oscillation quantum mechanics and its
relativistic foundations] Sopriazhennaia, ili avtokolebatel'-
naia kvantovaia mekhanika i ee relativistskie osnovy. Tomsk,
Tomskii politekhn. in-t, 1965. 110 p. (MIRA 18:4)

VARVARICHEV, A.A.; ZARUBIN, L.M.; SOKOLOV, V.A.

Casting cylinder sleeves in a green sand mold with a shell core.
Avt. prom. 31 no.3:39-40 Mr '65. (MIRA 18:7)

1. Yaroslavskiy motornyy zavod.

CHLISHCHEV, B.A., inzhener; SOKOLOV, V.A., inzhener.

Selection of automatic-cycle control circuits. Vest.mash. 35
no.10:3-9 0 '55. (MIRA 9:1)
(Machinery, Automatic) (Automatic control)

44285-65 EWI(a)/EWP(v)/EWP(k)/EWP(h)/EWP(1) Pf-4 GS

ACCESSION NR: AT5011615

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33
32
B+1

AUTHOR: Netushil, A. V., Polivanov, K. M., Zharkov, F. P., Sokolov, V. A.

TITLE: Some peculiarities of the auto-oscillations in nonlinear automation elements

SOURCE: Vsesoyuznoye soveshchaniye po magnitnym elementam avtomatiki, telemekhaniki, izmeritel'noy i vychislitel'noy tekhniki, Lvov, 1962. Magnitnyye elementy avtomatiki, telemekhaniki, izmeritel'noy i vychislitel'noy tekhniki (Magnetic elements of automatic control, remote control, measurement and control engineering); trudy soveshchaniya, Kiev, Naukova dumka, 1964, 421-430

TOPIC TAGS: nonlinear automation element, multicycle oscillation period, parametric system oscillation, nonlinear oscillation, autooscillation, automatic control system, induction parametron

ABSTRACT: According to the modern theory of nonlinear system eigen oscillations (see, e.g., N. N. Bogolyubov, Yu. A. Mitropol'skiy, Asimptoticheskiye metody v teorii kolebaniy, Fizmatgiz, M., 1958), the behavior of the system often depends on the initial deviation from the equilibrium position. Nevertheless, this fact is often neglected during discussions of nonlinear elements utilized in automation devices, while, in actuality, such elements may have more than one eigen oscillation mode. It is shown in this article that

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ACCESSION NR: AT5011615

one of the types of oscillation may sometimes occur only for initial deviations within a definite, quite narrow zone. The analysis of the discrete optimizer carried out by one of the authors (A. V. Netushil) showed the possibility of existence of stable eigen oscillations whose period contains not just two but several cycles. Such multicycle (four-cycle) oscillations possess definite associated criteria for their existence and require a specified initial elongation from the equilibrium position for their excitation. An analysis of the induction parametron (E. Goto, PIRE 1969, no. 8, 1304) shows that it can maintain a second level of parametric resonant oscillations distinct in amplitude from the first level oscillations. The probability pattern of the integral curves within the Van der Pohl plane indicates that this second level may be excited only by a fully defined sufficiently large initial displacement. All theoretical predictions have been confirmed by experiment (induction parametron) and the results of analog computer simulation. One should expect that higher oscillation levels will also be discovered in other parametric systems. Orig. art. has: 21 formulas and 12 figures.

ASSOCIATION: Kafedra teoreticheskikh osnov elektrotehniki MEI (Department of the Theoretical Foundations of Electrical Engineering, MEI)

SUBMITTED: 29Sep64

ENCL: 00

SUB CODE: IE, EC

NO REF SOV: 012

OTHER: 003

Card

2/2

398

L 50205-65 EWT(1)/EWA(h) Feb

ACCESSION NR: AP5008680

S/0144/65/000/002/0187/0194

681.142+621-52.

AUTHOR: Sokolov, V. A. (Assistant of department for theoretical bases of electrical engineering)

11
9
B

TITLE: Investigation of a film-type parametron by means of an analog computer

SOURCE: IVUZ. Elektromekhanika, no. 2, 1965, 187-194

TOPIC TAGS: parametron, film parametron

ABSTRACT: The results of simulating a thin-film parametron on a MN-7 Soviet-made analog computer are reported. The simulation was based on an equivalent circuit that represented the magnetization-vector rotation (in a sufficiently strong field). The parametron natural frequency was assumed within 10^7-10^9 per sec. These fundamental equations were set up in the computer:

$$\left\{ h_x + \frac{r}{L} \int h_x dt + \frac{1}{LC} \int \int h_x dt dt = - \frac{A}{L} \sin \varphi \right.$$

$$\left. \frac{d\varphi}{dt} = h_x \cos \varphi - h_y \sin \varphi \right\}$$

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ACCESSION NR: AP5008680

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where h_s and h_x are the components of the parametron field, $A = \frac{\omega_s^2}{l_s^2} \mu_0 M_0 V$, ω_s is the number of turns in the resonance winding, l_s is the length of an average magnetic line, V is the film volume; $b = \alpha/\gamma$, α is the relaxation factor, γ is the magneto-mechanical ratio. Both stationary and transient operating conditions were studied. Apparently, the upper usable frequency is somewhere between 120 and 150 Mc (for 80% Ni and 20% Fe films). "In conclusion, the author wishes to thank K. M. Polivanov for his valuable hints and attention to the work." Orig. art. has: 11 figures and 14 formulas.

ASSOCIATION: Moskovskiy energeticheskiy institut (Moscow Engineering Institute)

SUBMITTED: 08Apr64

ENCL: 00

SUB CODE: EC, DP

NO REF SOV: 005

OTHER: 000

me
Card 2/2

SOKOLOV, V.A.

Seminars for workers of the metal-cutting tool industry.
Mashinostroitel' no.6:46 Je '60. (MIRA 13:8)
(Gorkiy--Technical education)

SOKOLOV, V.A. (Rostov-na-Donu)

Transient processes in a magnetic amplifier with feedback and
inductive load connected through a rectifier. Avtom. i
telem. 22 no.6:807-810 Je '61. (MIRA 14:7)
(Magnetic amplifiers)

KOVAL'CHUK, N.I.; BEL'N, I.V.; SOKOLOV, V.A. (Moskva)

Experimental study of the thyroid function with I^{131} . Med. rad. 9
no.8:31-33 Ag '64. (MIRA 18:4)

LAVRENT'YEV, A.M., akademik; RABOTNOV, Yu.N., akademik; RZHANOV, A.V.;
VOROB'YEV, A.A., prof.; KUZNETSOV, Yu.A.; SOKOLOV, V.A., prof.

Vladimir Dmitrievich Kuznetsov, 1887-1963; an obituary.
Izv. SO AN SSSR no.2. Ser. tekhn. nauk no.1:142-143 '64.
(MIRA 17:8)
1. Chleny-korrespondenty AN SSSR (for Rzhhanov, Kuznetsov).

SOV/124-58-5-5860

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 5, p 132 (USSR)

AUTHOR: Sokolov, V.A.

TITLE: On the Problem of Considering the Dynamic Loads Caused by Railroad Rolling Stock in the Calculation of the Stability of Earth Roadbed Slopes (K voprosu ucheta dinamicheskikh nagruzok ot podvizhnogo sostava pri raschete ustoychivosti otkosov zemlyanogo polotna)

PERIODICAL: Tr. Novosibir. in-ta inzh. zh.-d. transp., 1955, Nr 12, pp 30-39

ABSTRACT: A laboratory installation is described for determining the shear resistance of earth under the action of vibrations of various frequencies and amplitudes. The amplitude was registered by an AVEM-type seismograph and an MPO-2 oscillograph. With the aid of this installation data were obtained for powdery loam; these data characterize the variation of the coefficient of internal friction and cohesion as a function of the amplitude at a specified frequency. The vibrations were chosen in such a way as to reproduce the vibrations observed in the vicinity of railroad tracks at the time of a train passage. It has been determined

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SOV/124-58-5-5860

On the Problem of Considering the Dynamic Loads (cont.)

that a vibration amplitude of 60μ , as compared to a total absence of vibrations, lowered the coefficient of internal friction by 66% and that of cohesion by 50%. The effect of the installation of protective shields is analyzed for the protection of the slopes of open cuts along a railroad line from vibrations produced by passing trains.

G.I. Pokrovskiy

1. Railroads--Simulation
2. Soils--Stability
3. Soils--Testing equipment
4. Soils--Vibration

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SOKOLOV, V.A., kand.tekhn.nauk, dotsent

Temperature conditions of individual foundations in Novosibirsk.
Trudy NIIZHT no.28:121-123 '62.

Practice in electrochemical stabilization of clay soils. 125-
127 (MIRA 16:11)

SOKOLOV, V.A., kand.tekhn.nauk, dotsent

Resistance of loess-type soils to displacement. Trudy NIIZHT
no.34:299-305 '63. (MIRA 17:3)

BOBROV, V.P.; BRAGIN, Yu.N. [Brahin, IU.N.]; BUTSYK, Yu.V.; LEVENSHTEYN, M.L.;
SOKOLOV, V.A.; YUDEL'SON, A.A.

Find of potassium salt in the Donets Basin. Geol. zhur. 24
no.4:107-108 '64. (MIRA 18:2)

1. Trest "Artemgeologiya".

L 21193-66 EWT(m)/EPF(n)-2/EWP(i)/EWA(h)/EWA(l) IJP(c) GG/RM
ACG NR: AP6006971 (A) SOURCE CODE: UR/0190/66/008/002/0193/0197

AUTHORS: Dzhagatspanyan, R. V.; Sokolov, V. A.; Khromenkov, L. G.; Korolev, B. M.

ORG: none

TITLE: On x-ray determination of crystallinity in polyethylene, chlorinated and sulfochlorinated by radiation ¹⁶

SOURCE: ¹⁹ Vysokomolekulyarnyye soyedineniya, v. 8, no. 2, 1966, 193-197

TOPIC TAGS: polyvinyl chloride, chlorination, polyethylene plastic, x ray analysis, radiation polymerization

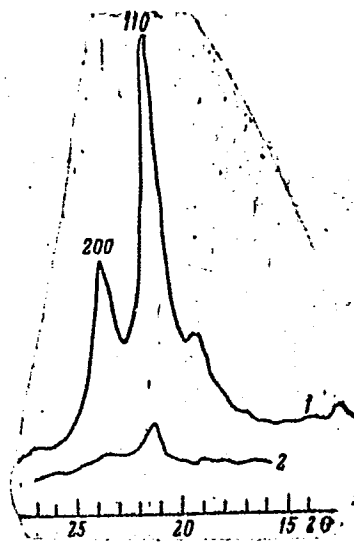
ABSTRACT: The degree of crystallinity of polyethylene (I) samples chlorinated and sulfochlorinated in solid phase by penetrating radiation from a Co⁶⁰ source was investigated. The method, involving x-ray study, consists of determining the ratio of the intensities of chlorinated and nonchlorinated samples. This ratio, in turn, gives the ratio of crystalline phases in the samples because only I is in the crystalline phase during the solid phase chlorination. The noninterfering chlorinated products are considered as the amorphous phase. Spectra of chlorinated and nonchlorinated I are shown in Fig. 1. The decrease in peak intensity is a measure ²

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UDC: 678.01:53+678.743+678.745

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ACC NR: AP6006971

Fig. 1. Spectra of untreated (1) and chlorinated (2) polyethylene.



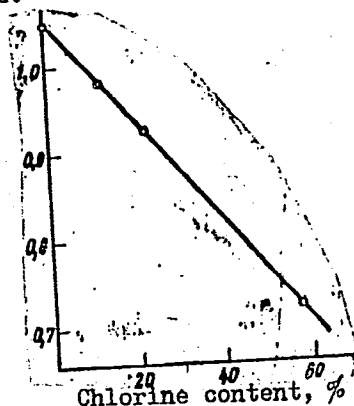
of the decrease of crystalline phase and of the increase of x-ray absorption coefficient in the chlorinated sample. Measurements of the densities of chlorinated samples indicate that each sample consists of a mixture of I and of the final

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L 24493-66
ACC NR: AP6006971

chlorination product, polyvinyl chloride. ¹⁵ The relationship between the density and chlorine content is illustrated in Fig. 2.

Fig. 2. Specific volume of chlorinated samples as a function of chlorine content.



Sulfochlorination in the solid phase has a similar effect. Chlorination of I in a CC1₄ suspension leads to retention of crystallinity to a greater degree. Orig. art. has: 1 table, 4 figures, and 3 equations.

SUB CODE: 07/ SUBM DATE: 04Jan65/ ORIG REF: 003/ OTH REF: 007
Card 3/3 *LC*

USSR/Physics
Luminescence

May 49

"Thermal Nature of Luminescence During the Oxidation of Zinc and the Absence of Cathodoluminescence in Its Oxides," V. A. Sokolov, Siberian Physico-techn Sci Res Inst, Tomsk State U imeni V. V. Kuybyshev, 3 1/3 pp

"Dok Ak Nauk SSSR" Vol LXVI, No 1

Conclusions: Luminescence during oxidation of zinc in an oxygen atmosphere is produced by temperature luminescence resulting from oxide reactions. No hemiluminescent phenomena were observed in spectrum or during the oxidation processes described.

50/49T92

USSR/Physics (Contd)

May 49

Under experimental conditions, the reducing processes had no part to play. Submitted by Acad S. I. Vavilov, 2 Mar 49.

50/49T92

PA 50/49T92

SOKOLOV, V. A.

С. С. Соколов, К. д.

12/2

Candoluminescence, Y. A. Sokolov, Uspekhi Fiz. Nauk 47, 837-80 (1952). ~~On reviews of previous investigations of candoluminescence (intense light emission by substances such as ZnO, ThO₂, and CaO when heated). By detailed reference to recent investigations of ZnO, he shows that no special mechanisms need be adduced to explain the luminescence; it is a straightforward result of the application of Kirchhoff's law to substances with the respective reflection (absorption) spectra exhibited by these substances. S. recommends that the term "candoluminescence" be dropped.~~

Cyrus Feldman

BB
JH

51-1-17/18

AUTHORS: Sokolov, V. A., Grozina, I. S. and Gorban', A. N.

TITLE: On "Candoluminescence" of CaO and Al₂O₃. (K voprosu o kandolyuminestsentsii CaO i Al₂O₃).

PERIODICAL: Optika i Spektroskopiya, 1957, Vol.III, Nr.1, pp.92-94. (USSR)

ABSTRACT: CaO and Al₂O₃ emit strongly in flames ("candoluminescence") due to oxidising and reducing reactions in chemically active regions of a flame. Some workers (Ref.2) regard this emission as of purely thermal origin. The present authors obtained spectra of CaO and Al₂O₃ emitting in town-gas flames and spectra of oxidation of Ca and Al by burning of metals in oxygen in front of a spectrograph slit. These spectra are shown in Figs.1 and 2. The results obtained, together with a comparison of emission of CaO and Al₂O₃ with that of a black body, establish that "candoluminescence" is of purely thermal character and obeys Kirchoff's law. The effect has nothing to do with true luminescence in the region of temperatures studied (above 600°C). There are 4 figures and 3 references, 1 of which is Slavic.

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51-5-7/11

Some Luminescence and Photoelectric Properties of Polycrystalline Cadmium Selenide.

by a very small maximum at 1.15μ which obviously coincides with the "hot" maximum in a pure CdSe. In the spectrum of CdSe-Cu II (the continuous line Fig.1b) there is only one short wave maximum at 0.92μ . The time of relaxation of the luminescence of pure CdSe is estimated to be of the order of 10^{-4} sec at room temperature. The relaxation is not exponential and the form of the curve is a function of intensity of the excited radiation and the temperature. Fig.2 shows the dependence of the stationary photoconductivity on the wavelength at room temperature. The photoconductivity of CdSe has a selective maximum at $\lambda = 0.71$ to 0.72μ (Fig.2, 1). For wavelengths less than 0.5μ the photoconductivity is practically zero. The long wavelength limit is at 1.2μ . This is in agreement with the work of Eckart and Schmidt (Ref.15). The spectra of CdSe-Cu are different from the spectra of the pure CdSe. The maximum of the curve has shifted towards the long wavelengths and does not fall off so rapidly on the long wavelength side. Pure CdSe has a conductivity proportional to E^q where E is the intensity of the exciting radiation. Fig.3 shows the dependence of q on temperature. The curve has a maxi-

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51-5-7/11

Some Luminescence and Photoelectric Properties of Poly-crystalline Cadmium Selenide.

"dark" period between successive excitations. The ratio increases with the duration of this "dark" period until it reaches a certain value and then remains constant. This constant value of the ratio increases with temperature and reaches a maximum at 120°C, after which it decreases again. The value of the above ratio also depends on the intensity of the exciting radiation. A negative "flare" has also been observed. This means that the photoconductivity has a lower value during an interval of time immediately after irradiation than during the "dark" period. This negative "flare" is only observed at sufficiently high temperatures. During experiments on the photoconductivity of CdSe it was found that the addition of a UV excitation to a constant long wavelength excitation leads to a rapid decrease in the photoconductivity. The majority of the above phenomena occur also in cadmium sulphide.

There are 8 figures and 18 references, 12 of which are Slavic.

ASSOCIATION: State Optical Institute, Leningrad Technological Institute, Chair of Physics (Gosudarstvennyy opticheskiy institut Leningradskiy tekhnologicheskii institut Kafedra fiziki)

Card 4/5

Some Luminescence and Photoelectric Properties of Polycrystalline Cadmium Selenide.

SUBMITTED: April 9, 1957.

AVAILABLE: Library of Congress.

Card 5/5

48-4-17/48

TITLE: On the Candoluminescence of Crystallophosphors (O kandolyumi-
nestsentsii kristallofosforov)

In a discussion that followed the report most of the opponents
disagreed with the notion of a pure candoluminescence as con-
tradicting to the second law of thermodynamics.

No references are cited.

INSTITUTION: Tomsk Polytechnic Institute

PRESENTED BY:

SUBMITTED: No date indicated.

AVAILABLE: At the Library of Congress.

Card: 2/2

SOKOLOV, V.A.

Existence of candoluminescence under the action of flame.
Izv. vys. ucheb. zav.; fiz. no.3:117-119 '58. (MIRA 11:9)

1. Tomskiy politekhnicheskii institut imeni S.M. Kirova.
 (Luminescence) (Phosphors)

51-4-3-23/30

AUTHOR: Sokolov, V. A.

TITLE: The Problem of Existence and the Nature of True
"Candoluminescence". (K voprosu o sushchestvovanii
i prirode istinnoy kandolyuminestsentsii.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.3,
pp.409-411 (USSR).

ABSTRACT: A group of workers led by V.M. Kudryartseva showed that certain peculiarities of the emission by some oxides at high temperatures are not due to "candoluminescence" (luminescence under the action of flames), but are simply thermal radiation (Ref.1-3). The "candoluminescence" effect nevertheless exists under correct conditions, such as avoidance of heating to a temperature at which quenching of luminescence occurs (from 100 to 500°C). To avoid temperature quenching and possible thermal emission of a phosphor (which occurs at 500-600°C and higher temperatures) the author used apparatus shown in Fig.1. A brass cylinder 1 was filled with a cooling mixture and was rotated slowly by means of an electric motor 2. A phosphor which covered the surface of the brass

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51-4 -3-23/30

The Problem of Existence and the Nature of True "Cathodoluminescence"

-luminescence. M.A. Prilezhayeva pointed out to the author that luminescence in flames could occur also as a result of recombination at the phosphor surface of free radicals or atoms into molecules; in this process the energy liberated would be sufficient to excite luminescence. There are 2 figures and 10 references, 9 of which are Soviet and 1 American.

ASSOCIATION: Tomsk Polytechnical Institute (Tomskiy politechnicheskoy institut)

SUBMITTED: July 1, 1957.

1. Luminescence--Theory
2. Luminescence--Temperature factors
3. Phosphors--Thermal emission

Card 3/3

SOV/51-5-6-18/19

AUTHORS: Gorban', A.N. and Sokolov, V.A.

TITLE: On the Nature of "Drummond's" Light" (K voprosu o prirode "Drummondova sveta")

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 6, p 713 (USSR)

ABSTRACT: "Drummond's light" is the very bright emission by CaO when excited by flames. The authors showed that at high temperatures (above 600° C) the emission of CaO in flames follows Kirchhoff's law and is not due to candoluminescence (Ref 2). The possibility of candoluminescence cannot be excluded at temperatures below the temperature of quenching of luminescence. The method of investigation was the same as that described in Ref 3. A sample of natural CaO was used in the form of a powder layer on the curved surface of a cylinder filled with a cooling mixture. It was found that CaO when touched by a Bunsen burner flame (with the cylinder rotating slowly) produces bright luminescence whose spectrum was recorded with an IKS-53 spectrograph. The authors also obtained the cathodoluminescence spectrum (under electron bombardment) of CaO. A figure on p 713 shows that the candoluminescence curve 1 and cathodoluminescence (curve 2) spectra are identical in

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SOV/51-5-6-18/19

On the Nature of "Drummond's Light"

the distribution of their bands and band maximum. It was found that luminescence under the action of flames appears most clearly at 400-450° C and is quenched completely at 600-650° C. Cathodoluminescence and photoluminescence are also quenched completely at 600-650° C. The figure also shows the normal heat radiation spectrum (curve 3) produced by heating in flames at temperatures above 650° C. Spectral analysis of CaO indicated the presence of small amounts of Ag, Cu and Mn, which are responsible for the bands in curves 1 and 2. There are 1 figure and 3 references, 2 of which are Soviet and 1 English.

SUBMITTED: July 2, 1958

Card 2/2

SOKOLOV, V.A.

Close-packed atoms in crystals of elementary substances. Uch.-
zap.Kazakh.un. 37 no.4:29-45 '58. (MIRA 15:4)
(Crystal lattices)

SOKOLOV, V.A.

Characteristics of thermal radiation. Izv. TPI 86:212-215
'58. (MIRA 13:5)
(Heat--Radiation and absorption)
(Luminescence)

ISKOLOV, V.A.

Comments on the possibility of thermal excitation of cathodoluminescence in crystal phosphors. Izv. TPI 95:248-252 '58.

(MIRA 14:9)

1. Predstavleno professorom doktorom A.A.Vorob'yevym.
(Phosphors) (Luminescence)

SOKOLOV, V.A.; GROZINA, I.S.; GORBAN', A.N.

Nature of cathodoluminescence of calcium oxide. Izv. TPI 95:
253-256 '58. (MIRA 14:9)

1. Predstavleno professorom doktorom A.A.Vorob'yevym.
(Luminescence) (Calcium oxide)

SOKOLOV, V.A.; GORBAN', A.N.

Nature of the catholuminescence of Al_2O_3 . Izv. TPI 95:257-259
'58. (MIRA 14:9)

1. Predstavleno professorom doktorom A.A.Vorob'yevym.
(Alumina) (Luminescence)

SOKOLOV, V.A.; NAZIMOVA, N.A.

Oscillatory structure of magnesium oxide in candoluminescence
spectra. Izv. TPI 95:260-263 '58. (MIRA 14:9)
(Magnesia--Spectra) (Luminescence)

SOV/51-7-2-22/34

AUTHORS: Jordan', A.M. and Sokolov, V.A.

TITLE: On the Problem of the Physico-Chemical Nature of Candoluminescence
(K voprosu o fiziko-khimicheskoy prirode kandolyuminestsentsii)

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 2, pp 259-261 (USSR)

ABSTRACT: Sokolov (Ref 1) reported observations of true candoluminescence (luminescence due to the action of flames). He suggested that one of the main causes of such luminescence is absorption by the phosphor of energy liberated in recombination, on the phosphor surface, of atoms and radicals into molecules. This suggestion has been confirmed by the following experiment. Recombination of atoms and radicals occurs readily on metal (e.g. Pt, V, Cu) surfaces as well as on surfaces of oxides of metals in the groups II and III of the periodic table. If candoluminescence is mainly due to recombinations on the phosphor surface, then introduction of a metal grid into flame together with a phosphor should depress the latter's luminescence, because the majority of recombinations would then occur on the metal grid. It was found that a copper grid placed in a Bunsen flame in such a way as to make the flame pass through the grid before reaching the phosphor (see figure on p 260) weakens candoluminescence of the phosphor very considerably. The authors determined

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SOV/51-7-2-22/34

On the Problem of the Physico-Chemical Nature of Candeluminescence

also the amount of atomic hydrogen and of radicals in the Bunsen flame as well as recombination coefficients of atoms and radicals on ZnS.CdS-Cu and CaO (lime). This was done by means of a thermoelectric probe method described earlier (Ref 3). It was found that the ratio of the pressure of atomic hydrogen and radicals to the total gas pressure was 0.225 and that the recombination coefficients on ZnS.CdS-Cu and CaO surfaces were 0.33-0.4 and 1.0 respectively. There are 1 figure, and 5 references, 4 of which are Soviet and 1 German.

SUBMITTED: January 26, 1959

Card 2/2

SOV/51-7-4-24/32

AUTHORS: Gorban', A.N. and Sokolov, V.A.

TITLE: Candoluminescence and Emission Due to Recombination on the Phosphor Surface in an Active-Gas Atmosphere

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 4, p 569 (USSR)

ABSTRACT: In an earlier paper (Ref 1) the authors showed experimentally that one of the main causes of candoluminescence (luminescence in flames) is absorption of energy liberated due to recombination of atoms and radicals on the phosphor surface. The present note describes a further experiment which confirms this hypothesis. Town gas was activated (production of atoms and radicals) by an electric discharge in a specially constructed tube (Fig 1). When this gas came into contact with a layer of ZnS,CdS-Cu phosphor the latter luminesced and the emission spectrum obtained under these conditions (Fig 2, curve 2) was identical with the candoluminescence spectrum (Fig 2, curve 1). There are 2 figures and 1 Soviet reference.

SUBMITTED: April 11, 1959

Card 1/1

SOV/51-7-6-12/38

AUTHORS: Gortan', A.N. and Sokolov, V.A.

TITLE: On the Semiconducting Mechanism of Surface-Recombination Luminescence ²¹

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, No 6, pp 815-817 (USSR)

ABSTRACT: V.A. Sokolov (Ref 1) suggested that candoluminescence ²¹ (luminescence in flames) is due to recombination on the phosphor surface of atoms and radicals, present in the flame, into molecules. An experimental proof of this hypothesis was given later (Ref 2). In the present note the authors apply to candoluminescence the ideas of Vol'kenshteyn, Voyevodskiy and Semenov (Refs 3-6) on the relationship between recombination of atoms and radicals on the surface of a solid and semiconducting properties of the latter. To illustrate these ideas the authors discuss recombination of atomic hydrogen and find that recombination which produces candoluminescence is satisfactorily explained by the energy band theory of solids. There are 1 figure and 7 Soviet references. ✓

SUBMITTED: April 11, 1959

Card 1/1

S/051/60/008/02/031/036
E201/E391

AUTHORS: Rabotkin, V.L. and Sokolov, V.A.

TITLE: "Anisotropy" of a Brightness Wave from a Polarized
Electroluminescent Cell

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 2,
pp 276 - 277 (USSR)

ABSTRACT: The authors describe properties of a polarized electro-
luminescent cell prepared as follows. A ZnS-Cu, Pb phosphor
was suspended in molten paraffin wax between two electrodes,
one of which served as a metal base and the other was made
of conducting glass. Paraffin wax was allowed to solidify
with 2.000 V DC across the electrodes. A cell prepared
in this way was excited with periodic unipolar pulses. If
the polarity of the exciting field coincided with the field
used to prepare the cell, then the brightness (luminance)
wave had the form shown in Figure 1, i.e. the two peaks
in each period were of approximately the same height.
When the exciting pulse polarity was opposite to that of

Card1/2

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S/051/60/009/003/010/011
E201/E69126. 1512
AUTHORS: Sokolov, V.A. and Tolstoy, N.A.TITLE: Luminescence of Thallium Chloride 21

PERIODICAL: Optika i spektroskopiya, 1960, Vol. 9, No. 3, pp. 421-423

TEXT: The authors investigated luminescence of thallium chloride monocrystals in an atmosphere of pure helium. Monocrystals were grown by a modified Stockbarger method in sealed Pyrex ampoules. The initial powder (used to grow monocrystals) was recrystallized twice in very pure distilled water and heated in vacuum for 3-4 hours at 200-220°C. Test samples of 1.5 x 10 x 15 mm dimensions and 100 g weight were cut from monocrystals. They were polished with a piece of flannel soaked in an aqueous solution of thallium chloride and dried in vacuum for 2-3 hours at 110°C. Preparation of the samples was carried out using exclusively red illumination ($\lambda > 600 \text{ m}\mu$). Luminescence was excited with a mercury line of $\lambda = 365 \text{ m}\mu$ from an SVDSH-250 lamp. A monochromator UM-2 was used and the spectral distribution of intensity was recorded with a photomultiplier FEU-22 and a microammeter M-95. During measurements the samples were kept in an atmosphere of pure helium and all heat treatments were carried

Card 1/2

NAZIMOVA, N.A.; SOKOLOV, V.A.

Investigation of the electronic-oscillatory structure in the
oxidation spectrum of magnesium. Izv.vys.ucheb.zav.; fiz. no.2:
143-148 '61. (MIRA 14:7)

1. Tomskiy politekhnicheskiy institut imeni S.M.Kirova.
(Magnesium oxide--Spectra) (Molecular dynamics)

SOKOLOV, V.A.; GORBAN', A.N.; NAZIMOVA, N.A.

"Selectivity" of the thermal radiation of CaO and MgO.
Opt. i spektr. ll no.2:273-274 Ag '61. (MIRA 14:8)
(Calcium oxide) (Magnesium oxide)
(Radiation)

20846

S/048/61/025/003/035/047
B104/B202

9.4160 (also 1137, 1395)

AUTHORS: Tolstoy, N. A., Tkachuk, A. M., Sokolov, V. A.,
Burlakov, A. V., Ryskin, A. I., Mansurova, Z. S., and
Yepifanov, M. V.

TITLE: Flash-heating of ZnS-phosphors and concurrence of
luminescence bands

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya,
v. 25, no. 3, 1961, 399-405

TEXT: This paper was presented at the 9th conference on luminescence
(crystal phosphors), Kiyev, June 20 to 25, 1960. Flash heating of phos-
phors is related to an accumulation of electrons or holes which occurs in
the interval between two excitations. Proceeding from the scheme suggested
by Schön and Klasens the authors discuss the processes occurring in this
connection with the aid of the scheme shown in Fig. 1. They explain the
filling of the blue and red luminescence centers with holes in the case of
steady excitation. They also discuss the mechanism of flash heating which
leads to the concurrence of blue and red bands which had been described

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20846

S/048/61/025/003/035/047
B104/B202

Flash-heating of ZnS-phosphors...

already by V. L. Levshin. On the basis of these considerations the authors study the dependence of the steady luminescence of short-wave bands on the intensity of the exciting light at different temperatures. Fig. 1 graphically shows the results obtained for different temperatures. In Fig. 1a which holds for very low temperatures, the intensity of red luminescence is represented as a linear function of energy. Fig. 1b which approximately holds for room temperature shows that red luminescence has one constant component and one component depending linearly on E. For some tens of degrees (Fig. 1c) the intensity of the red luminescence depends already nonlinearly on E. It becomes linear again only in the range of 100°C. This characteristic dependence of luminescence on the intensity of the exciting light at different temperatures is essentially explained by the filling of the first and second localization level which depends on temperature and intensity. Fig. 3 shows experimental results. It could be demonstrated already earlier that the curves of flash heating of the blue and red bands are opposite i.e., if one hole migrates off a blue center, a loss of a "blue quantum" occurs, if, however, a hole migrates to a red center, a "red quantum" is emitted. As could be proven, this process is specific and does not always apply. The experimental results

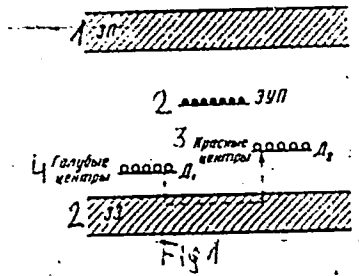
Card 2/3

Flash-heating of ZnS-phosphors...

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S/048/61/025/003/035/047
B104/B202

shown in Fig. 4 clearly show a parallelism. In the phosphors studied here red and blue luminescence occur "additively" and "concurrently". There are 5 figures and 9 references: 7 Soviet-bloc and 2 non-Soviet-bloc.

Legend to Fig. 1: 1) conduction band 2) electron adhesion level 3) red centers 4) blue centers. A_1 and A_2 hole levels of first and second localization.



Card 3/3

J

20853

S/029/61/025/003/012/017
B:04/B203

24.3500 1160, 1155, 1395

AUTHORS: Sokolov, V. A. and Gorban', A. N.

TITLE: Radical recombination luminescence of crystal phosphors

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25,
no. 3, 1961, 424-425

TEXT: This paper was read at the 9th Conference on Luminescence (Crystal Phosphors) in Kiyev, June 20-25, 1960. The authors report on studies of luminescence of luminophores in the atmosphere of an active gas and under the action of chemically active flames. As is known, the energy released in the recombination of atoms and radicals of gases in molecules on the surface of a crystal phosphor is the source for the excitation of luminescence of the crystal phosphor. It was also found that the luminescence of a phosphor under the action of chemically active flames was a consequence of the recombination of free atoms and radicals on the surface of the crystal phosphor. This kind of luminescence is called candoluminescence. The following experiments are indicated to prove the

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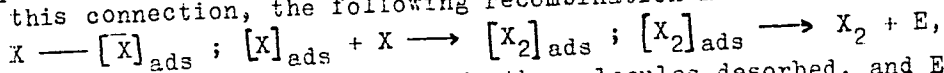
20853

S/O48/61/025/003/042/047

B104/B203

Radical recombination luminescence...

radical recombination mechanism of candoluminescence: (1) Determination of the recombination coefficients of some luminophores. (2) Observation of luminescence in the gases of the flame cone. (3) Extinction of luminescence of phosphors in the flame with the aid of an active catalyst. (4) Study of the luminescence of phosphors with free atoms and radicals obtained from electric discharges of the same gases which are present in the flame. Besides, chemical catalysis in semiconductors may also bring a qualitative clarification of the radical recombination luminescence. In this connection, the following recombination mechanism is given:



where X are the atoms adsorbed, X₂ the molecules desorbed, and E is the energy released by the recombination. The atom adsorbed is a localization center for an electron or hole, and is represented as acceptor or donor level in the energy diagram. On the other hand, an electron-hole pair is formed on the surface according to F. F. Vol'kenshteyn, the electron being localized while the hole moves away. The authors assume that in the case of a catalyst luminophore this hole creates the possibility for

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X

20853

S/048/61/025/003/042/047
B104/B203

Radical recombination luminescence...

an exothermic ionization of a luminescent center. This leads to a recombination of the electron from the conductivity band with a luminescent center, whereby a luminescent quantum is emitted. If the same electrons are generated in the free band, a molecule is formed and desorbed. In the case of an adsorption of the atom or molecule on an activator atom, the authors suggest direct ionization of the luminescent center, and then a shift of the activator level caused by disturbance of the electric field, thus giving rise to an Antistokes luminescence. The authors thank F. F. Vol'kenshteyn for interest and advice. There are 1 figure and 8 references: 7 Soviet-bloc.

X

Card 3/3

22182

S/048/61/025/004/031/048
B117/B212

24.3500

AUTHORS: Rabotkin, V. L. and Sokolov, V. A.

TITLE: Investigation of the electroluminescence of various phosphors excited with unipolar pulses of the electric field

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 4, 1961, 524-526

TEXT: The present paper was read at the 9th Conference on Luminescence (crystal phosphors). The authors have investigated the form of the brightness wave of the luminescence belonging to ZnS-Mn and ZnS-Cu,Pb phosphors which have been excited by a unipolar pulse that is a section of the sine wave and also by direct current. The luminescence has been recorded on an oscillograph of the type МПО-2 (MPO-2) with the help of a photomultiplier of the type ФЭУ-19М (FEU-19M) and via a direct-coupled amplifier. The ZnS-Mn phosphors have been obtained by annealing a compound consisting of ZnS, "pure for luminophors", and a corresponding amount of $MnCl_2$ in glass ampoules at $1200^{\circ}C$ and 30 minutes. Metallic manganese had a concentration

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S/048/61/025/004/031/048
B117/B212

Investigation of the...

of 10^{-3} , 10^{-2} , 10^{-1} g/g ZnS in this compound. If excitation was brought about by ultraviolet rays ($\lambda = 3600 \text{ \AA}$) the first phosphorus showed a light blue band, the second a light blue and orange, and the third an intense orange band in the luminescence spectrum. If excitation was brought about by an electric field, orange bands would occur only and the luminosity was especially bright near the cathode. The second maximum can be referred to the polarization effect of the dielectric which had been put during the tests between cathode and castor oil and the suspended luminophor in it. Using cellophane nearly extinguished the luminescence completely. If mica is used the second polarization maximum will be very faint. The form of the brightness wave for ZnS-Cu,Pb phosphorus is similar to that of ZnS-Mn with an intermediate layer of mica. Insertion of various solid dielectrics will hardly change it but any temperature variation is accompanied with a great change. The presence of two smaller maxima is very characteristic and they will disappear if the temperature is raised and the duty ratio changed by keeping the parameters of the exciting pulse unchanged. Removing the solid dielectric and changing the spacing between electrodes or changing the specific volume of the luminophor compared to the dielectric will change the ratio between the magnitudes of the principal

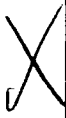
Card 2/3

22182

Investigation of the...

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B117/B212

maxima. The same will also occur if the castor oil is replaced by a dielectric having a lower viscosity and the amplitude of the exciting pulse is increased. The investigations allow the following conclusions: 1) The excitation mechanism of the luminescence of ZnS-Mn and ZnS-Cu,Pb phosphors differs, and is a function of the variable dielectric properties of the phosphorus grain; 2) the form of the brightness wave of ZnS-Cu,Pb phosphorus is a function of the grain quality to form "bridges" in the field and also keep them after the field has been removed. These "bridges" will extend from electrode to electrode and warrant the conductivity of the cell and its ability to luminesce in a steady field. The authors thank Z. A. Trapeznikova for supplying them with the ZnS-Cu,Pb luminophor. [Abstracter's note: Essentially complete translation]. There are 2 figures.



Card 3/3

POLIVANOV, K.M.; ZHARKOV, F.P.; SOKOLOV, V.A.

Parametrons with ferromagnetic cores. Izv. vys. ucheb. zav.;
radiotekh. 5 no.4:417-430 J1-Ag '62. (MIRA 16:6)

1. Rekomendovana kafedroy teoreticheskikh osnov elektrotehniki
Moskovskogo energeticheskogo instituta.
(Electronic calculating machines)
(Pulse techniques(Electronics))

GORBAN', A.N.; SOKOLOV, V.A.

Effect of an electric field on the radical recombination
luminescence of ZnS, CdS-Cu phosphor. Opt. i spektr. 12
no.1:116-117 Ja '62. (MIRA 15:2)

(Phosphors)
(Electric fields)

SOKOLOV, V.A.

Candoluminescence from the viewpoint of the Varilov - Wiedemann
criterion and modern physicochemical representations. Izv. AN
SSSR. Ser. fiz. 26 no.4:514-517 Ap '62. (MIRA 1964)

1. Kafedra fiziki Tomskogo politekhnicheskogo instituta.
(Luminescence) (Quantum theory)

L 18747-63 EWP(q)/EWT(m)/EDS AFFTC/ASD JD/JG
ACCESSION NR: AT3002212 S/2941/63/001/000/0160/0167

56

AUTHORS: Sokolov, V. A.; Tolstoy, N. A.

TITLE: The nature of luminescence in thallium chloride

SOURCE: Optika i spektroskopiya; sbornik statey. v. 1: Lyuminestsentsiya.
Moscow. Izd-vo AN SSSR. 1963. 160-167

TOPIC TAGS: luminescence, electronic transition, colloid, emission band

ABSTRACT: The authors have analyzed two theories put forth to explain the nature of luminescence in thallium chloride. The first, by H. Gobrecht and F. Becker (Zs. Phys., 5, 553, 1953) attributes blue radiation of TlCl to microquantities of water in a TlCl specimen playing the role of activator of blue luminescence. The red emission band is considered to be the result of a mechanical defect. The second, by A. S. Vysochanskiy (Kand. diss., Odessa, 1953; DAN SSSR, 112, 228, 1957), attributes the blue luminescence band to electronic transition in single hyperstoichiometric thallium atoms, and the red band to thallium atoms entering the colloidal state. Several sets of experiments were performed in which the effects of water, Cl₂, and Tl are studied independently on thallium chloride in

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ACCESSION NR: AT3002212

vacuum. The results refute all above theories except the red band assumption of
Gobrecht and Baker, which is attributed to defects in the crystal structure.
Orig. art. has: 7 figures.

ASSOCIATION: none

SUBMITTED: 23May62

SUB CODE: PH

DATE ACQ: 19May63

NO REF SOV: 010

ENCL: 00

OTHER: 004

Card 2/2

S/195/63/004/001/001/009
E075/E436

AUTHORS: Vol'kenshteyn, F.F., Gorban', A.N., Sokolov, V.A.

TITLE: The processes of recombination of free radicals on the surfaces of semiconductors and their role in luminescence

PERIODICAL: Kinetika i kataliz, v.4, no.1, 1963, 24-34

TEXT: The authors examined the theory of luminescence based on the recombination of radicals at the semiconductor surfaces and investigated the influence of external transverse electrical field on the intensity of candoluminescence. The luminescence was stated to be caused by the combination of ionized atoms with electrons from the solid lattice, the formation of ions being due to chemisorption. Electron exchange resulted between the local levels of chemisorbed atoms and the lattice energy zones. The exchange with the valency zones was thermal in character, whilst the exchange with the conductivity zones resulted from the recombination of radicals. The luminescence was produced only when the recombination occurred between chemisorbed atoms and atoms from the gaseous phase. The intensity of luminescence was determined by the Fermi level on crystal surfaces and given by
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The processes of recombination ...

S/195/63/004/001/001/009
E075/E436

$$I = A \left[1 + B \exp \left(\frac{\epsilon - \nu}{kT} \right) \right]^{-1} \quad (23)$$

$$\begin{cases} A = \alpha N^M P \\ B = 1 + \frac{b}{P} \end{cases} \quad (24)$$

where N^M - maximum number of atoms that can be adsorbed per unit surface, P - partial gas pressure, b - adsorption coefficient depending on temperature T , ϵ - energy level above the Fermi level, to which a surface electron is raised after a recombination act, ν - total energy of the lattice electron. At $P = \infty$, $\epsilon_M = \nu$. The condition favorable for the radical-recombination luminescence is $\epsilon < \epsilon_M$ (26) where

$$\epsilon_M = \nu - kT \log \left(1 + \frac{b}{P} \right), \quad I_M = \frac{1}{2} \alpha N^M P \quad (25)$$

When the Fermi level is depressed, the intensity of luminescence increases and vice versa. This confirms the conditions given
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The processes of recombination ...

S/195/63/004/001/001/009
E075/E436

by Eq.(26). The experimental results agree qualitatively with the developed theory. There are 7 figures.

ASSOCIATION: Tomskiy politekhnicheskiy institut
Institut fizicheskoy khimii AN SSSR
(Tomsk Polytechnic Institute
Institute of Physical Chemistry AS USSR)

SUBMITTED: September 18, 1961

Card 3/3

SOKOLOV, V.A.

From Galilei to Einstein; on the 400th anniversary of the birth
of Galileo Galilei. Izv. vys. ucheb. zav.; fiz. no.1:178 '64.
(MIRA 17:3)

1. Tomskiy politekhnicheskii institut imeni Kirova.

L 1115-66 EWT(1)/EWT(m)/EPF(c)/EWP(j)/T/EWA(h) IJP(c)/RPL AT/RM/GS

UR/0000/64/000/000/0457/0462

ACCESSION NR: AT5020492

AUTHORS: Vol'kenshteyn, F. F.; Gorban', A. N.; Sokolov, V. A.

81
3+1

TITLE: On the problem of semiconductor luminescence resulting from the recombination of free atoms and radicals on the surface

SOURCE: Mezhevuzovskaya nauchno-tekhnicheskaya konferentsiya po fizike poluprovodnikov (poverkhnostnyye i kontaktnyye yavleniya). Tomsk, 1962. Poverkhnostnyye i kontaktnyye yavleniya v poluprovodnikakh (Surface and contact phenomena in semiconductors). Tomsk, Izd-vo Tomskogo univ., 1964, 457-462

TOPIC TAGS: semiconducting material, luminescence, free radical, electric field, zinc sulfide, cadmium sulfide, Fermi level

ABSTRACT: A mechanism of radical-recombination luminescence is proposed, and an experiment conducted to confirm aspects of the theory of semiconductor luminescence is described. The work was performed to supplement the authors' earlier research in this area. Tests were run to determine the effect of a field on luminescence. Radicals of hydrogen and air were formed by electric discharge (+5 kV) under a pressure of ~1mm Hg in a tube about 2 m long and 3 cm in diameter, containing ZnS and CdS-Cu phosphor. The experimental results confirmed qualitatively

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ACCESSION NR: AT5020492

that the intensity of luminescence is dependent upon the location of the Fermi level and confirmed also the theoretically expected effect of an electric field on the adsorptivity of a semiconductor surface. Orig. art. has: 2 diagrams, 2 graphs, 1 table, and 9 formulas.

ASSOCIATION: none

SUBMITTED: 06Oct64

NO REF SOV: 007

ENCL: 00

SUB CODE: SS

OTHER: 002

Card

KC
2/2

X

ACCESSION NR: AP4036572

S/0139/64/000/002/0149/0152

AUTHORS: Sokolov, V. A.; Rusinov, L. A.

TITLE: Orange luminescence of thallium chloride

SOURCE: IVUZ. Fizika, no. 2, 1964, 149-152

TOPIC TAGS: luminescence, thallium chloride, mercury lamp, luminescence spectrum, monochromator UM 2, activation energy, blue center, crystal lattice, mercury lamp SVDSH 250, microammeter M 95, photoamplifier FEU 22, voltage stabilizer VS 10

ABSTRACT: The temperature quenching of the orange band luminescence of TlCl was investigated in a temperature range of -196 to -70C, and the nature of spectral distribution as a function of temperature in the same band was measured. Luminescent excitation was induced by a mercury lamp SVDSH-250 through a glass filter. The luminescence spectra were determined by a UM-2 monochromator and were recorded by the photoamplifier FEU-22 with microammeter M-95. A high-voltage stabilizer VS-10 was used with the photoamplifier. A special circuit served to stabilize the current from the excited source ($\lambda = 3650 \text{ \AA}$). The orange luminescence intensity is plotted as a function of T according to the exponential law $I = Ce^{\frac{w}{RT}}$. From the slope of a

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ACCESSION NR: AP4036572

log-log scale, W (the activation energy) was determined to be 0.07 ev. It is shown that blue and orange luminescence centers in $TlCl$ are of a similar nature but differ in their location in the crystal lattice. "The author is grateful to N. A. Tolstoy for his interest in the work and his valuable advice." Orig. art. has: 5 figures and 1 formula.

ASSOCIATION: Leningradskiy tekhnologicheskii institut imeni Lensoveta (Leningrad Technological Institute)

SUBMITTED: 28Jun62

DATE ACQ: 05Jun64

ENCL: 00

SUB CODE: GC

NO REF SOV: 005

OTHER: 001

Card 2/2

L 25243-65 EWT(1)/EWG(k)/EEG(t) Pz-6 IJP(c) AT

S/0051/65/018/001/0098/0101

ACCESSION NR: AP5003028

AUTHORS: Sokolov, V. A.; Tolstov, N. A.

TITLE: Luminescence and photoconductivity ²excitation spectra in TlCl

SOURCE: Optika i spektroskopiya, v. 18, no. 1, 1965, 98-101

TOPIC TAGS: luminescence, photoconductivity, excitation spectrum, luminescence center, thallium compound

ABSTRACT: To check on the assumption that the blue and orange luminescences of TlCl are connected with electron-vibrational transitions in two different types of glow centers, and also to clarify further details of the luminescence mechanism, the authors investigated the luminescence excitation spectra and the photoconductivity spectra of annealed single-crystal TlCl samples. The installation for the excitation spectrum measurement consisted of an illuminator

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L 25213-65

ACCESSION NR: AP5003028

and a monochromator with bent grating. The luminescence excitation spectra were measured with a photomultiplier. The blue and orange luminescence bands were separated by means of light filters. It was observed that the excitation spectra of the blue and orange luminescence and of the photoconductivity were identical in the region of fundamental absorption but different in the region of excitation absorption. It is thus concluded that different excitation mechanisms exist for the blue and orange luminescence when light quanta with $\lambda \geq 364$ nm are absorbed. On the other hand, in the case of plastically deformed crystals, the excitation spectra of the blue and orange luminescence were in full agreement. Consequently, exchange of excitation energy between the blue and orange centers can take place in the deformed crystals. Orig. art. has: 4 figures.

ASSOCIATION: None

SUBMITTED: 06Oct63

ENCL: 00

SUB CODE: OP, SS

Card

2/3

L 25213-65

ACCESSION NR: AP5003028

NR REF SOV: 007

OTHER: 010

Card

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L 32842-65 EWT(1)/EWT(m)/EPF(c)/EPF(n)-2/EWP(t)/EWP(b) Pr-4/Pu-4 IJP(c)/JD

ACCESSION NR: AP5005038

S/0051/65/018/002/0251/0257

AUTHOR: Sokolov, V. A.; Tolstoy, N. A.

31
30
B

TITLE: On the nature of luminescence of thallium chloride

SOURCE: Optika i spektroskopiya, v. 18, no. 2, 1965, 251-257

TOPIC TAGS: thallium compound, temperature dependence, luminescence, recombination center, dislocation, vacancy

ABSTRACT: This is a continuation of earlier work by the authors (Opt. i spektr. v. 9, 421, 1960; Izv. AN SSSR ser. fiz. v. 25, 375, 1960), where it was shown that the blue luminescence of TlCl is a property of this salt in the crystalline state with minimum number of mechanical defects. To check on the connection between this glow and point defects of the lattice the authors attempted to observe the variation of the blue glow with the time, temperature, and the storage time, and to establish a quantitative connection between the decrease in the orange glow and the increase in the blue glow. The band intensities were measured with a set-up described by the authors elsewhere (Kristallografiya v. 7, 390, 1962). The measurements were made in a rarefied helium atmosphere (spectral purity) at -196°.

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The samples tested were cut from single crystals grown by the authors as described earlier. The change in the ratio of the intensities of the blue and orange luminescence with degree of heating of the deformed sample was investigated. The maximum in the temperature quenching of the blue luminescence of the deformed samples disappears after the sample is annealed. It is assumed on the basis of the presented data that the recombination centers from which the blue luminescence of $TlCl$ is radiated are vacant cation lattice sites, and the recombination centers from which the orange luminescence of this salt is emitted are either cation vacancies near dislocations or some combinations of cation and anion vacancies of the hole type, which are formed near dislocations in large numbers. It is pointed out in the conclusion that these assumptions should be regarded only as working hypotheses. "The authors are grateful to G. G. Lidy'ya for measurement of the quantum yield of the $TlCl$ luminescence." Orig. art. has: 4 figures and 3 formulas.

ASSOCIATION: None

SUBMITTED: 06Oct63

ENCL: 00

SUB CODE: SS, OP

HR REF SOV: 012

OTHER: 009

Card 2/2