Liwski, S.

(a) **Peat lands of Biebrza.** A. Maksimow, H. Okruszko and S. Liwski. (b) **Peat lands of territories of the Omulew river basin.** H. Okruszko (*Roczn. Nauk rol.*, 1955, 71, A, 351—406, 407—441).—(a) A survey. The lands consist in river-type formations of no value except for agricultural purposes.
(b) A survey with suggestions for agricultural uses. P. S. ARUP.

(2)

J

POLAND/Soil Science - Organic Fertilizers.

Abs Jour : Ref Zhur Biol., No 22, 1958, 100094

Author : Maksimov, A., Liwski, S.
Inst : -
Title : Concerning the Fertilization Value of Peat, Saturated by Ammonia Gas at High and Low Temperatures.

Orig Pub : Roczn. gleboznawsze, 1956, 5, 221-249

Abstract : In vegetational and field experiments, peat, saturated by ammonia at high (100-250°) and low (down to 50°) temperatures, was tested, and its action was compared with nitrogen fertilizers and a mixture of peat with ammonium hydroxide. The advantages of peat, saturated by NH_3 at low temperatures, was explained. The action of this fertilizer on beets insured a larger harvest than the application of N_{aa} with the addition of calcium carbonate. In experiments with flax and winter rape, the action of peat, saturated by NH_4, was identical with the action of

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POLAND/Soil Science - Organic Fertilizers.

J

Abs Jour : Ref Zhur Biol., No 22, 1958, 100094

a mixture of N_{aa} and calcium carbonate. The NH_3-saturated peat insured the yield of larger oat harvests than N_{aa} and of an identical mustard harvest. In experiments with rye planted after oats, the after-effects of peat, saturated by NH_4 at low temperatures, insured an addition to the harvest of 1.6-5.2 c/ha, in comparison with the action of PK. Ammoniacal N, saturating peat at high temperatures, enters into composition of stable non-assimilable-by-plants compounds. -- S.A. Nikitin

Card 2/2

LIWSKI, Stefan

Role of copper in the fertility of peat soils. Rocz nauk roln rosl 87 no.3:437-470 '63.

1. Katedra Torfoznawstwa, Szkola Glowna Gospodarstwa Wiejskiego, Warszawa.

LIWSZYC, A.

Some problems of the technology of electric-discharge machining methods.
p. 401

MECHANIK Warszawa, Poland. Vol. 32, no.8, Aug. 1959

Monthly List of East European Accessions (EEAI) LC, Vol. 9No. 2, Feb. 1959
Uncl.

LIWSZYC, S.

New paths in endocrinology. Przegl. lek., Krakow 8 no. 4:85-92 1952. (CLML 22:5)

LIWSZYC, S.; ZYGUISKA-MACHOWA, H.

Blood sugar curves of the rabbit after irritation of the respiratory tract. Przegl. lek., Krakow 8 no. 11:338-341 1952. (CIML 23:5)

1. Of the Institute of General and Experimental Pathology (Head--Prof. B. Giedoss, M.D.) of Krakow Medical Academy.

LIWSZYC, S.;ZYGUISKA-MACHOWA, H.

Blood sugar curves following irritation of the respiratory tract in rabbit; further studies and conclusions. Przegl. lek., Krakow 9 no.2: 55-57 1953. (CIML 24:5)

1. Of the Institute of General and Experimental Pathology (Head--Prof. B. Giedosz, M.D.) of Krakow Medical Academy.

LIWSZYC, S.

New trends in BCG vaccination. Przegl. lek., Krakow 9 no.11: 272-275 1953. (CLML 25:5)

LIWSZYC, Stanislaw

Brenchial asthma in adolescence. Wiadomosci lek. 7 no.3:171-173 Mar. 54.

(ASTHMA, in adolescents)
(ADOLESCENCE, diseases, asthma)

LIWSZYC, Stanislaw

Bronchiectasis in adolescence. Wiadomosci lek. 7 no.9:500-502 Sept 54.

(ADOLESCENCE, diseases,
bronchiectasis)
(BRONCHIECTASIS,
in adolescence)

LIWSZYC, Stanislaw; OSTERCZY, Zbigniew.

Largactil in severe uremia. Polski tygod. lek. 10 no.40:1319-1320 3 Oct 55.

1. Z III Kliniki Chorob Wewnetrznych A.M. w Krakowie; kierownik: prof. dr. J.Aleksandrowicz. Krakow, III Klinika Chorob Wewnetrznych.

(UREMIA, therapy,
chloropromazine)
(CHLOROPROMAZINE, therapeutic use,
uremia)

LIWSZYC, Stanislaw (Krakow)

General irritating syndrome or Reilly's syndrome. Przegl. lek., Krakow 11 no.2:45-51 Feb 55.
(AUTONOMIC NERVOUS SYSTEM, diseases
general irritation, Reilly's synd.)

LIWSZYC, STANISŁAW

LIWSZYC, Stanislaw; POLATYNSKA-WECLAWOWICZ, Joanna

Effect of irritation of the autonomic nervous system on the function of the kidneys. Przegl. lek., Krakow 11 no.3:70-72 Mar 55.

1. Z zakladu potologii ogolnej i dosw. A.M. w Krakowie; kier. prof. dr. B.Giedosz.

(KIDNEYS, physiology
eff. of irritation of autonomic nervous system)
(AUTONOMIC NERVOUS SYSTEM, physiology
eff. of irritation of kidneys funct.)

LIWSZYC, Stanislaw (Krakow)

Common bronchial catarrh; pathogenesis and manifestations in relation to the age. Przegl. lek., Krakow 11 no.3:76-78 Mar 55.
(BRONCHITIS
pathogen. & manifest. in relation to age)

20

LIWSZYC, Stanislaw (Krakow)

Infectious diseases and the vegetative nervous system in current research. Przegl.lek,Krakow 11 no.4:103-106 '55.

1. Z Zakladu Patologii Ogolnej i Dows. A.M. w Krakowie. Kierownik: Prof. dr B. Giedosz.

(AUTONOMIC NERVOUS SYSTEM, in various diseases
commun. dis., current concepts)
(COMMUNICABLE DISEASES, physiology
autonomic NS, role, current concepts)

LIWSZYC, Stanislaw; POLATYNSKA-WECLAWOWICZ, Joanna, Krakow.

Effect of irritation of the autonomic nervous system in kidney function. 2 communication. Przegl.lek., Krakow 11 no.9:277-279 1955.

1. Z Zakladu Patologii Ogolnej i Doswiadczalnej A. M w Krakowie. Kierownik: Prof. dr med. B.Giedosz.

(AUTONOMIC NERVOUS SYSTEM, physiology,
eff. of irritation on kidney funct. in rabbits)
(KIDNEYS, physiology
funct. eff. of irritation of autonomic NS in rabbits)

LIWSZYC, Stanislaw; SURDACKI, Aleksander

Case of Kartagener's syndrome. Polski tygod. lek. 11 no.12: 541-542 19 Mar 56.

1. Z II Kliniki Chorob Wewnetrznych A.M. w Krakowie; kier.: prof. dr. Julian Aleksandrowicz. Krakow, ul. Szlak 14.
(KARTAGENER'S TRIAD, case reports,
(Pol))

LIWSZYC, Stanislaw; FROMOWICZ, Kurt Karol; OSTERCZY, Zbigniew; POLATYNSKA-WECLAWOWICZ, Joanna

Vegetative factor in pathogenesis of nephritis and in attempted application of phenothiazine derivatives. Polski tygod. lek. 11 no.22:977-981 28 May 56.

1. Z Zakladu Patologii Ogolnej i Doswiadczalnej AM w Krakowie; kier. prof. dr. Br. Giedosz i z III Kliniki Chorob Wewn. AM w Krakowie; kier. prof. dr. J. Aleksandrowicz, Krakow, ul. Kopernika 17, III Kl. Chor. Wewn.

(NEPHRITIS, experimental,
autonomic factor in, eff. on chlorpromazine ther. (Pol))
(CHLORPROMAZINE, effects,
on exper. nephritis, autonomic factor in (Pol))
(AUTONOMIC NERVOUS SYSTEM, in various diseases,
exper. nephritis, role in chlorpromazine ther. (Pol))

LIWSZYC, St.

St. Liwszyc, K.K. Fromowicz, Z. Osterczy, and J. Polatynska-Wecawowicz, "Die Rolle des neurovegetativen Faktors in der Pathogenese der Hierenentzuendung und Versuche ihrer Behandlung mit Phenothiazinderivaten," Das Deutsche Gesundheitswesen; Zeitschrift fuer Medizin (Berlin), 11th Yr, No 30, 26 Jul 56, p. 1012.

Rough Transl. of Title: The Role of Neurovegetative Factors in the Pathogenesis of Nephritis and the Investigation of its Treatment with Phenothiazine Derivitives.

From the Institute for General and Experimental Pathology, Medical Academy, Krakow (headed by Prof. Dr. Gierosz) and from the No. 3 Clinic for Internal Illnesses, Medical Academy, Krakow (headed by Prof. J. Aleksandrowicz).

Poland/Pharmacology. Toxicology. Tranquilizers V

Abs Jour : Ref Zhur-Biol., No 8, 1958. 37488

Author : ~~Liwszyc S.,~~ Polatynska-Weclawowicz J
Inst : Not Given
Title : Effect of Stimulation of the Automatic Nervous System on Renal Functions and the Results of an Attempt to Prevent a Renal Nervous Reaction with the Help of Largactil. Report III. (Vliyaniye razdrazheniya vegetativnoy nervnoy sistemy na deyatel'nost' nochek i rezul'tati popytki predotvrashcheniya nervnoy reaktsii pochek pri pomoshchi largaktila. Soobshcheniye III).

Orig Pub : Przel. lekar., 1956, 12, No 2, 55-59

Abstract : The irritation of a disected jugular bag on the necks of rabbits with a 5% solution of quinine chloride or with urea produced albuminuria and

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Poland/Pharmacology. Toxicology. Tranquilizers

Abs Jour : Ref Zhur-Biol., No 8, 1958, 37488

Abstract : hematuria. Anesthesia or the preliminary application of phenol to the irritated section removed this reaction. The administration of largactil intramuscularly 30 to 40 minutes, or intravenously 15 to 20 minutes before the experiment in doses of 1 to 15 mg/kg removed or weakened this effect. The possibility of clinically utilizing the above data is indicated.

Card 2/2

LIWSZYC, Stanislaw; FROMOWICZ, Kurt Karol; JANICKI, Kazimierz; RZADKOWSKA, Irena

Intravenous administration of chlorpromazine in pulmonary edema. Polski tygod. lek. 13 no.24:915-917 16 June 58.

1. Z III Kliniki Chorob Wewnetrznych Akademii Medycznej we Krakowie; kierownik: prof. dr med. J. Aleksandrowicz. Adres: Krakow, ul. Kopernika 17; III Klin. Chor. Wewn. A. M.

(PULMONARY EDEMA, ther.
chlorpromazine, intravenous admin. (Pol))
(CHLORPROMAZINE, ther. use
pulm. edema, intravenous admin. (Pol))

LIWSZYC, Stanislaw; GUZEK, Jan. W.; MIKULOWSKI, Pawel

Effect of reflexes from the palate on kidney status. Polski tygod. lek. 13 no.25:953-956 23 June 58.

1. (Z Zakladu Patologii Ogolnej i Doswiadczalnej Akademii Medycznej w Krakowie; kierownik: prof. dr med. Bronislaw Giedosz i z Zakladu Anatomii Patologicznej Akademii Medycznej w Krakowie; kierownik: prof. dr med. Janina Kowalczykowa). Adres: Krakow, ul. Czysta 18; Zaklad Patologii A. M.

(PALATE, physiol.
eff. of stimulation of soft palate on kidney funct., reflex mechanisms in guinea pig. (Pol))
(KIDNEYS, physiol.
same)
(REFLEX
mechanism of kidney response to stimulation of soft palate in guinea pig (Pol))

LIXANDRU, T.

G-2

RUMANIA/Organic Chemistry. Synthetic Organic Chemistry.

Abs Jour: Referat Zhur-Khimiya, No 4, 1958, 11295.

Author : Matei, I., Cocea, E., and Lixandru, T.
Inst : Iasi Polytechnic Institute.
Title : The Condensation of Benzoin with m- and p-aminophenols

Orig Pub: Bull Inst Politehn Iasi, 1, No 1-2, 89-99 (1955) (in Rumanian with summaries in German and Russian)

Abstract: The reaction of benzoin (I) with m-aminophenol (II) in the presence of $ZnCl_2$ and CH_3COOH gives a substance (III) having the general formula $H_{15}ON=C_{22}H_{17}ON$ [sic] which is probably a mixture of 2,3-diphenyl-6(or 4)-amino-coumarone and of its N-acetyl derivative, and the substance $C_{30}H_{26}O_4N_2$ of the probable structure IV [see insert]. Under the same conditions I and p-aminophenol (V) give substances having the

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Abs Jour: Referat Zhur-Khimiya, No 4, 1958, 11295.

pitation with water from CH_3COOH); the benzene-insoluble fraction of the precipitate on treatment with alcohol gives 3.2 gms crude IV, mp 255°. On refluxing with $(CH_3CO)_2O$ III forms the completely N-acetylated derivative $C_{22}H_{17}O_2N$. Similarly a mixture of 6 gms I and 8 gms V gives 1.5 gms VIII, mp 270-271° (from benzene). The alcoholic mother liquor remaining after the separation of VIII is evaporated to dryness and the residue is treated with ether. The ether-insoluble fraction of the precipitate yields 0.6 gms VI, mp 166°; the ether-soluble fraction yields 4.5 gms VII, mp 90°. IV, VI, and VII are purified by precipitation with water from alcoholic solution.

MATEI, Ilie, prof.; LIXANDRU, T.; COMANITA, E.

Mechanism of the condensation reaction of acenaphthenequinone with p-aminophenol in the presence of certain complexing salts; $ZnCl_2$, $CdCl_2$, $NiCl_2$, $CoCl_2$. Studii chim Iasi 11 no.2:281-289 '60.

1. Catedra de Tehnologia subst. organice, Institutul Politehnic Iasu. 2. Comitetul de redactie, "Studii si cercetari stiintifice, chimie" (Academia R.P.R., Filiala Iasi), redactor responsabil; membru corespondent al Academiei R.P.R. (for Matei).

(Condensation, Chemical) (Salts)

LIYALETDINOV, A.N.

Phosphoric acid mobilization in phosphorite-manure composts as related to the vital activities of micro-organisms. Trudy Inst. mikrobiol. i virus. AN Kazakh. SSR 3:181-192 '59.
(MIRA 13:2)

(COMPOST) (SOIL MICRO-ORGANISMS) (PHOSPHATES)

LIYAMSHEV, L. M.

"Diffraction theory of noise due to turbulent flows and boundary layers"

report submitted for the 4th Intl. Congress of Acoustics,
Copenhagen, Denmark, 21-28 Aug 1962.

Acoustical Inst. of the Acad. of Sci. U.S.S.R., Moscow.

LIYANSKIY, M.

Aleksandrova's brigade marches in the front ranks. Obshchestv.pit. no.10:6-8 O '60. (MIRA 13:11)

1. Direktor stolovoy No.5 g.Tushino.
(Moscow--Restaurants, lunchrooms, etc.)

LIYAS, M.

USSR/Cultivated Plants - Fruits. Berries.

Abs Jour : Ref Zhur - Biol., No 4, 1958, 15747

Author : M. Liyas

Inst : -

Title : Winter Damage to the Fruit Trees at the Yygeva Selection Station.
(Zimniye povrezhdeniya plodovykh sadov Yychvaskoy selektsionnoy stantsii).

Orig Pub : Sotsialistlik Polluma jandus, 1957, No 3, 120-121.

Abstract : No abstract.

Card 1/1

LIYAS, M. M

USSR/Cultivated Plants. Fruits. Berries.

Abs Jour : Ref Zhur-Biol., No 15, 1958, 68349

Author : Liias, M.
Inst :
Title : Two Winter-Hardy Seedlings with High Yields.

Orig Pub : Sots. pollumajandus, 1957, No 8, 356-357

Abstract : Pear strains cultivated during the winter of 1955/1956, suffered severely from frost and perished almost completely in the Estonian SSR. In the garden of an amateur gardener named Kukk in Tartu, two winter-hardy pear seedlings did not suffer from winter frosts and gave yields of 125-150 kilograms of fruit per tree. Both trees were about 20 years old; they were distinguished by their sturdy growth, their absolute resistance to cold, and lack of defects.

Card : 1/2

LIYBASHENKO, Ya. S.

"Diseases of Wild Animals." Collected Works. Under the editorship of S. Ya. Liybashenko, Moscow Sel'khozgiz, 1952, 456 pages with illustrations.

SO: Veterinariya; November 1952, Unclassified. Trans. #155 by L. Lulich

KH. LIYDEMAA

PHASE I BOOK EXPLOITATION SOV/4466

Akademiya nauk Estonskoy SSR. Institut fiziki i astronomii

Issledovaniya po fizike atmosfery, Vyp. 1 (Research on Atmospheric Physics, No. 1) Tartu, 1959. 107 p. 800 copies printed. [In Russian and English.]

Editorial Board: J. Ross (Chairman), O.Avaste, Kh. Liydemaa, and H. Mürk; Ed.: Kh. Niylisk.

PURPOSE: This publication is intended for geophysicists, meteorologists, and astronomers.

COVERAGE: This is the first issue of a new serial publication put out by the Sektor fiziki atmosfery Instituta fiziki i astronomii AN Estonskoy SSR (Sector of Atmospheric Physics of the Institute of Physics and Astronomy of the Academy of Sciences Estonskaya SSR) on research in the physics of the atmosphere. The publication is to appear at irregular intervals (1 - 2 issues per year) and will, for the most part, contain papers in actinometry. Issue 1 contains articles dealing with radiation intensity and the characteristics of atmospheric transparency, spectral reflectivity of vegetation covers, and a discussion of

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Research on Atmospheric Physics, No. 1 SOV/4466

Makhotkin's index of turbidity. No personalities are mentioned. An English summary follows each article. References accompany each article.

TABLE OF CONTENTS:

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Tooming, H. Some Problems Concerning the Distribution of the Total Radiation in the Vegetation Cover 83

The author thanks Yu. Ross.

AVAILABLE: Library of Congress

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65971

SOV/58-59-4-9433

24.7700

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 4, p 288 (USSR)

AUTHORS: Lushchik, Ch.B., Liyd'ya, G.G.

TITLE: Exciton Capture Centers in Alkali Halide Crystals Activated by Mercury-Like Ions

PERIODICAL: Tr. In-ta fiz. i astron., AS EstSSR, 1958, Nr 7, pp 193 - 226 (Eng. résumé)

ABSTRACT: The authors investigated the changes that arise in the absorption and in the excitation spectra of KBr crystals activated by mercury-like ions (Ga^+, In^+, Tl^+, Ge^{2+}, Sn^{2+}, and Rb^{2+}) after X-ray irradiation and illumination by ultraviolet radiation in the region of activator and exciton absorption bands. On the basis of the obtained results and the data in the literature the authors examine the interaction of excitons with impurity and intrinsic crystal microdefects serving as "exciton dissociation centers" and "exciton annihilation centers". The former may be divalent impurity ions, e.g. $M^{2+} + ex \rightarrow M^{2+} ex \rightarrow M^{2+} e + p$ with subsequent hole localization in the cation vacancy (this was demonstrated experimentally for KBr-Pb, KBr-Ge, and KBr-Mn), while the latter may be

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SOV/58-59-4-9433

Exciton Capture Centers in Alkali Halide Crystals Activated by Mercury-Like Ions

monovalent impurity ions, e.g. $M^+ + ex \rightarrow M^+ ex \rightarrow M^{+*} \rightarrow M^+ + h\nu$ (M is the impurity ion, ex is the exciton, e is the electron, and p is the hole). The phenomenon of the de-exciting action of X-rays was investigated in NaCl-Pb, KBr-Tl, and KCl phosphors. The authors discuss the exciton mechanism of this phenomenon. The de-exciting action of excitons in KBr-Pb is experimentally confirmed. A study of the optical decoloration spectrum of the F centers in KCl-Ca, Ag showed that the F centers become decolorized not only in the F and V absorption bands but also in other electron absorption bands. The bibliography contains 84 titles.

G.G. Liyd'ya

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65970

24.3400 SOV/58-59-4-9422

Translation from: Referativnyy Zhurnal Fizika, 1959, Nr 4, p 286 (USSR)

AUTHOR: Liyd'ya, G.G.

TITLE: Study of Negative Excited Absorption in Alkali Halide Crystal Phosphors

PERIODICAL: Tr. 3-y Stud. nauchno-tekhn. konferentsii Pribaltiki i BSSR, Riga, 1958, pp 8 - 18

ABSTRACT: The changes in the absorption spectra of single crystals of KBr-Pb, KBr-In, and KBr-Tl were investigated after excitation by X-rays and ultraviolet light in the region of the exciton and activator absorption bands. X-ray irradiation as well as excitation by ultraviolet light in the region of the long-wave fall-off of the exciton band of KBr crystals with a divalent admixture of Pb^{2+} leads to the appearance of considerable negative excited absorption in the activator bands of Pb^{2+}. The effect in the case of X-ray irradiation is explained by electron capture by the Pb^{2+} ions, and in the case of irradiation in the exciton band it is explained by interaction between the excitons and the Pb^{2+} ions, the lead

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SOV/58-59-4-9422

Study of Negative Excited Absorption in Alkali Halide Crystal Phosphors

capturing the electron while the hole is localized in the intrinsic lattice micro-defect. In crystals with monovalent admixtures (Tl^+, In^+) this effect is considerably less pronounced. The bibliography contains 12 titles.

G.G. Liyd'ya

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LiyD'ya, G. G.

24(4) PHASE I BOOK EXPLOITATION SOV/3140

Akademiya nauk Ukrainskoy SSR. Institut fiziki

Fotoelektricheskiye i opticheskiye yavleniya v poluprovodnikakh; trudy pervogo vsesoyuznogo soveshchaniya po fotoelektricheskim i opticheskim yavleniyam v poluprovodnikakh, g. Kiyev, 20-26 noyabrya 1957 g (Photoelectric and Optical Phenomena in Semiconductors; Transactions of the First Conference on Photoelectric and Optical Phenomena in Semiconductors...) Kiyev, 1959. 403 p. 4,000 copies printed.

Additional Sponsoring Agency: Akademiya nauk SSSR. Prezidium. Komissiya po poluprovodnikam.

Ed. of Publishing House: I. V. Kisina; Tech. Ed.: A. A. Matveychuk; Resp. Ed.: V. Ye. Lashkarev, Academician, Ukrainian SSR, Academy of Sciences.

PURPOSE: This book is intended for scientists in the field of semiconductor physics, solid state spectroscopy, and semiconductor devices. The collection will be useful to advanced students in universities and institutes of higher technical training specializing in the physics and technical application of semiconductors.

COVERAGE: The collection contains reports and information bulletins (the latter are indicated by asterisks) read at the First All-Union Conference on Optical and Photoelectric Phenomena in Semiconductors. A wide scope of problems in semiconductor physics and technology are considered: photoconductivity, photoelectromotive forces, optical properties, photoelectric cells and photoresistors, the actions of hard and corpuscular radiations, the properties of thin films and complex semiconductor systems, etc. The materials were prepared for publication by E. I. Rashboy, O. V. Snitko, K. B. Tolpygo, A. F. Lubchenko, and M. K. Sheynkman. References and discussion follow each article.

Photoelectric and Optical Phenomena (Cont.) SOV/3140

Photoelectric and Optical Phenomena (Cont.) SOV/3140

LYDIYA, G. G., LUSHCHIK, N. Ye., SHVARTS, K. K., LUSHCHIK, Ch. B., and YAEK, I. V.

Physical Processes in Alkali Halide Phosphors
Activated by Mercury-Like Ions

Ch. B. Lushchik, I. W. Jack, G. G. Lüdja, N. E. Lushchik, and K. K. Schwarz
Physics and Astronomy Institute, Academy of Sciences of the Estonian S.S.R.,
Tartu, U.S.S.R.

A number of alkali halide phosphors activated by monovalent and divalent ions having the electronic configuration of neutral mercury were prepared. Diffusion and precipitation of activator ions were investigated as were absorption, emission, and radiationless processes within the impurity center. Energy transfer by means of excitons and electron-hole pairs between the luminescent center, the host crystal and color centers were also studied.

Report presented at the 117th Meeting of the Electrochemical Society, Chicago, 1-5 May 1960.

24663
S/081/61/000/009/003/015
B101/B205

24,3500

AUTHORS: Liyd'ya, G. G., Yaek, I. V.

TITLE: Formation of F centers in the KI-Tl crystal by ultraviolet rays

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 9, 1961, 31, abstract 9B213 (9B213) ("Tr. In-ta fiz. i astron. AN EstSSR", 1960, no. 12, 281 - 284)

TEXT: The formation of F centers in monocrystalline layers of the KI (Tl) phosphor has been studied in detail. It was found that the accumulation of light energy exhibits three different mechanisms, depending on the excitation energy: an electron-hole, an exciton , and a "delocalized" mechanism (RZhKhim, 1960, no. 9, 33849), all of which lead to the formation of F centers. The luminescence of KI(Tl) during excitation has also been studied. The steady luminescence consists of two components, i. e., a "rapid" (fluorescent lifetime shorter than 1 sec) and a "recombinative" one (fluorescent lifetime of the order of 1 min). An

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Formation of F centers in the....

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external temperature quenching is observable during excitation within the main absorption range: The recombinative part is quenched at 260 - - 370°K. This occurs long before the internal quenching sets in. [Abstracter's note: Complete translation.]

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SOV/51-8-1-26/40

AUTHORS: Yaek, I.V. and Livl'ya, G.T.

TITLE: Excitation of Recombination Luminescence in the Fundamental Absorption Bands of Certain Halides

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 1, pp 142-144 (USSR)

ABSTRACT: Luminescence of activator ions is excited in the fundamental absorption bands of alkali-halide phosphors. Transfer of energy from the base to the activator may occur via excitons or as a result of electron-hole processes. In the latter case either electron recombination luminescence is possible (free electrons recombine with holes localized at or near luminescence centres), or hole recombination luminescence (holes recombine with electrons localized at or near luminescence centres). The relative importance of these processes was studied using excitation spectra of steady-state luminescence and recombination luminescence (phosphorescence). This study was extended to fundamental absorption bands corresponding to exciton formation and "band-band" transitions. Alkali iodides (KI:Tl, KI:..., CsI:Tl, RbI:Tl, CdI$_2$:Pb) with fundamental absorption bands lying in the region $\lambda > 185$ mμ were the objects of this investigation. The excitation spectra of phosphorescence were the functions $I_{ph}(\nu) = I^{*}_{ph}/B(\nu)$,

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Excitation of Recombination Luminescence in the Fundamental Absorption Bands of Certain Halides

where I^{*}_{ph} is the intensity of afterglow at a time t since the end of excitation, and $B(\nu)$ is the intensity of the exciting light. Under the conditions of total absorption (neglecting reflection losses) these functions are the phosphorescence yield spectra. The phosphors were excited using light of 186-225 mμ from a condensed spark between Zn, Cu, Al electrodes. In the region $\lambda > 210$ mμ the phosphors were also excited with light from a hydrogen lamp passed through a monochromator of a spectrophotometer SF-4. The quantity $B(\nu)$ was found using an anthracene screen. Phosphorescence was recorded with a photoelectric photometer, consisting of FEU-19, a d.c. amplifier and an automatic-recording potentiometer EPP-09. A special check showed that the intensity of luminescence was proportional to the intensity of the exciting light. A figure on p 143 shows the absorption spectrum of the base (curve 1), the excitation spectrum of phosphorescence (curve 2) and of steady-state luminescence (curve 3) of KI with 0.06 mol.% of Tl (the upper part of the figure) and of RbI:Tl (the lower part of the figure). The excitation spectra of the remaining iodides were similar. Three regions can be distinguished in the absorption spectrum: the activator absorption (transitions $^1S_0 \rightarrow {}^3P_1$ and $^1S_0 \rightarrow {}^1P_1$ in Tl^+ ions), the exciton absorption (ex) and the absorption corresponding to "band-band" transitions (e + p).

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Liyd'ya, G.G.

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S/051/60/009/01/012/031
E201/E691

AUTHORS: Lushchik, Ch.B., Liyd'ya, G.G., Yaek, I.V. and Tiysler, E.S.

TITLE: The Mechanism of the Recombination Luminescence of Activated Alkali-Halide Crystals

PERIODICAL: Optika i spektroskopiya, 1960, Vol 9, Nr 1, pp 70-76 (USSR)

ABSTRACT: This paper was presented in an expanded version at the Conference on Physics of Alkali-Halide Crystals (Tartu, June 1959). The authors report and discuss the results of an investigation of the recombination luminescence (due to recombination of electrons and holes) and photochemical transitions (optical bleaching) in KCl, KBr and KI crystals activated with Ga^{+}, Ge^{++}, In^{+}, Sn^{++}, Tl^{+} and Pb^{++}. The crystals were excited with X-rays and light in the regions of exciton and activator absorption bands and of the "band-band" transitions. The role of electron, hole, exciton and sensitization processes is discussed. The discussion is illustrated by excitation, luminescence, thermoluminescence, optical flash stimulation, optical and thermal bleaching spectra (Figs 1-5). There are 5 figures and 32 references, 30 of which are Soviet and 2 English.

Card 1/1

SUBMITTED: September 28, 1959

83333 S/058/61/000/006/019/063
A001/A101

24.3500 (1137, 1138, 1395)

AUTHORS: Liyd'ya, G.G., Yaek, I.V.

TITLE: Origination of F-centers in KI-Tl crystals by ultraviolet radiation

PERIODICAL: Referativnyy zhurnal, Fizika, no. 6, 1961, 164, abstract 6V222 ("Tr. In-ta fiz. i astron. AN Est.SSR", 1960, no. 12, 281-284)

TEXT: The authors studied in detail the processes of F-center origination in monocrystalline layers ($d \approx 5\ \mu$) which were obtained by melting KI-Tl phosphor subjected to irradiation by ultraviolet rays. The experiments conducted have shown that three different mechanisms of accumulating light energy can take place, dependent on E_{exc}, namely: electron-hole, exciton, and "delocalization" mechanism. F-centers are created by all these ways. The luminescence of KI-Tl during excitation was also investigated. It turned out that stationary luminescence consists of two components: "fast" (rise time is $\sim$1 sec) and "recombinational" ($\sim$1 min), the ratio of which depends on the wavelength, intensity of exciting light and temperature.

N. Maksimova

[Abstracter's note: Complete translation.]

Card 1/1

LUSHCHIK, Ch.B.; LIYD'YA, G.G.; LUSHCHIK, N.Ye.; SHVARTS, K.K.; YAEK, I.V.

Physical processes in alkali halide crystal phosphors activated by mercury-like ions. Fiz.tver.tela 3 no.4:1176-1184 Ap '61. (MIRA 14:4)

1. Institut fiziki i astronomii AN Estonskoy SSR, Tartu.
(Phosphors)

31116
S/613/61/000/014/010/019
D207/D303

9.4175 (1114, 1163)

AUTHORS: Liyd'ya, G. G., and Yaek, I. V.

TITLE: External thermal and optical quenching of KI:Tl photoluminescence

SOURCE: Akademiya nauk Estonskoy SSR. Institut fiziki i astronomii. Trudy. No. 14, 1961. Issledovaniya po lyuminestsentsii, 236-246

TEXT: The authors studied the effect of external quenching (heating and infrared F-band illumination) on luminescence of the KI phosphor containing 0.05 mol. & Tl; external quenching means processes occurring outside luminescence centers. A thin layer (4 μ) was used and the Tl^+ emission was selected by means of filters. The phosphor was excited with short ultraviolet radiation in the fundamental absorption region. Excitation at λ = 219 mμ produced anion excitons and at λ = 186 mμ it generated free electrons and holes. The rise curve showed that luminescence consisted of two components: A "fast" component which rose to its steady-state va-

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External thermal and ...

lue in less than 1 sec from beginning of excitation and a "slow" component which reached the steady state in about 1 min. The fast component exhibited no optical quenching (it was unaffected by F-band illumination), but it was quenched thermally at 500 - 600°K. It was, therefore, concluded that the fast component represented "direct" excitation of activator ions. The slow component was quenched thermally at 250 - 350°K, indicating typical external quenching of recombination luminescence. F-band illumination (λ = 680 mμ) quenched the slowcomponent when excitation produced inter-band transitions, but the slow component was enhanced when ultra-violet excitation generated excitons. A simple theory, accounting for the observed quenching and enhancement of the slow component, is given in the paper. Acknowledgment is made to Ch. B. Lushchik who directed this work. There are 2 figures and 21 references: 19 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: H. Klasens, Nature, 158, 306 (1946); F. Seitz, Rev. Mod. Phys., 26, 7 (1954).

SUBMITTED: August 9, 1960

Card 2/2

S/613/61/000/014/013/019
D207/D303

AUTHOR: Liyd'ya, G. G.

TITLE: The mechanism of interaction between excitons and Tl ions in the KI:Tl phosphor

SOURCE: Akademiya nauk Estonskoy SSR. Institut fiziki i astronomii. Trudy. No. 14, 1961. Issledovaniya po lyuminestsentsii, 272-275

TEXT: The author reports a study of transfer of the absorbed optical energy from excitons to Tl^+ centers in KI:Tl crystals; this energy is subsequently emitted as Tl^+ luminescence. Experiments were carried out at 120°K. Two quartz monochromators of СФ-4 (SF-4) type and a photomultiplier ФЭУ-18 (FEU-18) were used to obtain emission spectra (excitation wavelength fixed), excitation spectra (emission wavelength fixed) and absorption spectra. The following were recorded: Absorption spectrum in the 4-6 eV region; excitation spectra of the 2.9 eV ($^3P_1 \rightarrow {}^1S_0$) emission and of the F-band flash;

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The mechanism of interaction ...

quantum yield spectrum of 2.9 eV emission; fluorescence and excitation spectra of the 4 eV ($^3P_2 \rightarrow {}^1S_0$) emission. The results indicate that excitons generated by absorption of light react with Tl^+ activator centers as follows:

$$Tl^+(^1S_0) + ex \rightarrow Tl^+ex \rightarrow Tl^+(^3P_1) \rightarrow Tl^+(^1S_0) + h\nu \qquad (2)$$

where "ex" represents free excitons, and "hv" represents the 2.9 eV emission. There are 1 figure and 10 references: 7 Soviet-bloc and 3 non-Soviet-bloc. The references to English-language publications read as follows: K. J. Teegarden, Phys. Rev., 105, 1222 (1957); P. Yuster and C. Delbecq, J. Chem. Phys., 21, 892 (1953); P. D. Johnson and F. E. Williams, Phys. Rev., 117, 964 (1960).

SUBMITTED: January 19, 1961

Card 2/2

S/613/61/000/017/007/011
D051/D113

24.3500 (1137, 1138, 1163)

AUTHOR: Liidja, G.G.

TITLE: KI-In luminescence excitation in the long wavelength part of fundamental absorption

SOURCE: Akademiya nauk Estonskoy SSR. Institut fiziki i astronomii. Trudy, no. 17, 1961. Issledovaniya po lyuminestsentsii, 93-104

TEXT: The absorption spectra, stationary luminescence excitation spectra and F-flash excitation spectra of thin melted KI-In films (0.002% mol) were investigated at 300° and 100° K. No "D-band" (analogue of the KI-Tl 5.5 eV band) was found in the absorption spectrum at low temperature. The In^+ stationary luminescence yield is quite low in the maximum of the exciton band, but at the long wavelength slump attains 70% (300° K) or 85% (100° K) of the yield upon activator excitation. After plastic flow, it was observed that the yield decreases somewhat when $E_{exc} > 4.3$ eV. The F-stimulated flash of In^+ emission was also studied. The shape of the excitation spectrum depends upon excitation density. The spectrum for a low

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density is given. The difference between exciton and activator excitation is well characterized by the spectrum of the relative yield of flash (the ratio of the intensity of flash to that of fluorescence upon equal excitation). At 100°K, it reveals a long region in the tail of the exciton band (5.3-5.7 eV), where η_{relat} is constant and considerably lower than in the maximum of the exciton band. This field does not appear at 300°K. Red light irradiation simultaneous with excitation increases the saturated luminescence intensity in the case of exciton excitation (amplification) and decreases it in the case of band-to-band excitation (quenching). Ch.B. Lushchik, F.Savikhin, and R.Kink are thanked for help rendered. There are 5 figures. The most important English-language reference is: G.Chiarotti, Phys.Rev., 107, 381, 1957.

SUBMITTED: April 24, 1961

89237

S/048/61/025/001/003/031
B029/B067

9.6150 (also 1137, 1395)

AUTHORS: Luchik, Ch. B., Liyd'ya, and Yaek, I. B.

TITLE: Mechanism of the processes of energy accumulation by crystal phosphors

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 1, 1961, 23-27

TEXT: The present paper deals with the following mechanisms of energy accumulation by crystal phosphors: production mechanism of F-centers in crystals, and mechanisms of thermal and optical "de-excitation" of ion crystals. Three stages are distinguished in energy accumulation by crystals: 1) production of a long-lived excited state; 2) long-lasting conservation of the excited state; 3) processes of "de-excitation" of the crystal. D. I. Blokhintsev (Ref. 1) showed that the electrons and holes occurring after excitation are localized at lattice defects which are far from one another. For this reason, their direct recombination is impossible, and the electrons or holes must be set free from the trapping centers for "de-excitation" of the crystal. Intense ion diffusion prevents

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the crystal from remaining in the excited state for a long time. Even in the production of the simplest F-centers it is necessary to take account of both the active role of electron - hole processes and exciton, sensitizing, ion processes, etc. The number, n_F, of F-centers can be concluded either from the absorption $\chi_F \sim n_F$, from the intensity of luminescence photo-stimulated in the F-region, or from the electron emission photo-stimulated from the F-centers. The accuracy of the two last-mentioned methods exceeds the first by several orders of magnitude. Fig. 1 shows the absorption spectra (1) and the spectra of the production of F-centers (2) for the phosphors KCl - Ca, Tl; KBr - Ga; KBr - In; and KBr - Tl. According to the data obtained, the $^1P_1$ states of monovalent impurity ions can be "de-localized" with a certain probability, which results in the formation of F- and V-centers in the basic material of the crystal. Fig. 2 shows the spectrum of the production of F-centers in KI - Tl as measured by the luminescence method. F-centers are formed not only in the ac region but also in the ex (~220 mμ) and ep regions (~190 mμ) with even stronger efficiency. The production mechanisms of F-centers in the ex- and

ep-regions differ from each other. The dislocation mechanism of the production of F-centers needs additional investigations. The authors then discuss the mechanisms of thermal and optical de-excitation of ion crystals. The third stage of the phenomenon studied here has been investigated in previous papers. The thermal destruction of F-centers in alkali-halide crystals does not lead to their direct thermal ionization. For the NaCl, KCl, and KBr crystals, the thermal destruction of F-centers in the range 100-300°K is connected with hole processes; in the range 400-500°K, however, it is related to electron processes. The ultraviolet radiation at the same frequencies (in the ex and ep regions) is capable of producing and destroying F-centers. Finally, the authors demonstrate that alkali-halide salts are typical crystal phosphors. During an investigation of the luminescence of alkali-halide salts with excitation in the region of self-absorption of the crystal it has been found that many phenomena observed in these crystals are the same as in ZnS phosphors. This investigation was carried out at Tartu. Further details on this subject will be published later. This is the reproduction of a lecture read at the Ninth Conference on Luminescence (Crystal Phosphors), Kiyev, June 20-25, 1960. There are 2 figures and 38 references: 32 Soviet-bloc and 5

non-Soviet-bloc.

ASSOCIATION: Institut fiziki i astronomii Akademii nauk ESSR (Institute of Physics and Astronomy, Academy of Sciences of the Estonskaya SSR)

Legend to Fig. 1: spectra of absorption (1), of F-center production (2), of negative, excited absorption (3), and of the production of activator centers (4).
Legend to Fig. 2: 1) absorption spectrum, 2) spectrum of the excitation of steady luminescence, 3) of recombination phosphorescence, 4) of optical flash-up, 5) and 6) emission spectra in the case of steady luminescence and optical flash-up, 7) spectra of the stimulation of optical flash-up

24.7700

S/058/62/000/008/043/134
A061/A101

AUTHORS: Lushchik, Ch. B., Liyd'ya, G. G., Soovik, T. A., Yaek, I. V.

TITLE: The mechanism of the luminescence of alkali halide crystals under excitation by ultraviolet and hard radiations

PERIODICAL: Referativnyy zhurnal, Fizika, no. 8, 1962, 42, abstract 8V294 ("Tr. In-ta fiz. i astron. AN EstSSR", 1961, no. 15, 103 - 126; summary in English)

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TEXT: The physical processes taking place in ionic crystals under the action of UV and hard radiations are examined. Attention is chiefly devoted to the interaction of different elementary excitations of the basic substance with luminescence centers. An attempt is made to appraise the relative role of exciton and electron-hole processes in gamma and R luminescence. There are 76 references.

[Abstracter's note: Complete translation]

Card 1/1

44376

S/613/62/000/018/006/013
E039/E120

24350

AUTHORS: Kink, R.A., and Liyd'ya, G.G.

TITLE: Non-linear effects in KI-Tl and NaI-Tl luminescence

SOURCE: Akademiya nauk Estonskoy SSR. Institut fiziki i astronomii. Trudy no.18. 1962. Issledovaniya po lyuminestsentsii. 72-92.

TEXT: The photoluminescence of KI-Tl and Na-Tl phosphors in the form of very thin layers ($\sim$ 1 μ) is investigated when excited with ultraviolet light from three spectral regions: in the absorption bands of activator centres (ac - excitation); in the longwave band of the fundamental absorption, where anion excitons are created (ex-excitation); and when excited with the shorter wavelength ultraviolet corresponding to the band to band transitions (ep-excitation). The dependence of the luminescence intensity of ordinary thallious centres on the duration and intensity of excitation is measured at room temperature. The steady state emission is made up of two components: a fast component ($\tau < 10^{-2}$ sec), and a slow or inertial component ($\tau \sim$ minute). With ac-excitation the fast component (fluorescence)

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accounts for more than 95% of the steady state emission. With ep-excitation the slow component may be up to 90% of the saturated intensity. In the case of KI and Tl with ex-excitation the fast component is the principal one, while for NaI-Tl at higher ex-excitation intensities the proportion due to the slow component increases considerably. Steady state luminescence increases with intensity of excitation for ep-excitation of KI-Tl and NaI-Tl and ex-excitation of NaI-Tl. In the case of ex-excitation of KI-Tl the yield is independent of the excitation density. The mechanism of these processes is discussed.
There are 10 figures.

SUBMITTED: December 27, 1961

Card 2/2

ACCESSION NR: AR4043997 S/0058/64/000/006/D074/D074

SOURCE: Ref. zh. Fizika, Abs. 6D557

AUTHOR: Lushchik, Ch. B.; Liyd'ya, G. G.; Soovik, T. A.

TITLE: The mechanism of luminescence of alkali-halide drystals on excitation by UV and hard radiation

CITED SOURCE: Sb. Stsintillyatory* i stsintillyats. materialy*. Khar'kov, Khar'kovsk. un-t, 1963, 110-113

TOPIC TAGS: luminescence, luminescence mechanism, alkali halide, alkali halide crystal, ultraviolet radiation, x ray radiation, gamma radiation, hard radiation

TRANSLATION: Using KI-Tl as an example, discusses the mechanism of luminescence of alkali-halide drystals during excitation by UV-, γ-, and x-ray radiation. From a comparison of the kinetics of the build-up of luminescence, the effect on it of preliminary irradiation in the F-band, and thermal quenching of luminescence during various forms of excitation, the conclusion is drawn that in the luminescence of KI-Tl during excitation by hard radiation an essential role is played by the

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ACCESSION NR: AR4043997

exciton mechanism of energy transfer from the lattice of the basic substance to the luminescence centers. Bibliography: 25 references.

SUB CODE: IC, OP ENCL: 00

Card 2/2

ACCESSION NR: AT4020799 S/2613/63/000/023/0109/0136

AUTHOR: Kink, R. A.; Liyd'ya, G. G.

TITLE: Some peculiarities of photoluminescence in NaI-Tl and NaI-In

SOURCE: AN EstSSR. Institut fiziki i astronomii. Trudy*, no. 23, 1963. Issledovaniya po lyuminestsentsii (Research in luminescence), 109-136

TOPIC TAGS: luminescence, photoluminescence, exciton, phosphor, crystalline phosphor, alkali halide luminescence, NaI-Tl luminescence, NaI -In luminescence, photoluminescence excitation wavelength

ABSTRACT: The authors have studied luminescence in NaI-Tl and NaI-In phosphors, excited with ultraviolet radiation which was absorbed in the host crystal, as a function of the excitation wavelength, intensity and time, as well as during simultaneous irradiation with red light. Under stationary conditions, the saturated quantum yield of luminescence due to the activator, both in the exciton band and when excited with shorter wavelengths corresponding to band-to-band transitions, approaches the quantum yield in the activator absorption band when $^1S_0 - {}^3P_1$ transitions are excited. In this respect, NaI-phosphors are similar to the other activated iodides (KI-Tl, KI-In, RbI-Tl, CsI-Tl heavily doped). The kinetics of NaI-Tl luminescence differ from that of KI-Tl and RbI-Tl. When excited,

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ACCESSION NR: AT4020799

luminescence rises in the exciton band slowly, and only 15% of the saturated intensity is built up momentarily (in less than 0.01 seconds). The intensity of the instantaneous component is a linear function of the intensity of the excitation; the intensity of the inertial component is a superlinear component of the same parameter. If an NaI-Tl crystal is excited in the longwave-band region of the exciton band (where the exciting light penetrates to a depth greater than 1 micron), the kinetics of NaI-Tl approach those of KI-Tl. This peculiarity of NaI-Tl and NaI-In phosphors is also attenuated by a drop in temperature. With excitation at 100K, the luminescence build-up remains slow in the band-to-band region, whereas with exciton-excitation the inertial component is reduced to 40% (NaI-Tl) or disappears altogether (NaI-In). Apparently, two effects are present here: 1) Near the surface, there are defects in which the excitons are dissociated into electrons and holes that later recombine and give rise to a slow luminescence build-up. 2) A small energy interval between the exciton band and the conduction band may cause autoionization in the excitons, with the same result. At 100K, band-to-band excitation and exciton-excitation are individualized, because the exciton band and continuous absorption overlap to a smaller extent. The shape of the excitation spectrum of phosphorescence proves that the exciting light quanta, the energy of which corresponds to the "shoulder" in the absorption spectrum of NaI (5.7-5.8 electron volts), create electrons and holes in the crystal. In the peak region of the fundamental absorption area (5.45 - 5.65 electron volts), the energy of the absorbed quanta is conveyed to the luminescence center chiefly by "exciton

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ACCESSION NR: AT4020790

impact". "The authors express their gratitude to Ch. B. Lushchik for proposing the subject and discussing the work, to T. Soovik for his useful remarks, and to O. M. Kondvalov and A. N. Panova for supplying the monocrystals." Orig. art. has: 6 figures and 1 table.

ASSOCIATION: Institut fiziki i astronomii AN EstSSR (Institute of Physics and Astronomy, AN EstSSR)

SUBMITTED: 12Jan63 DATE ACQ: 07Apr64 ENCL: 00

SUB CODE: PH NO REF SOV: 028 OTHER: 014

3/3

Card

L 20763-65 EEC(b)-2/EPF(c)/EPF(n)-2/EWT(l)/EWT(m)/T Pr-4/Pu-4 IJP(c)/
SSD(c)/AFWL/ASD(a)-5/ASD(m)-3/AFETR/AFTC(a)/ESD(ga) GG

ACCESSION NR: AT5000396 S/3119/64/000/001/0015/0025

AUTHOR: Lushchik, Ch.B., Lyd'ya, G.G., Elango, M.A. B+1

TITLE: Study of the processes of generation of radiation-induced defects in ionic crystals

SOURCE: AN LatSSR. Institut fiziki. Radiatsionnaya fizika, no. 1, 1964. Ionny*ye kristally* (Ionic crystals), 15-25

TOPIC TAGS: alkali halide crystal, crystal lattice, lattice defect, radiation defect, color center, thallium activator, ultraviolet irradiation

ABSTRACT: The object of this work was to study the creation of color centers in NaCl single crystals by x-rays and by irradiation in the vertical channel of the IRT reactor of the Institut fiziki AN Lat.SSR (Physics Institute of the Academy of Sciences of the Latvian SSR). The study is a direct continuation of a series of investigations conducted at the Institut fiziki i Astronomii AN Est.SSR (Institute of Physics and Astronomy of the Academy of Sciences of the Estonian SSR) and aimed at elucidating the mechanisms governing the coloration of ionic crystals by ultraviolet light. Spectra of the creation of color centers in thin films of KI-Tl by monochromatic ultraviolet radiation were recorded. Electron, exciton, and ionization mechanisms of the creation of color centers and radiation-induced defects in

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L 20763-65
ACCESSION NR: AT5000396

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ionic crystals are discussed on the basis of the data obtained and literature data. "In conclusion, the authors express their appreciation to K.K. Shvarts for his collaboration in the work and for reviewing the results, as well as to V.P. Denka, E.R. Il'mas, and R.A. Kink for their participation in the experiments." Orig. art. has: 5 figures.

ASSOCIATION: Institut fiziki i astronomii AN Est. SSR (Institute of Physics and Astronomy, AN Est.SSR); Institut fiziki AN Lat.SSR (Physics Institute, AN Lat.SSR)

SUBMITTED: 18Mar64 ENCL: 00 SUB CODE: OP, SS

NO REF SOV: 025 OTHER: 034

Card 2/2

L 6091-65 EWT(1)/T/EEC(b)-2 LJP(c)
ACCESSION NR: AT5013536 UR/2613/64/000/026/0112/0120

AUTHORS: Il'mas, E. R.; Kink, R. A.; Liyd'ya, G. G.; Malysheva, A. F. 23 24 B+1

TITLE: Absorption spectra 21 of lead halide salts in the region from 2 to 9.5 eV

SOURCE: AN EstSSR. Institut fiziki i astronomii. Trudy, no. 26, 1964. Issledovaniya po lyuminestsentsii (Research on luminescence), 112-120

TOPIC TAGS: absorption spectrum, lead compound, halide salt, thin film, exciton, absorption band

ABSTRACT: The authors have measured the absorption spectrum of thin layers of $PbCl_2$, $PbBr_2$, and PbI_2 sublimated on LiF plates. Unlike earlier investigations, the spectrum measurement is extended in this work to 9.5 eV energy. The purpose of the investigation was to determine the energy spectrum of various elementary excitations of the crystal and to check whether the energy of anionic excitons is larger

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L 60914-65
ACCESSION NR: AT5013536

than the energy of the cationic excitons in ionic crystals containing Pb^{++}. The results show that the lowest energy absorption bands in $PbCl_2$ (4.55 eV) and in $PbBr_2$ (3.7 eV) are correlated with the absorption bands and the phosphors KCl-Pb and KBr-Pb, corresponding to the $^1S_0$ -- $^1P_1$ transitions in the Pb^{++} ions. In view of this correlation, the bands in $PbCl_2$ and $PbBr_2$ are attributed to cationic excitons. This makes $PbCl_2$ and $PbBr_2$ suitable objects for the investigation of the migration of cationic excitons in phosphors. 'The authors thank Ch. B. Lushchik for a discussion of the work and T. Laysaar and T. Savikhina for help with the measurements.' Orig. art. has: 4 figures.

ASSOCIATION: Institut fiziki i astronomii AN EstSSR (Institute of Physics and Astronomy, AN EstSSR)

SUBMITTED: 18Jun63 ENCL: 00 SUB CODE: OP

NR REF SOV: 011 OTHER: 013

Card 2/2

L 60903-65 EWT(l) LJP(c)
ACCESSION NR: AT5013545 UR/2613/64/000/026/0213/0215

AUTHORS: Il'mas, E. R.; Liyd'ya, G. G.; Lushchik, Ch. B. 12 B

TITLE: Photon multiplication as an elementary act of the scintillation process

SOURCE: AN EstSSR. Institut fiziki i astronomii. Trudy, no. 26, 1964. Issledovaniya po lyuminestsentsii (Research on luminescence), 213-215

TOPIC TAGS: photon multiplication, scintillation counting, alkali halide crystal, photon yield, quantum yield

ABSTRACT: For the purpose of an experimental investigation of the elementary scintillation act, wherein one quantum of ultraviolet radiation is transformed into two quanta of visible light ($\eta = 2$), the authors succeeded to obtain photoluminescence with $\eta > 1$ and a series of single crystals of KCl, KBr, and KI activated with thallium and indium. The excitation source was a powerful discharge in hydro-

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ACCESSION NR: AT5013545

gen, neon, or helium in a flow-through quartz lamp, making it possible to experiment in the spectral range from 5 to 21 eV. The luminescence excitation spectra were measured at 293K at 90° to the direction of excitation by means of a sensitive photoelectric photometer, relative to sodium salycilate standard. The quantum yield began to increase with increasing frequency, starting with 11, 13.5, and 16.7 eV for KI-In, KBr-In, and KCl-Tl respectively, and exceeding unity for KI-In and KBr-In. The photon multiplication began at a photon energy approximately double the width of the forbidden band, apparently as a result of generation of two electron-hole pairs by a single quantum. A detailed report will be published in the journal 'Optika i spektroskopiya.' Orig. art. has: 1 figure

ASSOCIATION: Institut fiziki i astronomii AN EstSSR (Institute of Physics and Astronomy, AN EstSSR)

SUBMITTED: 22May64 ENCL: 00 SUB CODE: OP

NR REF SOV: 004 OTHER: 002

Card 2/2

L 60908-65 EWT(1)/EWT(m)/EWP(t)/EWP(b) LJP(c) JD

ACCESSION NR: AT5013546 UR/2613/64/000/026/0216/0219

AUTHORS: Kink, R. A.; Liyd'ya, G. G.; Maaroos, A. A.; Soovik, T. A.

TITLE: Concentration dependence of the photoluminescence and radioluminescence yields of KI-Tl

SOURCE: AN EstSSR. Institut fiziki i astronomii. Trudy, no. 26, 1964. Issledovaniya po lyuminestsentsii (Research on luminescence), 216-219

TOPIC TAGS: photoluminescence, radioluminescence, potassium iodide phosphor, concentration dependence

ABSTRACT: The authors measured the dependence of the luminescence yield on the concentration of thallium in KI-Tl in which the excitons or electron-hole pairs were produced optically or by α-particle bombardment. The crystals were grown by the Kiropoulos method. The luminescence quantum yield was measured with a vacuum monochromator by a method described elsewhere (Opt. i spektr. v. 18, 1965). Plots are presented of the concentration dependences of the energy yield of

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the stationary luminescence when excited in the maximum of the exciton absorption band (5.65 eV) and when excited in the region where electron -hole pairs are produced (8.6 eV). In the former case the plot is nearly a straight line with less than unity slope, showing saturation when the concentration of the activator exceeds 10^{-1} molar per cent. The difference in the concentration dependence of the exciton and the electron-hole luminescence can be attributed to the fact that the ratio of the effective cross sections for capture by the luminescence center and by the competing defects is much smaller for excitons than for electrons and holes. In the case of α-particles excitation, the dependence of the scintillation yield on the concentration does not coincide with the dependence of the photoluminescence for either interband excitation or excitation in the exciton band, but is closer to the latter. Although this can be interpreted as being due to the appreciable role of exciton processes in α scintillations produced in KI-Tl, it is emphasized that the conditions for optical and α excitations differ greatly. Orig. art. has: 1 figure

L 60908-65
ACCESSION NR: AT5013546

ASSOCIATION: Institut fiziki i astronomii AN EstSSR (Institute of Physics and Astronomy, AN EstSSR)

SUBMITTED: 10Jun64 ENCL: 00 SUB CODE: OP

NR REF SOV: 004 OTHER: 001

Card 3/3

ACCESSION NR: AP4043338 S/0181/64/006/008/2256/2262

AUTHORS: Lushchik, Ch. B.; Liyd'ya, G. G.; Elango, M. A.

TITLE: Electron-hole mechanism of production of color centers in ionic crystals

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2256-2262

TOPIC TAGS: color center, ionic crystal, electron bombardment, x ray irradiation, color center, ultraviolet irradiation, alkali halide, crystal lattice defect

ABSTRACT: The present communication is a direct continuation of a cycle of investigations carried out by their laboratory to clarify the mechanism whereby ionic crystals become colored by ultraviolet radiation, x-rays, and radiation from reactors. Natural crystals of NaCl and crystals of NaCl.Tl and KCl.Ag grown from melts of especially pure salts by the Kiropoulos method were irradiated in

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ACCESSION NR: AP4043338

the vertical channel of the IRT-2000 reactor, and also with x-rays (60keV), slow electrons (150 eV), and ultraviolet radiation (5--14 eV). The authors were especially interested in elementary processes which occur during a complicated phenomenon such as radiation coloring of ionic crystals, and paid consequently special attention to a parallel investigation of the production of F centers by these type of radiations. It is shown that irradiation of the crystals leads not only to a filling of the anion vacancies by electrons, but also to generation of a large number of new point defects and their clustering. Only the electron-hole mechanism of F-center production is considered in detail, the others having been treated by the authors in numerous other papers. It is pointed out, however, that this is not the only possible mechanism. "We are deeply grateful to K. K. Shvarts for collaboration and to G. Va e. E. Il'mas, T. Eksina, and I. Yaek for participating in the experiments and a discussion of the results." Orig. art. has: 6 figures.

Card 2/3

ACCESSION NR: AP4043338

ASSOCIATION: Institut fiziki i astronomii AN ESSR, Tartu (Institute of Physics of Astronomy, AN ESSR)

SUBMITTED: 28Dec63 ENCL: 00

SUB CODE: OP, SS NR REF SOV: 031 OTHER: 008

Card 3/3

L 2836-66 EWT(l)/EWT(m)/T/EWP(t)/EWP(b) LJP(c) JD/JG/GG

ACCESSION NR: AT 021772 UR/2613/64/000/028/0003/0019

AUTHORS: Lushchik, N. Ye.; Lushchik Ch. B.; Liyd'ya, G. G.; Meriloo, I. A.

TITLE: Localized electronic excitations of ionic crystals, activated by mercury-like ions

SOURCE: AN EstSSR. Institut fiziki i astronomii. Trudy, no. 28, 1964. Issledovaniya po lyuminestsentsii (Research on luminescence), 3-19

TOPIC TAGS: luminescence property, luminescence research, luminescence, luminescence spectrum, luminescence yield, luminescent crystal, phosphor, gallium, indium, tin, tellurium, lead

ABSTRACT: In order to determine the nature of the excitation and energy migration in activated alkali halide crystals, the excitation spectra of 13 alkali halide crystals activated by Ga, In, Sn, Tl, and Pb in the spectral region 3-10 ev were investigated. The study is an extension of the previously reported work in the spectral region 2-6 ev by N. Ye. Lushchik, (Materialy VII Soveshchaniya po lyuminestsentsii (Kristallofosfory), Tartu, 1959, str. 27). Four series of experiments were performed

I	KF-In,	KCl-In,	KBr-In,	KJ-In,
II	KF-Tl,	KCl-Tl,	KBr-Tl,	KJ-Tl.

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L 2836-66

ACCESSION NR: AT5021772

III KCl-Ga, KCl-In, KCl-Sn, KCl-Tl, KCl-Pb,
IV KBr-Ga, KBr-In, KBr-Sn, KBr-Tl.

In series I and II, the activator was fixed (In or Tl), and the anion was varied. In series III and IV, the activator was varied, but the anion remained fixed (KCl or KBr). The experimental procedure followed was that of E. R. Il'mas, G. G. Liyd'ya, and Ch. B. Lushchik, (Opt. i spektr., 1964). Excitation spectra for the systems investigated are presented graphically, and the position of D absorption bands are tabulated. It was found that the excitation bands at the long wavelength tails of exciton absorption bands were almost independent of the activator, but depended substantially on the nature of the host anion. A model for near activator centers is proposed. It is concluded that the phosphors investigated exhibit activator as well as near activator electronic excitations. The authors thank E. R. Il'mas for the development of the ultraviolet vacuum experimental apparatus and R. A. Kink for his help, as well as A. A. Maaroos for the Tl determination in the phosphors. Orig. art. has: 2 tables and 6 graphs.

ASSOCIATION: Institut fiziki i astronomii, AN EstSSR (Institute for Physics and Astronomy, AN EstSSR)

SUBMITTED: 14Feb64 ENCL: 00 SUB CODE: SS, OP

NO REF SOV: 038 OTHER: 011

Card 2/2 BVK

L 2832-66 EWT(1)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG

ACCESSION NR: AT5021777 UR/2613/64/000/028/0080/0092

44,55 44,55 44,55 56 50 B+1

AUTHORS: Gorbachev, B. N.; Kink, R. A.; Liyd'ya, G. G.

TITLE: On the dependence of the effectiveness of the exciton and electron-hole energy transfer mechanisms in alkali iodides on the intensity of excitation

SOURCE: AN EstSSR. Institut fiziki i astronomii. Trudy, no. 28, 1964. Issledovaniya po lyuminestsentsii (Research on luminescence), 80-92

TOPIC TAGS: luminescence property, luminescence research, luminescence, luminescence spectrum, luminescence yield, luminescent crystal, ultraviolet radiation, phosphor

21,44,55

ABSTRACT: The dependence of the luminescence yield on the intensity of host lattice excitation with monochromatic ultraviolet radiation in certain alkali iodides activated with thallium (NaI, KI, RbI, and CsI) was determined. The investigation was a continuation of the work of E. R. Il'mas, G. G. Liyd'ya, and Ch. B. Lushchik (Opt. i spektr. (v pechati)). Monocrystals of the phosphors were grown after the method of Kiropulos; all measurements were carried out in vaccuum. Quantum yields of luminescence as a function of excitation energy were determined, and the results are shown graphically in Fig. 1 on the Enclosure. It was found that the intensity of the slow luminescence component (attributed to the electron-hole energy transfer

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L 2832-66
ACCESSION NR: AT5021777 6

mechanism) increased with increasing intensity of excitation, and that intensity of the fast component is independent of the intensity of excitation. The x-ray luminescence of CsI - Tl was also studied, and it was found that the efficiency of radioluminescence is independent of the intensity of the excitation radiation. The authors thank Ch. B. Lushchik for suggesting the investigation and for his help in evaluating the experimental results. Orig. art. has: 2 tables and 6 graphs.

ASSOCIATION: Institut fiziki i astronomii, AN EstSSR (Institute for Physics and Astronomy, AN EstSSR) 44,55

SUBMITTED: 08Jan64 ENCL: 01 SUB CODE: SS, OP

NO REF SOV: 017 OTHER: 006

Card 2/3

L 2832-66
ACCESSION NR: AT5021777

ENCLOSURE: 01

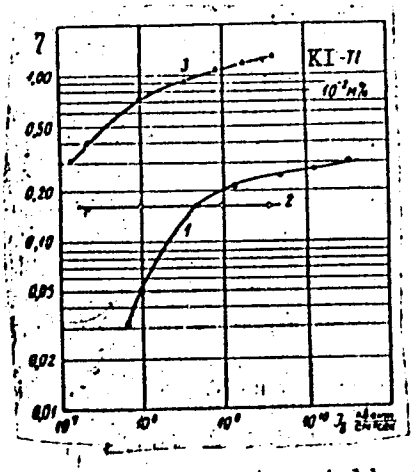

Fig. 1. Dependence of luminescence quantum yield on the intensity of excitation for excitation with energy quanta 10.15 ev (1), and 16.7 ev (2,3), filter SZS-18; 1,3 - quantum yield of slow component, 2 - quantum yield of fast component

BVK
Card 3/3

L 38[illegible]-65 EEC(b)-2/EWT(1)/T Pi-4 IJP(c) GG

ACCESSION NR: AP5006433 S/0051/65/018/003/0453/0460

AUTHOR: Il'mas, E. R.; Liyd'ya, G. G.; Lushchik, Ch. B.

TITLE: Photon multiplication in crystals. I. Luminescence excitation spectra of ionic crystals in the range from 4 to 21 eV

SOURCE: Optika i spektroskopiya, v. 18, no. 3, 1965, 453-460

TOPIC TAGS: ionic crystal, photon multiplication, excitation spectrum, luminescence excitation, luminescence yield, quantum yield

ABSTRACT: This is the first of a series of papers and is devoted to a convincing experimental proof of the existence of photon multiplication in crystals in the optical band. To this end, the authors measured the luminescence excitation spectra of 11 single-crystal phosphors KI-Tl, KI-In, RbI-Tl, RbI-In, CsI-Tl, CsI-In, KBr-Tl, KBr-In, KCl-Tl, KCl-In, and NaCl-Tl in the range from 4 to 21 eV. A vacuum SP-68 monochromator modified for luminescence measurement was used. The ultraviolet source was a quartz-capillary high-power lamp of construction described by F. I. Vilesov (PTE, no. 4, 89, 1958). The luminescence of the phosphors was registered with a photomultiplier through filters that separated the individual

Card 1/2

L 43879-65

ACCESSION NR: AP5006433

bands. The details of the test procedure are described. The results show that at energies above 12 eV the quantum yield of the activator luminescence increases, exceeding in many cases the near-unity quantum yield of luminescence produced by direct excitation of the luminescence centers. This demonstrates beyond any doubt that one exciting quantum can produce in ionic crystals two luminescence quanta, proving the existence of photon multiplication in the optical spectrum. The results show also that the stepwise character of variation of the quantum yield from activated ionic crystals as a function of the frequency of the applied light, indicated in earlier papers by one of the authors (Ch. B. Lushchik, Tr. IFA AN ESSR, no 14, 3, 1961 and others), is observed not only in the region of activator but also in the region of the fundamental absorption, at least up to 21 eV energy. Orig. art. has: 5 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 08Apr64 ENCL: 00 SUB CODE: OP,SS

NR REF SOV: 014 OTHER: 019

Card 2/2 mb

L 45756-65 EWT(l)/T/EEC(b)-2 Pi-4 IJP(c) GG
ACCESSION NR: AP5011116 UR/0051/65/018/004/0631/0636

AUTHOR: Il'mas, E. R.; Liyd'ya, G. G.; Lushchik, Ch. B. 21 B

TITLE: Photon multiplication in crystals. II. Photon multiplication mechanisms

SOURCE: Optika i spektroskopiya, v. 18, no. 4, 1965, 631-636

TOPIC TAGS: alkali halide phosphor, quantum yield, optical activation, luminescence, photon multiplication, impurity center, photostimulated luminescence, exciton, electron hole multiplication

ABSTRACT: Part I of the article, published earlier (Opt. i spektr. v. 18, 453, 1965) demonstrated that the activator-glow quantum yield exceeds unity in some crystals excited in the region of the vacuum ultraviolet. The purpose of Part II was to ascertain the mechanism whereby the energy of one exciting quantum is transformed in the crystal into the energy of two or more luminescence quanta of equal frequency. To this end, the excitation spectra of the instantaneous stationary glow component and of the photostimulated luminescence were investigated in KI-Tl, KI-In, RbI-Tl, and RbI-In in the region from 4 to 21 ev. The experimental procedure was the same as described in Part I. The dependence of the

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L 45756-65
ACCESSION NR: AP5011116

instantaneous and inertial stationary glow components on the frequency of the exciting light was studied. An analysis of the experimental data shows that there exist at least two mechanisms of photon multiplication: exciton and electron-hole. It is observed that in the region of photon multiplication the dependence of the yield on the intensity of excitation has singularities connected with the jump-like increase in the volume density of excitation. No mechanism connected with direct excitation of impurity centers by fast electrons could be detected in the experiment. Orig. art. has: 3 figures and 2 formulas. [02]

ASSOCIATION: None

SUBMITTED: 08Apr64 ENCL: 00 SUB CODE: OP, SS

NO REF SOV: 012 OTHER: 006 ATD PRESS: 4001

Card 2/2

L 32925-65 EEC(b)-2/EWT(l)/T LJP(c) S/0048/65/029/001/0027/0035
ACCESSION NR: AP5004515

AUTHOR: Il'mas,E.R.; Kink,R.A.; Liyd'ya,G.G.; Lushchik,Ch.B.

TITLE: Transformations of electron excitations in ionic crystals /Report, 12th Conference on Luminescence held in L'vov 30 Jan-5 Feb 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v.29, no.1, 1965, 27-35

TOPIC TAGS: luminescence, ionic crystal, exciton, quantum yield, alkali halide

ABSTRACT: The reflection spectra from the (100) surfaces of eight alkali halides were measured to a quantum energy of 14 eV with a vacuum monochromator and the results are presented graphically. These spectra show numerous peaks above a relatively smooth background; the peaks in the long wavelength portion of the spectra are characteristic primarily of the anion, and those in the short wavelength region of the cation. The energies of the short wavelength peaks are close to the minimum excitation energies of the free cations. The excitation spectra of the stationary activator luminescence for a number of ionic crystals activated with In or Tl were measured by methods described elsewhere by three of the present authors (Optika i spektroskopiya 17, No.6,1964). The quantum efficiencies were obtained by correcting

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L [illegible]

ACCESSION NR: AP5004515

for incomplete absorption and selective reflection, and the results for several al-
kali halides are presented graphically. Three regions can be distinguished in the
KCl and KBr spectra, in each of which the quantum yield is approximately constant:
[illegible] region of activator absorption, the longest wavelength exciton absorption band,
[illegible] a broad region extending to about 11 eV in the [illegible] rides [illegible] iodides an
[illegible] in quantum yield was observed at excitation energies [illegible] 2 eV
This is ascribed to a photon multiplication process [illegible]
ed above. These experimental data are discussed in some detail in connection with
other material in the literature. The striking fact that emerges is that the final
results are the same whether the ionic crystal is excited by high energy photons or
[illegible] energy ones. It is concluded that the high energy excitation is rapidly
[illegible] formed into simple excitons and [illegible]. Orig. art. has: 4 figures
and 1 table.

ASSOCIATION: Institut fiziki i astronomii Akademii nauk EstSSR (Institute of Physics and Astronomy of the Academy of Sciences, Estonian SSR)

L 5454-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG
ACC NR: AP5025095 SOURCE CODE: UR/0368/65/003/003/0276/0278

AUTHORS: Kink, R. A.; Liyd'ya, G. G.

ORG: none

TITLE: Photoluminescence of alkali iodides activated by thallium and indium /Presented at the 12th Conference on Luminescence in L'vov January 1964/

SOURCE: Zhurnal prikladnoy spektroskopii, v. 3, no. 3, 1965, 276-278

TOPIC TAGS: photoluminescence, luminescence research, luminescence spectrum, luminescence crystal, potassium iodide, rubidium iodide

ABSTRACT: The photoluminescence of KI and RbI activated by Tl and In respectively was investigated. The luminescence was produced by excitation in the exciton absorption region ($\sim$ 5.5 ev) and the vacuum ultraviolet region. The experimental results are presented graphically (see Fig. 1). It is concluded that electron hole luminescence bears a pure recombination character, usually associated with a subsequent localization at the luminescence centers. By optical studies only it is impossible to determine whether hole localization occurs first, followed by

UDC: 535.37

Card 1/2

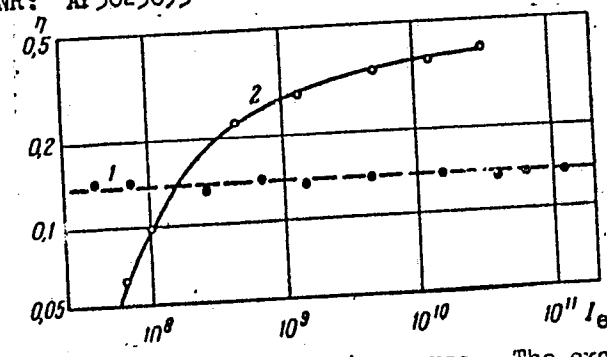

Fig. 1. Dependence of stationary luminescence yield, η of KI - Tl phosphor for exciton excitation (1, E_{ex} = 5.6 ev) and electron-hole excitation (2, E_{ex} = 10, 15 ev) on the intensity of excitation. I_{ex} (quanta·cm^{-2}·sec^{-1}) C_{Tl} = 5 x 10^{-2} mole % in crystal, filters SZhS-18 FS - 1 and neutral NS-8 and NS-9, T = 295K, yield at E_{ex} = 4.35 ev is taken as unity.

electron recombination, or vice versa. The exciton luminescence is best described as exciton annihilation of excitons migrating to the luminescence centers and subsequent energy transfer to the latter, as reported by Ch. B. Lushchik, N. Ye. Lushchik, G. G. Liyd'ya, and L. A. Teyss (Trudy IFA AN ESSR, v. 6, 63, 1957). The authors thank Ch. B. Lushchik for help received in evaluating the experimental results. Orig. art. has: 3 graphs.

SUB CODE: OP, SS SUBM DATE: 05Jan65/ ORIG REF: 010/ OTH REF: 002

Card 2/2 md

EEC(b)-2/EPF(n)-2/EPA(s)-2/EWA(c)/EWT(l)/EWT(m)/EWP(b)/T/EWP(t) Pt-4/
Pt-7/Pu-4 IJP(c) GG/JD/JG

ACCESSION NR: AP5009507 S/0048/65/029/003/0373/0379

AUTHOR: Zazubovich,S.G.; Liyd'ya,G.G.; Lushchik,N.Ye.; Lushchik,Ch.B.

TITLE: Optical structure of luminescence centers in activated ionic crystals /Report, 12th Conference on Luminescence held in L'vov, 30 Jan-Feb 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 3, 1965, 373-379

TOPIC TAGS: luminescence, luminescence polarization, luminescent crystal, luminescence center, alkali halide, single crystal

ABSTRACT: This paper is concerned with the luminescence of alkali halide crystals activated by mercury-like ions. Excitation spectra are presented for the potassium halides activated with indium and tantalum (8 spectra); these spectra cover the photon energy range from 2 to 10 eV. Three principal excitation regions are distinguished: a group of long wavelength bands (the A, B, and C bands); an excitation band adjacent to the fundamental absorption edge (the D band); and an excitation band within the fundamental absorption region. Earlier experimental data, both of the present authors and of others, are adduced, including polariza-

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L 43905-65

ACCESSION NR: AP5009507

tion spectra of the luminescence of KCl activated with Ga, In, Tl, Ge, Sn, and Bi. These data are discussed at some length, and it is concluded that the A, B, and C bands are due to activator excitation and are genetically related to transitions to the $^3P_1$, $^3P_2$, and $^1P_1$ states of the free activator ion, and that the D band is due to excitation of ions of the host, perturbed by neighboring activator ions. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 00 ENCL: 00 SUB CODE: OP, SS

NR REF SOV: 017 OTHER: 007

Card 2/2 mB

ACC NR: AT7001730 SOURCE CODE: UR/3119/66/000/004/0071/0083

AUTHOR: Il'mas, E. R.; Liyd'ya, G. G.; Lushchik, Ch. B.; Soovik, T. A.

ORG: Institute of Physics and Astronomy, AN EstSSR (Institut fiziki i astronomii AN EstSSR)

TITLE: Photon multiplication in crystals and the phenomenon of radioluminescence

SOURCE: AN LatSSR. Institut fiziki. Radiatsionnaya fizika, no. 4, 1966. Ionnyye kristally (Ionic crystals), 71-83

TOPIC TAGS: photon, radioluminescence, x ray effect, quantum yield, ionic crystal, absorption band, light excitation

ABSTRACT: In connection with their earlier experiments (Opt. i spektr. v. 18, 631, 1965 and elsewhere) dealing with observation and investigation of photon multiplication by crystals in the optical band (rather than x-ray or gamma region), the authors discuss in the present article the connection between this effect and the phenomena of x-ray luminescence and radioluminescence. Particular attention is paid to the role of different electronic excitations of the crystal lattice and to luminescence excited in ionic crystals by hard radiation. Photon multiplication in the optical range was investigated with a special set-up including a vacuum monochromator and a diffraction grating, a high power discharge lamp, a monochromator, a vacuum chamber

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ACC NR: AT7001786

for the samples, and a comparison standard (sodium salicylate) described in the earlier investigation. A number of optical phenomena were investigated in the photon energy range from 5 to 21 eV, particularly the spectra of the quantum yield of stationary photoluminescence of several dozen activated ion crystals. The results show convincingly that photon multiplication in the optical region of the spectrum does exist arises when a single photon produces two electronic excitations in the crystal lattice. The two possible mechaisms for this phenomenon (exciton and electron-hole) are described there and characteristic features are compared with earlier experiments by the authors and by others. It is shown that these two mechanisms operate also in the case of radioluminescence of ionic crystals. A formula is derived for the energy yield of activator luminescence excited in the main absorption bands of a crystal. The possibility of decreasing the time lag of the electron-hole radioluminescence mechanism in scintillating crystals is discussed. As a rule, in stationary radioluminescence the electron-hole mechanism predominates, while in scintillations the two mechanisms are in general on par. In NaI-Tl crystals the electron-hole mechanism apparently predominates. It is shown that a possible reason for the deviation of the real scintillation yield from the estimates presented in the article is the inertia of the electron-hole mechanism. Orig. art. has: 4 figures, 4 formulas, and 1 table.

SUB CODE: 20/ SUBM DATE: 00/ ORIG REF: 022/ OTH REF: 006

Card 2/2

LIYELAUSIS, O.A.

D-8

USSR/Statistical Physics - Liquids

Abs Jour : Referat Zhur - Fizika, No 5, 1957, 11517

Author : Kirho, I.M., Liyelausis, O.A.

Inst : Institute of Physics, Academy of Sciences, Latvian SSR.

Title : Possibility of Employing the Method of Similarity for Determination of Parameters of a Liquid Metal.

Orig Pub : Fiz. metallov i metallovedeniye, 1956, 2, No 3, 563-564

Abstract : The authors discuss the possibility of determining the electric conductivity, the density, and viscosity of a liquid metal by similarity methods, using experiments on the twist of a liquid, filling a closed cylindrical vessel, in a rotating magnetic field, and from the damping of the motion of a liquid after the rotating field is turned off. The Navier-Stokes and electrodynamic equations are written in dimensionless forms. As a result

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D-8

USSR/Statistical Physics - Liquids

Abs Jour : Ref Zhur - Fizika, No 5, 1957, 11517

of experiments with mercury, one-to-one relations are established between the similarity criteria for frequencies of 50, 100, and 200 cycles.

Card 2/2

LIYELAUSIS, O.A.

PHASE I BOOK EXPLOITATION SOV/3762

Konferentsiya po magnitnoy gidrodinamike. Riga, 1958.

Voprosy magnitnoy gidrodinamiki i dinamiki plazmy; trudy Konferentsii. (Problems in Magnetohydrodynamics and Plasma Dynamics; Transactions of a Conference) Riga, Izd-vo AN Latviyskoy SSR, 1959. 343 p. Errata slip inserted. 1,000 copies printed.

Sponsoring Agency: Akademiya nauk Latviyskoy SSR. Institut fiziki.

Editorial Board: D.A. Frank-Kamenetskiy, Doctor of Physics and Mathematics, Professor; A.I. Vol'dek, Doctor of Technical Sciences, Professor; I.M. Kirko, Doctor of Physics and Mathematics; V.Ya. Valdre, Candidate of Physics and Mathematics; V.G. Vitol, Candidate of Physics and Mathematics; Yu.M. Kruzin'; and V.Ya. Kravchenko.

Ed.: A. Teytel'baum; Tech. Ed.: A. Klyavinya

PURPOSE: This book is intended for physicists working in the field of magneto-hydrodynamics and plasma dynamics.

COVERAGE: This volume contains the transactions of a conference held in Riga, June 1958, on problems in applied and theoretical magnetohydrodynamics. The objects of the conference were the investigation of the basic trends in theoretical and applied magnetohydrodynamics, establishing contact between the people doing research in different branches of magnetohydrodynamics, and promoting the participation of theoretical physicists in problems in applied magnetohydrodynamics. More than 160 persons from different parts of the Soviet Union took part in the conference, and 55 papers were read. Similar conferences are to be held regularly in the future; the next such conference is scheduled to be held in Riga in June 1960. In this present collection of the transactions of the conference, most of the papers and comments on papers are presented by the authors themselves in an abridged form. The book is divided into two parts: the first part deals with problems in theoretical magnetohydrodynamics and plasma dynamics, and consists of 33 articles on such aspects of the problem as the application of magnetohydrodynamics in astrophysics (D.A. Frank-Kamenetskiy), magnetohydrodynamics and the investigation of cosmic-ray variations (L.I. Dorman), acceleration of plasma in a magnetic field (G.V. Gordeyev and A.I. Gubanov), stability of shock waves and magnetohydrodynamics (A.I. Akhiyezer). The second part, consisting of 33 articles, deals with problems of experimental magnetohydrodynamics, including the application of physical simulation for investigation of electromagnetic processes in liquid metals (I.M. Kirko) and the development of electromagnetic pumps (P.G. Kirillov), at the Institute of Physics of the Academy of Sciences, Latvian SSR. Several articles are devoted to induction pumps, electromagnetic crucibles, electromagnetic stirrers for molten metals, and their application in the metallurgical industry including schematic diagrams of their power-supply systems. References are given at the end of most of the articles.

AVAILABLE: Library of Congress

JA/mas
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Card 12/12

89427

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11.4300

AUTHORS: Branover, G., Liyelausis, O.

TITLE: Effect of a transverse magnetic field on the internal structure and the hydraulic resistance in turbulent flows of liquid metal. 1. State of the problem and tasks of research

PERIODICAL: Izvestiya Akademii nauk Latviyskoy SSR, no. 1(162), 1961, 59-66

TEXT: The hypothesis according to which a magnetic field suppresses the turbulence in a mercury flow was established long ago. A turbulent flow of liquid metal was observed in all magnetic-hydrodynamic apparatus (pumps, mixers, etc.). The characteristic quantity of the flow is the drag coefficient for which the relation $\lambda \sim \tau_0/v^2 \sim \nu/\delta v^2$ (3) holds in a laminar flow of liquid metal, where τ_0 denotes the stress of the frictional force on the wall, δ the thickness of the boundary layer in a laminar flow, and the velocity of flow. The relation indicated shows that the drag [illegible] at the critical velocity does not depend on the magnetic

field. At Reynolds numbers below 7000, the drag coefficient in a laminar flow drops down to a value $\lambda = \lambda_{cr} = \text{const}$, whereas at Reynolds numbers above 7000 the drag coefficient rises with the increase of the magnetic field. The increase, drop, or constancy of the drag coefficient is determined by the ratio of the Hartman effect (braking of concentrated motion by the magnetic field, accompanied by a velocity change and an increase of the drag coefficient) and of the suppression of turbulent pulsation of velocities, accompanied by a decrease of the drag coefficient. In the present paper, the authors determine the effect of a magnetic field on the drag, on the velocity distribution in various cases, and on the mass transfer process which is directly connected with the structure of turbulence. The experimental arrangement (Fig. 2) is a system of canals and tubes with closed mercury circulation produced by a d.c. electromagnetic pump (K). The measurements were made in open canals of rectangular cross section (3 cm wide), one of which, 150 cm long, was laid between the poles of an electromagnet with a homogeneous transverse field of 1750 gauss, whereas the second one, about 100 cm long, was outside the magnetic field. The average depth of mercury in the canal was 4.5 cm. A flowmeter (B) was inserted in the system. At the

passage of a current of up to 1000 a between the electrodes of the pump, and an induction of about 1500 gauss between the magnet poles, the mean velocity in the canal attained 20 cm/sec. The Reynolds number varied in the experiments from Re = 6680 to Re = 18400, and the Hartman number from M = 0 to M = 41.5. A modified Pitot tube was used to measure the velocity at different points of the canal. Fig. 3 gives some results of these measurements. Fig. 4 shows the dependence of the uniform velocity distribution coefficient $\psi = U_\delta/U_{max}$ (5) (U_δ = velocity near the wall, U_{max} = velocity in the flow axis) on the ratio M^2/Re. Fig. 5 shows the velocities measured in the horizontal plane at different Hartman numbers, and Fig. 6 the change of the uniform velocity distribution coefficient with the field stress in the artificially roughened canal. The rate of dissolution of lead in a mercury flow is greatly slowed down by the magnetic field. There are 7 figures, 1 table, and 10 references: 5 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Institut fiziki AN Latv.SSR
(Institute of Physics of the AS Latviyskaya SSR)