ARKHANGEL'SKAYA, N.V., (Moskva, Krasnokazarmennaya ul., d.3,kv.276)

Characteristics of cardiac circulation in the case of dextrad division of the bulbul cordis (Fallot's tetralogy) and certain other congenital heart diseases. Grud.khir.1.no.2: 31-38, Mr-Ap '59 (MIRA 16:7)

1. Iz I Gorodskoy klinicheskoy bol'nitsy imeni N.I.Pirogova (glavnyy vrach - zasluzhennyy vrach RSFSR L.D.Chernyshev) i Instituta grudnoy khirurgii (dir.-prof. A.A.Busalov) AMN SSSR.
(HEART--BLOOD SUPPLY) (TETRALOGY OF FALLOT)

2295. **Rare variants of the points of entry of vena cava into the heart (Russian text)**
ARKHANGELSKAYA N. V. *Khirurgiya* 1959, 1 (93—98) Illus. 3

Three cases of double superior vena cava associated with dextra-division of the bulbus cordis with a patent foramen ovale are described. In 2 cases the anomalous left superior vena cava entered the right atrium through the coronary sinus and in the 3rd case the left atrium. The presence of a double superior vena cava was diagnosed in all of the patients, but the entry of the superior vena cava into the right atrium through the coronary sinus was not detected. The presence of a double superior vena cava and of a patent foramen ovale enhanced the haemodynamic disturbances which occurred in connection with the dextra-division of the bulbus cordis.

(XVIII, 7, 9)

BAKULEV, A.N., akademik; SMIRENSKAYA, Ye.M. (Moskva, Baltiyskiy per., d.3/25,kv.27); GEL'SHTEYN, G.G.; ARKHANGEL'SKAYA, N.V.

Massage of the heart under clinical conditions. Grud. khir. 1 nc.4:6-14 Jl-Ag '59. (MIRA 15:3)

1. Iz Instituta grudnoy khirurgii AMN SSSR (dir. - prof. A.A. Busalov, nauchnyy rukovoditel' - akademik A.N. Bakulev).
(CARDIAC MASSAGE)
(CHEST—SURGERY)

ARKHANGEL'SKAYA, N.V., kand.med.nauk (Moskva)

Polycystosis of the kidneys; clinical anatomical comparisons. Klin. med. 37 no.11:99-104 N '59. (MIRA 13:3)

1. Iz patologoanatomicheskogo otdeleniya (zaveduyushchiy - kand.med. nauk N.V. Arkhangel'skaya) i urologicheskogo otdeleniya (nauchnyy rukovoditel' - prof. A.Ya. Pytel') 1-y Moskovskoy gorodskoy klinicheskoy bol'nitsy imeni N.I. Pirogova (glavnyy vrach - zasluzhennyy vrach RSFSR L.D. Chernyshev).
(KIDNEY DISEASES pathology)

ARKHANGEL'SKAYA, N.V., kand.med.nauk (Moskva)

"Vascular bed of the pulmonary artery in congehital heart defects" by K.Kohn, M.Richter. Reviewed by N.V.Arkhangel'skaia. Arkh. pat. 21 no.9:75-77 '59. (MIRA 14:8)

(PULMONARY ARTERY) (HEART--ABNORMITIES AND DEFORMITIES)
(KOHN, K.) (RICHTER, M.)

ARKHANGEL'SKAYA, N.V. (Moskva, Krasnokazarmennaya ul.,d.3,kv.276)

Characteristics of the histostructure of the cardiac vessels in dextrad division of the bulbus cordis (tetralogy of Fallot). Grud. khir. 2 no.1:53-60 Ja-F '60. (MIRA 15:3)

1. Iz Instituta grudnoy khirurgii AMN SSSR (dir. - prof. A.A. Busalov, nauchnyy rukovoditel' - akademik A.N. Bakulev) i patologoanatomicheskogo otdeleniya I Gorodskoy klinicheskoy bol'nitsy imeni N.I. Pirogova (glavnyy vrach - zasluzhennyy vrach RSFSR L.D. Chernyshev).
(HEART--BLOOD SUPPLY)
(TETRALOGY OF FALLOUT)

ARKHANGEL'SKAYA, N.V.

Condition of the pulmonary arterial system in congenital heart defects. Grud. khir. 2 no.6:55-60 N-D '60. (MIRA 14:1)

1. Iz patomorfologicheskoy laboratorii (zav. - prof. Ya.L.Rapoport) Instituta grudnoy khirurgii (dir. - prof. S.A.Kolesnikov) AMN SSSR. Adres avtora: Moskva, Leninskiy prospekt, d.8, Institut grudnoy khirurgii AMN SSSR.
(HEART--ABNORMITIES AND DEFORMITIES)
(LUNGS--BLOOD SUPPLY)

ARKHANGEL'SKAYA, N.V.

Pathological anatomy of Vieussens-Rhebesius vessels in dextroposition of the bulbus of the heart (tetrology of Fallot) and their role in coronary circulation in this disease. Arkh.pat. 22 no.3:10-19 '60. (MIRA 13:12)
(TETRALOGY OF FALLOT) (CORONARY VESSELS--DISEASES)

ARKHANGEL'SKAYA, N.V.

Labor anesthesia with promedol combined with propazine. Sov. med. 25 no.3:80-84 Mr '61. (MIRA 14:3)

1. Iz akushersko-ginekologicheskoy kliniki lechebnogo fakul'teta (zav. - prof. A.M.Foy) Saratovskogo meditsinskogo instituta (direktor - dotsent N.R.Ivanov).

(ANESTHESIA IN OBSTRETICS) (PROMAZINE)
(PIPERDINE)

RAPOPORT, Ya.L.; ARKHANGEL'SKAYA, N.V.; BYKOVA, N.A.; GENIN, N.M.

Pathomorphological changes in the mitral valve at various periods after commissurotomy. Grud.khir. 4 no.6:17-22 N-D'62 (MIRA 16:10)

1. Iz laboratorii patomorfologii (zav. - prof. Ya.L.Rapoport) i otdeleniya priobretennykh porokov serdtsa (zav. - prof. S.A. Kolesnikov) Instituta serdechno-sosudistoy khirurgii (dir. - prof. S.A.Kolesnikov; nauchnyy rukovoditel' - akademik A.N. Bakulev) AMN SSSR. Adres avtorov: Moskva, V-49, Leninskiy prospekt, d.8, Institut serdechno-sosudistoy khirurgii AMN SSSR.

(MITRAL VALVE--DISEASES) (HEART--SURGERY)

ARKHANGEL'SKAYA, N.V.

State of the arterial system of the lungs in congenital heart defects with reduced blood supply of the pulmonary artery. Grudn. khir. 5 no.4:37-43 Jl-Ag'63 (MIRA 17:1)

1. Iz patomorfologicheskoy laboratorii (zav. - prof. Ya.L. Rapoport) Instituta serdechno-sosudistoy khirurgii (dir. prof. S.A. Kolesnikov) AMN SSSR. Adres avtora: Moskva V-49, Leninskiy prosp., d.8, Institut serdechno-sosudistoy khirurgii AMN SSSR.

ARKHANGEL'SKAYA, O.A.; RAKHMANOV, P.A.; TOPOR, V.N.; SHELOMOVA, I.N., red.

[Trade-union tourist bases] Turistskie bazy profsoiuzov. Moskva, Profizdat, 1965. 412 p. (MIRA 18:1)

137-58-6-13453

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 330 (USSR)

AUTHORS: Khazan, A. N., Arkhangel'skaya, O. S.

TITLE: The Relationship Between the Elastic Limit and Ultimate Tensile Strength of Alloyed Steel Employed in Turbogenerators (O sootnoshenii velichin predela tekuchesti i predela prochnosti v legirovannoy stali, primenyayemoy v turbogeneratorakh)

PERIODICAL: Elektrosila, 1957, Nr 15, pp 69-74

ABSTRACT: By employing statistical methods for processing of results of experiments performed at the "Elektrosila" plant, as well as in a number of other plants, the metals laboratory of the "Elekrosila" derived certain relationships between the σ_s and σ_b values of two basic groups of forgings employed in construction of turbogenerators: forgings made of 0KhN3M steel (rotors, ventilator and centering rings, etc.), and forgings made of nonmagnetic EI-503 steel (binding rings). The results of 400 experiments dealing with forgings of the first group were processed and it was established that the magnitude of the σ_s / σ_b ratio was never less than 0.7 and that it increased with increasing values of σ_s. In the course of the research, the σ_s was expressed

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The Relationship Between the Elastic Limit (cont.)

as a function of σ_s / σ_b, and σ_s / σ_b as an inverse function of σ_s by means of the following two equations: 1) $\sigma_s = 231.8\ \sigma_s / \sigma_b - 118.2$; and 2) $\sigma_s / \sigma_b \times 10^3 = 3.49\ \sigma_s + 562.4$. On the basis of these equations, corrections on specifications for σ_b of centering rings, ventilator hubs, etc. were introduced in the interdepartmental TUMOP 16-54 and OPTU 83-54 specifications. The results of 805 tests performed on specimens taken from binding rings (forgings of the 2nd group) were processed statistically. The ring specimens, made of EI-503 steel containing 0.6-0.7% C, 7.5-9.4% Mn, 7.5-9.0% Ni, 3.0-4.0% Cr, and 0.5-1.0% W, were tested by the method of warm hardening (a combination of hardening with hot mechanical working conducted partially at temperatures near the threshold of recrystallization). The statistical results were represented by means of graphs showing the expressions σ_s / σ_b and $\sigma_b - \sigma_s$ as functions of σ_s. On the basis of these graphs the following deductions were made: 1. The relationships between the values of σ_s and σ_b change abruptly as the level of the ultimate tensile strength is varied. 2. In the case of 0KhN3M steel and hardened EI-503 steel the relationship of σ_s and σ_b is influenced very little by the structure of the steel or by the degree of alloying. However, in case of structural carbon steels and EI-503 steel, which had not been hardened, the values of the σ_s / σ_b ratio decrease to 0.5 or lower. 3. The widely accepted

137-58-6-13453

The Relationship Between the Elastic Limit (cont.)

mathematical relationship between σ_b and σ_s presented in the TU in the form of a constant difference is, without doubt, incorrect and should be deleted.

I. G.

1. Steel--Mechanical properties 2. Steel--Applications 3. Steel--Statistical analysis 4. Steel--Test results

Card 3/3

ARKHANGEL'SKAYA, S. V.

SEMENYAKO, Ye.M.; ARKHANGEL'SKAYA, S.V.

A rare case of gangrene of the bladder. Urologiia 22 no.2:48-50 Mr-Ap '57. (MLRA 10:7)

1. Iz urologicheskogo otdeleniya (nauchnyy rukovoditel' - prof. A.Ya.Pytel') fakul'tetskoy khirurgicheskoy kliniki (dir. - prof. A.N.Bakulev) II Moskovskogo meditsinskogo instituta i patologo-anatomicheskogo otdeleniya 1-y gorodskoy bol'nitsy (glavnyy vrach L.D.Chernyshev).

(BLADDER, gangrene
rare case)

ARKHANGEL'SKAYA, T. N., Cand Biol Sci -- "Innervation of the aorta of an amphibian (a frog)." Semipalatinsk, 1960. (Novosibirsk Med Inst). (KL, 1-61, 186)

ARKHANGEL'SKAYA, T.P.

Histological study of the innervation of the aorta in a frog. Trudy Semipal. med. inst. 2:362-374 '59. (MIRA 15:4)

1. Iz kafedry gistologii Semipalatinskogo meditsinskogo instituta.
(AORTA--INNERVATION)

BRONSHTEYN, A.P.; ARKHANGEL'SKAYA, T.V.; TALISMAN, L.B.; GORBATYY, Yu.Ye.; EPEL'BAUM, M.B.

Physicochemical investigation of the thermal destruction process of some Kuznetsk Basin coals. Koks i khim. no.11:12-17 '62. (MIRA 15:12)

1. Chelyabinskiy metallurgicheskiy zavod (for Bronshteyn, Arkhangel'skaya). 2. Ural'skiy filial Akademii stroitel'stva i arkhitektury SSSR (for Talisman, Gorbatyy, Epel'baum).
(Kuznetsk Basin--Coal--Carbonization)

ARKHANGEL'SKAYA, V. and ARKHANGEL'SKIY, I. (et. al.)

"On the Problem of Variability of the Anthrax Bacillus", Iz. AN Kazakh SSR, No. 6, pp 18-21, 1950.

ARKHANGEL'SKAYA, V.A.

Match factory operations according to new technological practices. Der.prom. 5 no.11:17 N '56. (MLRA 10:1)

1. TSentral'naya nauchno-issledovatel'skaya laboratoriya spichechnoy promyshlennosti.
(Match industry)

ARKHANGEL'SKAYA, V.A.

MEKHTIYEVA, T.N.; ARKHANGEL'SKAYA, V.A.

Revising the standards for bone glue. Der.prom. 6 no.6:15 Je '57. (MIRA 10:8)

1.TSentral'naya nauchno-issledovatel'skaya laboratoriya spichechnoy promyshlennosti.

(Glue--Standards)

Arkhangel'skaya, V.A.

ARKHANGEL'SKAYA, V.A.

Composition of the striking heads of matches. Der. prom. 6 no.10:28 O '57. (MIRA 10:11)

1. TSentral'naya nauchno-issledovatel'skaya laboratoriya spichechnoy promyshlennosti.

(Matches)

ARKHANGEL'SKAYA, V. A.

Jan 49

USSR/Physics
Phosphors
Luminescence

"A Study of the Initial Stages of Luminescence and Extinguishing in Zinc-Sulfide Phosphors With the Aid of an Oscillographic Phosphoroscope," V. A. Arkhangel'skaya, A. M. Bonch-Bruyevich, N. A. Tolstoy, P. P. Feofilov, 4 pp

"Dok Ak Nauk SSSR" Vol LXIV, No 2

Partial results obtained during study of crystallic phosphors by the "partial time" method. Method allows studies to be conducted in the time interval 10-5-10-1 seconds, suitable for investigating the little-studied initial stages of extinguishing, and the completely unstudied stages of crystallic phosphors bursting into luminescence. Submitted 5 Nov 48.

25/49T99

CA ARKHANGEL'SKAYA, V. A.

Kinetics of initial stages of relaxation of stimulated phenomena in crystal phosphors and semiconductors. V. A. Arkhangel'skaya, M. Bonch-Bruevich and N. A. Tolstoi. *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 15, 695-706(1951); cf. *C.A.* 45, 7878h.—All measurements were made with a γ meter (cf. *C.A.* 45, 10000i) on ZnS-Cu phosphors, heated at 800° with 5% NaCl flux and contg. 10^{-6} to 10^{-2} g. Cu/g. ZnS. Photoluminescence was observed after excitation with light of wave lengths 313 mμ (excitation of filter band) and 365 mμ (excitation of activator band) on the green (Cu) and blue (Zn) emission bands, cathodoluminescence after excitation with 2000-v. electron beams of 0.1–80 microamp. The decay curve is hyperbolic $I(t) = I_0/(1 + \alpha t)^\beta$ where α is independent of the excitation intensity E and λ (or c.d. and excitation voltage) and $\alpha \sim E^\gamma$ with $\gamma = 0.5$–0.7 for different concns. of Cu; also $\alpha \sim i^\gamma$ ($\gamma = 0.35$–0.55) for cathode rays. The decay curve is thus not specific to the mode of excitation and initial stages of decay are the same for cathode rays and light excitation. The decay is accelerated when the "normal" Cu concn. 10^{-4} is exceeded. Below normal concn. the curves do not change in the temp. interval $T = 300$–$400°K$ whereas above normal concn. the decay curves tend to become exponential. The speed of excitation is proportional to $E^{1/2}$ and the stored energy is higher than the emitted light sum. At increased temp. the excitation is retarded. Temp.-conditioned decay starts at 150° for phosphors with Cu content below normal and at room temp. for concns. above normal, the decay becoming faster. The kinetics of hyperbolic photoconductors having the change in cond. $\Delta\sigma \sim 1/(1 + bt)^\beta$, β independent of intensity, $b \sim E^\gamma$ and $\gamma \sim 0.5$ are similar to the above-described kinetics of ZnS-Cu, whereas exponential photoconductors having $\Delta\sigma \sim e^{-t/\tau}$ are similar to willemite and phosphors contg. Mn. Changes in kinetics as a function of temp. can be tied to changes in cond. Electron-bombardment-induced cond. was measured by a method described for CdS (*C.A.* 45, 6043d). The sample is first stabilized by bombarding it for 10–15 min. with the max. current. This type of cond. can be described by $\Delta\sigma = \Delta\sigma_0/(1 + bt)^\beta$, in which b and β are independent of the c.d. The rate of increase of the cond. is proportional to $\sqrt{i}$.

S. Palsweer

CA ARKHANGEL'SKAYA, V. A.

Kinetics of the initial stages of the photoluminescence of zinc sulfide-copper phosphors. V. A. Arkhangel'skaya, A. M. Bonch-Bruevich, N. A. Tolstoi, and P. P. Feofilov. *Zhur. Eksptl. Teoret. Fiz.* 21, 380 (1951).—The rate of decay of the phosphorescence of thin transparent layers of powders of ZnS phosphors with a Cu content varying from 10^{-5} to 10^{-2} g./g., all heated at 800° with 5% NaCl, and of a ZnS-Cu with 10^{-4} g. Cu/g. heated at temps. varying from 700 to 1200°, was detd. in rectangular light impulses with the aid of the "taumeter," an oscillographic phosphorescope with exponential time sweep. In all cases, the decay is hyperbolic, $I \sim (1 + at)^{-n}$, as evidenced by the linearity of the plot $\theta = (1/a\alpha) + (1/\alpha)t$, where the "instantaneous relaxation time" $\theta = -I/(dI/dt)$; slight deviations from linearity are only at the beginning of the ex-

ordinate system, and decrease with increasing intensity of excitation, E. The exponent n is independent of E. The parameter a increases with E according to $a \sim E^{\gamma}$, where γ varies between 0.5 and 0.8; in "pure" ZnS, $\gamma = 0.5$, which corresponds to purely bimol. recombination. The observed deviations from $\gamma = 0.5$ do not correspond to partial degeneration into a pseudo unimol. recombination which would call for $\gamma < 0.5$, and not $\gamma > 0.5$ as observed. The growth of the brightness is approx. $I \sim (1 - e^{-t/\tau})$, and the time t_m corresponding to half the stationary brightness follows $1/t_m \sim E^{\gamma}$, with γ varying between 0.5 and 0.7, and $= 0.5$ for pure ZnS. The value of n remains const., $n = 0.7 \pm 0.1$, independent of the concn. of the activator and of the exciting wave length (365 and 313 mμ), and of the thickness of the phosphor layer. At const. Cu content, 10^{-4}, n remains unaffected by the ignition temp., 700–1200°, in the prepn. of the phosphor. The difference of the rates of decay of the blue and the green emission bands (the 1st decays considerably faster) is detd. by different values of a for the emission bands. In excitation with 365 or 313 mμ, if E in each case is so chosen that a is the same, the decay curves coincide; this takes place when the stationary brightness in 365 mμ is 30 times as great as in 313 mμ. That the difference of the stationary brightnesses in 365 and in 313 mμ is control in the difference of the absorption coeffs., i.e. that the kinetics of the decay is detd. simply by the vol. of excited states, was corroborated by direct detn. of the absorption of microcrystals of the phosphor in 313 and 365 mμ. The ratio of the absorption coeffs. k_{313}/k_{365} was found ≥ 15, which is consistent with the above ratio of 30. For phosphors ignited at different temps., a falls with increasing ignition temp., in accord with the known fact of increasing length of the phosphorescence with increasing ignition temp. Contrary to Lenard's "center" theory, it develops that the kinetics of the early stages of the decay are *at least* bimol., i.e. that any deviations from pure bimolecularity point in the direction opposite to that of pseudounimol. kinetics. This "higher than bimol." growth of the light stored with increasing E may be linked with the phosphorescence-reducing effect of light stressed by Antonov-Romanovskii.

N. Thon

(C. A. 45, 5008*f*).

ARKHANGEL'SKAYA, V. A.

CA

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Investigation of the kinetics of the cathodoluminescence of ZnS.Cu phosphors by the method of the "taumeter." V. A. Arkhangel'skaya, A. M. Bonch-Bruevich, N. A. Tolstoi, and P. P. Feofilov. *Zhur. Eksptl. Teoret. Fiz.* 21, 297–304(1951); cf. *C.A.* 45, 7878h.—The decay of the luminescence of ZnS.Cu phosphors with 10^{-6} to 10^{-3} g. Cu/g. was followed by oscillography with exponential scanning (*Zhur. Eksptl. Teoret. Fiz.* 19, 421(1949); *Izvest. Akad. Nauk S.S.S.R. Ser. Fiz.* 13, 211(1949)) under intermittent excitation with rectangular electron-beam impulses. The decay of the intensity I follows the law $I \sim (1 + at)^{-n}$, with a const. and equal 0.7 ± 0.1, independently of the electron c.d. i (5–75 microamp./sq. cm.), of the Cu content, and of the voltage U(2000–4400 v.), and in both the blue and the green bands. The value of a depends on i, following $a = i^{\gamma}$, with $0.5 < \gamma < 0.7$; the rate of growth of the intensity at any given moment is also proportional to i^{γ}. This behavior is entirely analogous to that of the photoluminescence of the same phosphors. For every intensity of excitation with ultraviolet of a given wave length (313 or 365 mμ), one can find a corresponding i of the electron beam of given velocity, such that the relaxation curves will be similar. The stationary intensities I_0 are inversely proportional to the absorption coeffs. k, i.e. $I_0^{(1)}/I_0^{(2)} = k^{(2)}/k^{(1)}$. Thus, if the optical absorption coeffs. k_0 are known, the absorption coeffs. k for electrons can be detd. through coincidence of the relaxation curves, or by detn. of the ratio of a at equal intensities. For electrons of 2000 v., and light of 313 mμ, the order of magnitude of the ratio k_e/k_0 was thus detd. to be ~ 10. From the fact that, as in photoluminescence, the decay of cathodoluminescence is, at the limit, a bimol. process, it follows that the total light stored and emitted is proportional to i^2/n, i.e. the increase of the stationary no. of excited electrons depends nonlinearly on the no. of electrons impinging per unit time. The regions where 2 different impinging electrons excite the crystals must therefore overlap. By rough calcn., in the range of i where bimolecularity still holds, points hit by electrons within the relaxation time of cathodoluminescence (> 10^{-1} sec.) are sepd. at least by hundreds of at. distances; consequently, the spheres of excitation by electrons must have macroscopic dimensions.

N. Thon

1952

ARKHANGEL'SKAYA, V. A.

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CA

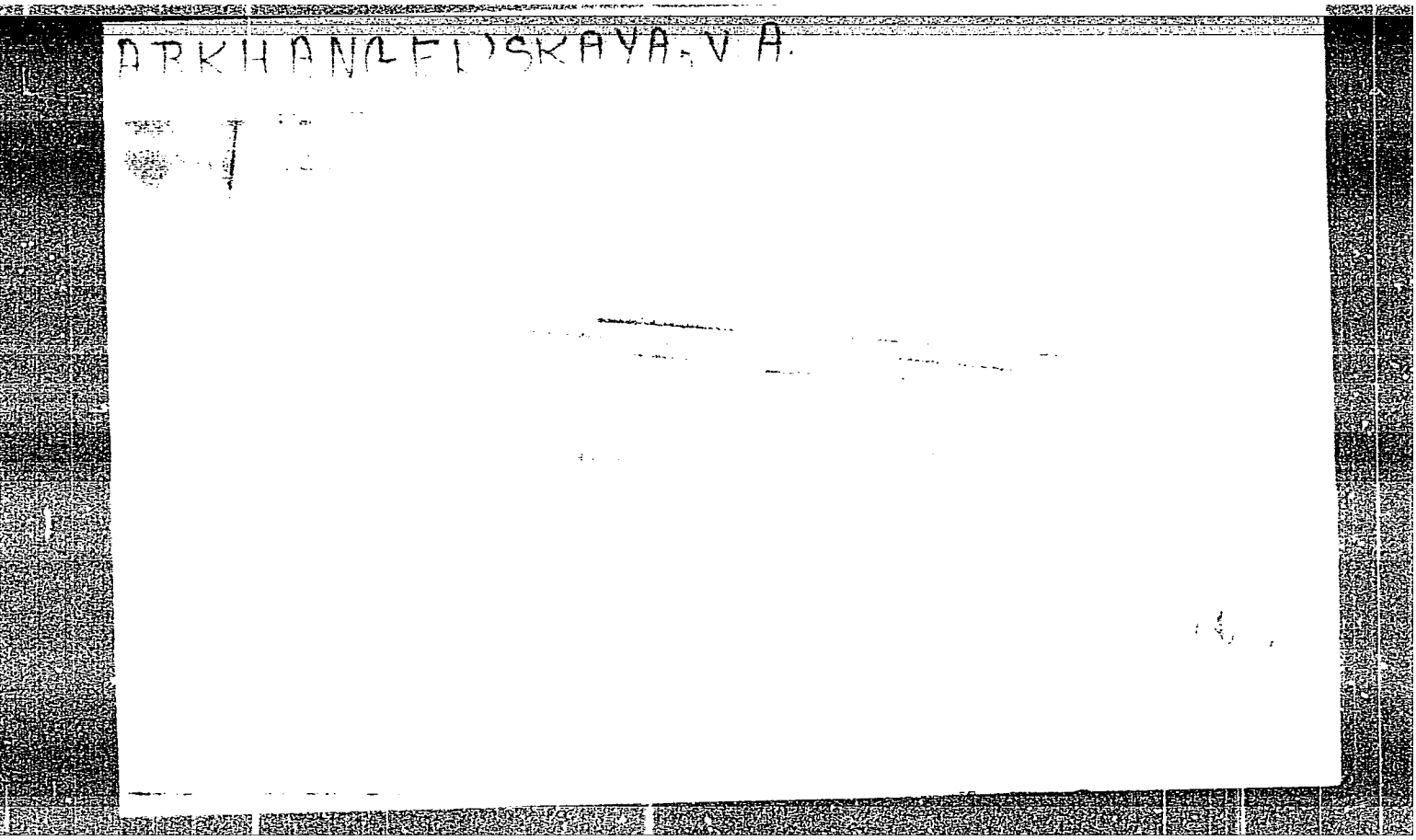
Change of the conductivity of cadmium sulfide on irradiation with electrons. V. A. Arkhangel'skaya and A. M. Bonch-Bruevich. *Doklady Akad. Nauk S.S.S.R.* 77, 229–32(1951).—Crystals of CdS, of a dark cond. less than 5×10^{-13} ohm^{-1}, were exposed to impulses of an electron beam of about 2000 v., and the induced elec. cond. $\Delta\sigma$ was recorded by the method of Tolstoi and Frofilov (*Zhur. Eksptl. Teoret. Fiz.* 19, 421(1940)). $\Delta\sigma$ is a linear function of $\sqrt{i}$ (c.d. of the impinging electron beam), except at lowest i. The decay of $\Delta\sigma$ is slower the higher i. Thus, variation of i from 1 to 15 microamp./sq. cm. increases the half time of the decay by a factor of 1.5. If i is kept const., and the irradiation has been kept up for 10–15 min., the time for the decay to a stated fraction remains const. and is independent of the c.d. of the electron beam, provided it remains below the original i. This constancy is preserved for several days. For a crystal preliminarily irradiated with i = 15 microamp./sq. cm., the points representing log $(\Delta\sigma/\Delta\sigma_0)$ as a function of log t (time in sec.), in irradiation with 1 and with 15 microamp./sq. cm., lie on the same curve, up to $t = 2 \times 10^{-2}$. Linear fall of log $(\Delta\sigma/\Delta\sigma_0)$ as a function of log t is observed between 20 and 500 sec. The relation between i and the time t_m necessary for the cond. to reach the stationary value $\Delta\sigma_0$ is $t_m\sqrt{i}$ = const. The kinetics of the excitation of the cathodocond. of CdS follows approx. a bimol. law. The agreement is strict with respect to the proportionality between $1/t_m$ and $\sqrt{E}$, where E = intensity of excitation, taken to be proportional to i. The deviation from the required proportionality between $\Delta\sigma_0$ and $\sqrt{E}$ at low E (low i) is analogous to the known degeneracy of the bimol. law of growth of the photocond. in the range of low intensities of illumination. The decay of $\Delta\sigma$ in the range 0.001–0.02 sec. can be approximated by the hyperbolic law $\Delta\sigma = \Delta\sigma_0/(1 + at)^\alpha$. The plot of the instantaneous relaxation times θ vs. log t gives $\alpha = 0.65$ and $a = 500$, independently of i. The independence of a of i means that the decay of $\Delta\sigma$ does not follow the bimol. law, which calls for $\Delta\sigma = \sqrt{i}\,f(t\sqrt{i})$. This suggests that the very nature of the cathodocond. changes when the electron bombardment is discontinued. In the range up to 0.02 sec., θ increases proportionally to log t. At later stages of the decay, θ evidently increases more steeply than in the initial stages, in contrast to what is usually found in luminescence.

N. Thon

ARKHANGEL'SKAYA, V.A

[illegible] of luminescence of silver halide salts [illegible]

[illegible] The luminescence was [illegible] [illegible] first [illegible] [illegible] to be insymmetrical, nonexponential, and dependent [illegible] [illegible] ponential process. The kinetics of [illegible] are more complicated, consisting of 2 parts, a process with a time const. of 1-10 microsec and a slower process with a time const. of about [illegible] millisec. The data indicated that Ag halide salts were typical crystal phosphors [illegible]



APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00010202

USSR

535.371 : 537.312.5

6939. Infrared emission bands and kinetics of emission and photoconduction in CdS in temperature region of quenching of luminescence. V. A. ARKH-ANGEL'SKAYA. *Dokl. Akad. Nauk SSSR*, 100, No. 2, 233–5 (1955) In Russian.

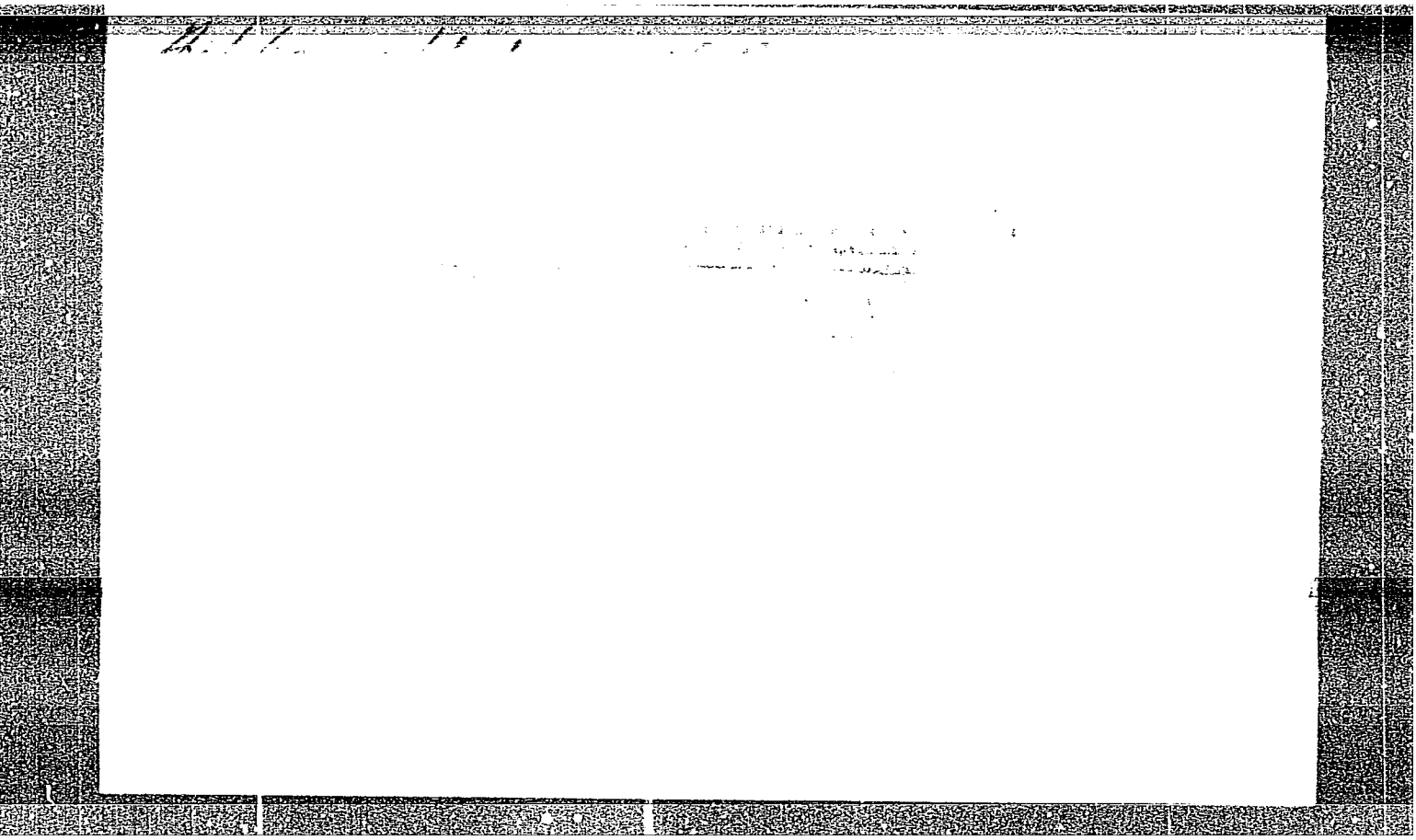
An investigation of growth and decay of luminescence in the red and infrared, and of photocurrents. Spectra at 20, 60 and 100°C show gradual development of longer waves up to 10 140 Å with rising temperature, but above 200°C the infrared emission disappears. The existence of two bands in phosphorescence is shown by two decay curves. Infrared luminescence is not due to impurities. The dependence of instantaneous emission on exciting light is not linear but proportional to 1·5 power. Agreement between growth and decay of phosphorescence and of photocurrent indicates emission due to recombination of electrons with centre.

J. EWLES

ARKHANGEL'SKAYA, V.; TOLSTOY, N.; FEOFILOV, P.

Fifth Conference on Luminescence (crystal phosphors). Opt. i spektr. 1 no.6:813-820 D '56. (MLRA 9:12)

(Tartu--Luminescence--Congresses)



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АРХАНГЕЛЬСКАЯ, В.А.

USSR / Physical Chemistry. Crystals. B-5

Abs Jour : Ref Zhur - Khimiya, No 8, 1957, 25922.

Author : V.A. Arkhangel'skaya, P.P. Feofilov.
Inst : Academy of Sciences of USSR
Title : Luminescence Spectra of Crystals of Some Iodides.

Orig Pub : Dokl. AN SSSR, 1956, No 5, 803 - 805

Abstract : The luminescence spectra (LS) of Hg, Pb and Ag iodides consist of series of bands at the temperature of liquid air. The distances between them and their width increase together with the shift towards the long wave region. The relative intensity of the bands depends very much on the conditions, under which the sample has been prepared, and on the excitation intensity. LS of red HgI_2 consists of a narrow band ($\Delta\lambda$ about 3 mu) at about 536 mu and wide bands at about 565 and 750 mu. The most short-wave band is shifted about 3 mu from the most long-wave exiton ab-

Card : 1/2

USSR / Physical Chemistry. Crystals. B-5

Abs Jour : Ref Zhur - Khimiya, No 8, 1957, 25922

Abstract : sorption band towards the long-wave side. LS of PbI_2 consists of a narrow band ($\Delta\lambda$ about 2 mu) at about 497 mu and wide bands at 515 and 670 mu. Stokes' shift of the narrow band is about 2 mu. There are in LS of AgI a narrow band ($\Delta\lambda$ about 2 mu) at 432 mu and wide bands at 450, 527, 650 and 780 mu. Stokes' shift is about 3 mu. A similar correspondence of absorption spectra and LS is observed also in case of CdS. The displacement of maxima of narrow radiation bands relatively to the bands of exiton absorption is nearly the half of the band width. It is concluded that the narrow radiation bands are bands of resonance luminescence and that they are caused by the collapse of the exiton state.

Card : 2/2

ARKHANGEL'SKAYA, V.A.

PRIKHOT'KO, A.F.

24(7) p 3 PHASE I BOOK EXPLOITATION SOV/1365

L'vov. Universytet

Materialy X Vsesoyuznogo soveshchaniya po spektroskopii. t. 1: Molekulyarnaya spektroskopiya (Papers of the 10th All-Union Conference on Spectroscopy. Vol. 1: Molecular Spectroscopy) [L'vov] Izd-vo L'vovskogo univ-ta, 1957. 499 p. 4,000 copies printed. (Series: Its: Fizychnyy zbirnyk, vyp. 3/8/)

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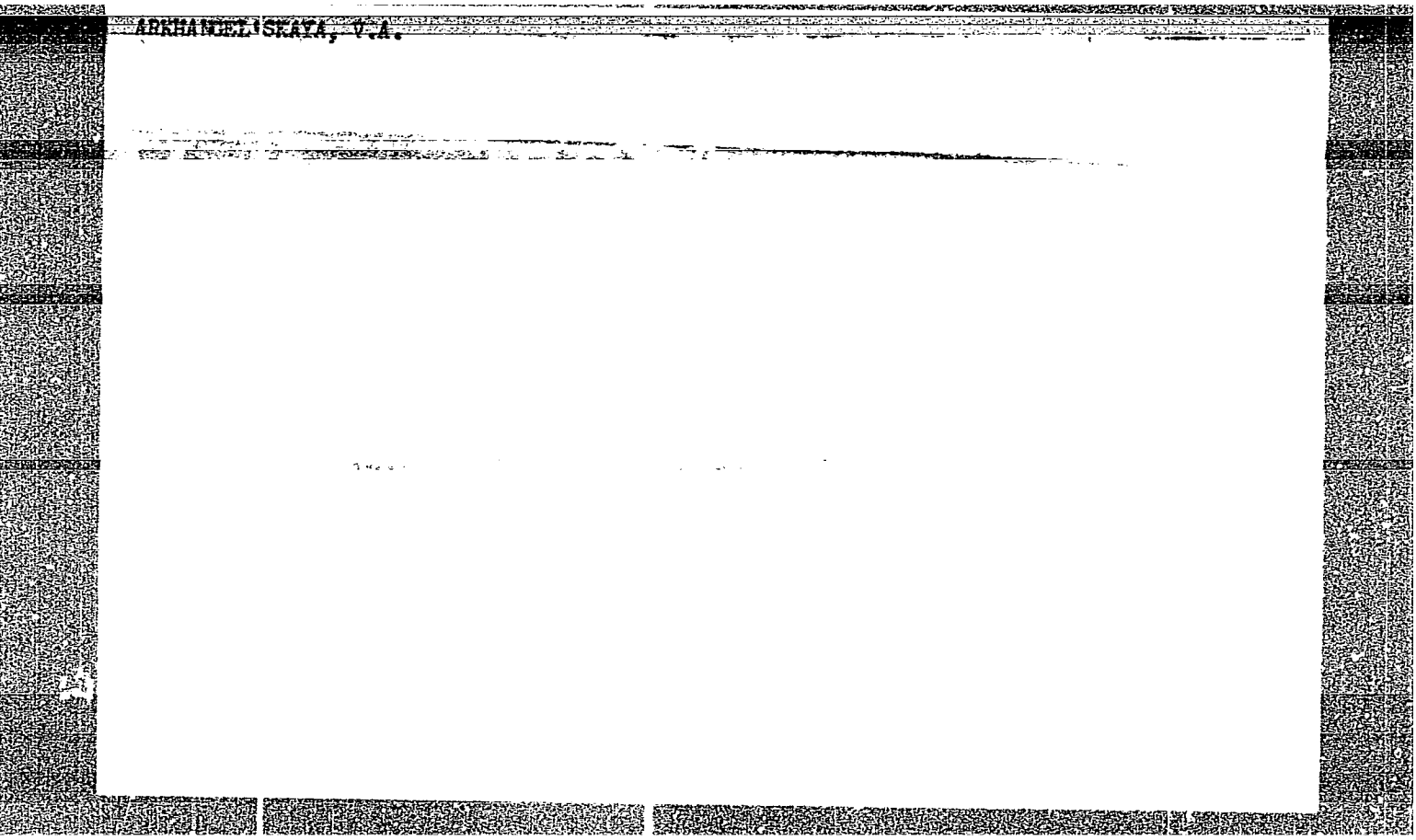
Card 23/30



APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00010202

ARKHANGEL'SKAYA, V.A.; VAYNBERG, B.I.; RAZUMOVA, T.K.

Determination of the permeability of the Schumann spectrum region by optical materials. Fiz. sbor. no.3:363 '57. (MIRA 11:8)

1. Gosudarstvennyy ordena Lenina opticheskiy institut im. S.I. Vavilova.
(Phosphors--Optical properties) (Spectrum, Ultraviolet)

ARKHANGEL'SKAYA, V A

SUBJECT: USSR/Luminescence 48-4-18/48

AUTHORS: Arkhangel'skaya V. A. and Feofilov P.P.

TITLE: Luminescence of Some "Pure" Salts (Lyuminestsentsiya nekotorykh "Chistykh" soley).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21, #4, p 530 (USSR)

ABSTRACT: At the liquid air temperature, luminescence spectra of some non-activated salts (HgJ_2, PbJ_2, AgJ, CdS) consist of a series of bands whose width increases systematically toward the longer wavelengths.

The intensity of individual bands in luminescence spectra greatly depends on the intensity of exciting light. The intensity of short wavelength bands rises with excitation intensity steeper than linear, according to the expression;

$$I \sim E^{\gamma}$$

where $\gamma > 1$, whereas for long wavelength bands $\gamma \leqslant 1$.

Card 1/2

AUTHORS: Arkhangel'skaya, V.A. and Feofilov, P.P. 51-4-5-9/29

TITLE: Zeeman Effect of Anisotropic Centres in the Cubic Crystal Lattice (Yavleniye zeemana dlya anizotropnykh tsentrov v kubicheskoy kristallicheskoy reshetke)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol IV, Nr 5, pp. 602-619 (USSR)

ABSTRACT: Study of magnetic splitting of spectral lines of anisotropic centres makes it possible to find the orientation of these centres with respect to the symmetry axes of the crystal and to find the multipolarity of transitions of the spectral lines of absorption or emission. From the orientation of centres one can make deductions on their structure and their nearest neighbours. From the multipolarity of transitions one can deduce the energy levels of these centres. The first part of this paper is a theoretical consideration of magnetic splitting of spectral lines in crystals with the anisotropic centres oriented in different ways with respect to the symmetry axes. The second part of the paper compares the calculated and experimental values obtained by the study of Zeeman splitting of rare-earth ion lines in synthetic

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fluorite monocrystals. Splitting of both absorption and luminescence lines was studied in fluorite containing Pr, Nd, Sm, Eu, Tb, Dy, Ho, Er and Tm. Concentration of these ions was of the order of 10^{-4}g/g. The samples were in the form of parallelopipeds. The apparatus is shown in Fig 10. Sample K was placed inside a Dewar vessel D filled with liquid nitrogen. The vessel D was placed between the poles of a large electromagnet. To study the absorption spectra an incandescent lamp was used, which was replaced by a mercury lamp when luminescence was investigated. A spectrograph with a bent diffraction grating, which had a dispersion of 3.2 Å°/mm in the first order, was used. Zeeman splitting of lines was observed in the absorption spectra of fluorite containing Nd, Sm, Ho and Er, and in the luminescence spectra of crystals with Sm, Eu (Fig 11), Tb (Fig 11), Dy, Ho and Er. Some of these results are given in Table 7. No effect of magnetic field on the absorption and luminescence spectra of crystals with Pr and on the luminescence spectra of crystals with Tm was observed. The nature of the splitting observed experimentally on rare-earth ions corresponded to the calculated values for centres oriented along

the third order symmetry axis (C_3). The magnitude of the magnetic splitting of the rare-earth lines considerably exceeds the magnitude of the normal Zeeman splitting. This observation agrees fully with the results reported by Becquerel (Ref 2). From the splitting of spectral lines the nature of the elementary oscillators was determined (results are given in Table 9). In the luminescence spectra of fluorite with Sm (Fig 12, Table 10) and in the luminescence spectra of fluorite with Ho and Er (Fig 13) anomalous Zeeman splitting was observed, which did not agree with the authors' calculations. There are 13 figures, 10 tables and 17 references, of which 10 are Soviet, 4 German, 1 French, 1 English and 1 American.

Card 3/3

ASSOCIATION: Gosudarstvennyy opticheskiy institut im. S.I. Vavilova
(State Optical Institute imeni S.I. Vavilov)

SUBMITTED: July 8, 1957

1. Crystals - Transitions - Polarity 2. Spectral lines - Magnetic splitting 3. Crystal centers - Energy theory

AUTHORS: Arkhangel'skaya, V.A., Vaynberg, B.I. and Razumova, T.K. 51-4-5-19/29

TITLE: Thermoluminescent Monocrystals of $CaSO_4$-Mn (Termolyuminestsiruyushchiye monokristally $CaSO_4$-Mn)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol IV, Nr 5, pp. 681-683 (USSR)

ABSTRACT: The authors prepared large crystals (1 x 10 x 10 mm plates) of $CaSO_4$-Mn by slow cooling of a melt consisting of 45% NaCl, 45% $CaSO_4$ and 10% $MnSO_4$. The melt was cooled from 1000°C to room temperature. The amount of Mn varied from about 0.01% to 0.1%. These crystals exhibited bright green thermoluminescence when excited by short-wavelength ultraviolet, X-rays, β-rays or γ-rays. Thermoluminescent intensity of powders prepared from monocrystals grown as described in the present paper was 2-3 times higher than the emission of powders prepared from monocrystals grown from a solution in H_2SO_4 (Ref 6). The main maximum of the thermal stimulation curves (83°C) was the same for monocrystals prepared by growing from melt and those grown from solution (Fig 1a, 1b). Thermoluminescence curves of monocrystals and powders differ considerably in the half-width of the main maximum and the position of the maximum is slightly displaced towards low temperatures in

the case of monocrystals (compare Fig 1a, 1b with Fig 1v). It is found that $CaSO_4$-Mn may be used as a sensitive dosimeter for γ-rays, α-rays and X-rays (Fig 2 shows thermoluminescent intensity as a function of γ-ray dose). The use of monocrystalline samples, instead of powders, of $CaSO_4$-Mn makes it possible to increase the dosimeter sensitivity. There are 2 figures and 7 references, 3 of which are American, 2 German and 2 Soviet.

ASSOCIATION: Gosudarstvennyy opticheskiy institut imeni S.I. Vavilova (State Optical Institute imeni S.I. Vavilov)

SUBMITTED: August 12, 1957

1. Crystals - Thermoluminescence 2. Crystals - Excitation 3. Crystals - Growth

SOV/51-5-4-9/21

AUTHORS: Arkhangel'skaya, V.A. and Tolstoy, N.A.

TITLE: Kinetics of Luminescence of Certain Tungstates and of Zinc Oxide (Kinetika svecheniya vol'framatov i okisi tsinka)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 4, pp 415-422 (USSR)

ABSTRACT: The authors studied kinetics of photoluminescence and cathodoluminescence of $CaWO_4$, $CdWO_4$, $MgWO_4$, $ZnWO_4$, $CaMoO_4$ and ZnO. To study relaxation of cathodoluminescence the authors used the "taumeter method" (Refs 8, 9) with the following modifications: (A) An electron gun produced 12-keV electrons which were used to bombard phosphor samples deposited on chromium plated copper. This copper plate was used to vary the sample temperature from 20°C to 300°C. (B) A special wide-band (2 to 10^7 c/s) cathode-ray oscillograph was used. (C) Photomultipliers used were of Soviet (FEU-19, Sb-Cs type) and German (A.E.G., Cs oxide type) origin. To measure photoluminescence relaxation the authors used a "taumeter" (Ref 8) and the wide-band cathode-ray oscillograph referred to above. The cathodoluminescence relaxation of $CaWO_4$, $CdWO_4$, $MgWO_4$, $ZnWO_4$ and $CaMoO_4$ phosphors had

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the following common characteristics: (1) the rise and decay curves of luminescence were symmetrical; (2) the form of relaxation curves does not depend on the current density in the electron beam; (3) at room temperature the relaxation curves are not of purely exponential nature. Fig 1 shows the decay curves for $MgWO_4$ (Fig 1a) and $CaWO_4$ (Fig 1b). Each of these curves may be represented by two exponential curves whose time constants τ do not differ much from one another. The values of the relaxation time $\bar{\tau}$ given in this paper are the averages of the two values of τ obtained by fitting two expcnentials to each decay curve. Dependence of $\bar{\tau}$ on temperature is given, for the five phosphors listed above, in Fig 2. Fig 3 gives the dependences of the relative brightness I/I_{20} and the relaxation time $\bar{\tau}/\bar{\tau}_{20}$ on temperature t. I_{20} and $\bar{\tau}_{20}$ denote the brightness and the relaxation time at 20°C, and Fig 3 deals with $CaWO_4$ and $MgWO_4$ only. Relaxation of photoluminescence was also studied. Photoluminescence was excited using a mercury lamp SVDSh-250 (365, 334 and 313 mμ). For all the five phosphors listed above the following characteristics of photoluminescence relaxation were noted: (1) the rise and decay curves of luminescence are symmetrical and are of purely exponential nature in a temperature

range from -183°C to +100°C; (2) the form of the decay curves does not depend on the intensity of excitation. Fig 4 gives the $\tau(t)$ curves for photoluminescence of $MgWO_4$, $ZnWO_4$, $CdWO_4$ and $CaMoO_4$. In addition to the four tungstates and one molybdate listed above the author studied two types of ZnO, which differed in their methods of preparation and spectral and relaxation properties. ZnO of type I was prepared from ZnS by oxidation at 800°C. Its photoluminescence spectrum, excited by 365 mμ, is shown in Fig 5, curve 2. It was found that the value of τ in photoluminescence of ZnO I was constant within the range of temperatures from -183°C to +20°C and was equal to 1.25×10^{-6} sec. Curve 1 in Fig 5 represents electron-excited cathodoluminescence of ZnO I. The temperature dependence of τ/τ_{20} and I/I_{20} for electron-excited ZnO I is shown in Fig 6. The cathodoluminescence decay of ZnO I consists of two processes: (1) a fast exponential decay with $\tau = 1.25 \times 10^{-6}$ sec., and (2) a slow non-exponential "tail" with $\tau = 10^{-4}$ sec. The value of τ for the exponential part of the cathodoluminescence decay of ZnO I does not depend on the electron beam density or electron energy. The exponential τ remains constant on heating up to 60°C, and then it falls

reaching 4.5 x 10^{-7}sec at 220°C. Above 145°C the non-exponential "tail" disappears completely. The second type of zinc oxide (ZnO II) is obtained by reduction of ZnO with lampblack above 1000°C. The photoluminescence spectrum of ZnO II is displaced towards longer wavelengths compared with the corresponding spectrum of ZnO I. The cathodoluminescence spectrum of ZnO II possesses also an emission band in the near ultraviolet (Refs 7, 12). X-ray diffraction showed that the lattices of ZnO I and ZnO II are identical. The differences between ZnO I and ZnO II lie only in the chemistry or topography of micro-defects. There are 6 figures, 1 table and 15 references, 10 of which are Soviet, 2 English, 1 Dutch, 1 American and 1 translation.

ASSOCIATION: Gosudarstvennyy opticheskiy institut im. S.I. Vavilova (State Optical Institute imeni S.I. Vavilov).

SUBMITTED: January 6, 1957

Card 4/4 1. Tungsten compounds--Luminescence 2. Zinc oxide--Luminescence
3. Electron bombardment--Applications 4. Phosphors--Properties

ARKHANGEL'SKAYA, V.A.; VAYNBERG, B.I.; RAZUMOVA, T.K.

Reflesometer based on the $CaSO_4$,Mn phosphor for use in the vacuum ultraviolet region. Opt. i spektr. 8 no.2:279-280 F '60. (MIRA 13:10)

(Spectrum, Ultraviolet)

S/089/60/008/06/13/021
B006/B063 8231

21.5200

AUTHORS: Arkhangel'skaya, V. A., Vaynberg, B. I., Kodyukov, V. M., Razumova, T. K.

TITLE: Dosimetry of γ-Radiation, β-Particles, and Neutrons by Means of the Luminescence of the Phosphor $CaSO_4$.Mn

PERIODICAL: Atomnaya energiya, 1960, Vol. 8, No. 6, pp. 559-561

TEXT: In the present article, the authors report on their investigations of the luminescence of the phosphor $CaSO_4$.Mn. The energy, L, stored by this phosphor during its irradiation (called light sum) can be regained as light when heating this phosphor. The maximum in the spectrum of this thermoluminescence is near 500 mμ, as may be seen from Fig. 1. The brightness of this luminescence is a function of the temperature to which the phosphor was heated (Fig. 2). This curve has a peak within the range 80-100°C, which does not depend on the kind of excitation of the phosphor. The phosphor is much more sensitive to X-rays and soft gamma radiation than to harder gamma rays (Curve 1 in

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Fig. 3). When using a lead filter it is possible to extend the sensitivity of a $CaSO_4$.Mn dosimeter to the range 0.1-2.6 Mev (Curve 2 in Fig. 3). With a luminescent area of 2 cm^2, the lower limit is 0.001 r, and the upper limit is about 400 r. Above this dose the L(D) curve is no longer straight (Fig. 4a). At $D \simeq 1000$ r, this deviation is only 30% approximately. A dose of beta rays (e.g., of Sr^{90}, Y^{90}) can be recorded by this apparatus within a range of 1.10^5 - 1.10^8 particles/cm^2 without the occurrence of non-linearity in the L(D) curve (Fig. 4b). The sensitivity of this phosphor at ~15-kev X-radiation amounts to some microroentgens. The L(D) curve for this range is shown in Fig. 4v. When the phosphor is stored at room or higher temperatures, its light sum decreases the quicker the higher is the temperature. Fig. 5 shows L(t) for a phosphor stored at 22°C, 37°C, and 57°C. L drops exponentially with t; at 57°C (Curve 3) it drops so rapidly that L drops to one-tenth of its initial value within 40 hours. This phosphor has some advantages over SrSEu.Sm, such as its insensitiveness to moisture, light, and ultraviolet radiation up to 1500 A. High-density

Dosimetry of γ-Radiation, β-Particles, and Neutrons by Means of the Luminescence of the Phosphor $CaSO_4$.Mn

S/089/60/008/06/13/021
B006/B063 82314

irradiation of 2600-1800 Å for some time leads to a partial loss of the light sum without radiation (which, however, cannot be brought about with a lamp or direct sunlight). $CaSO_4$.Mn may also be used to record thermal and fast neutrons. In the first case, the lead filter is replaced by a thin cadmium layer, and in the second case, polymethyl methacrylate is introduced into the phosphor after its preparation. There are 5 figures and 3 references: 1 German and 1 US.

SUBMITTED: September 11, 1959

Card 3/3

L 19487-63 EWT(l)/EWP(q)/EWT(m)/EWP(B)/BDS AFFTC/ASD/IJP(C)/SSD JD

ACCESSION NR: AT3002238 S/2941/63/001/000/0299/0305

AUTHORS: Arkhangel'skaya, V. A.; Razumova, T. K.

TITLE: Quantum yield of thermal luminescence of $CaSO_4$-Mn phosphor

SOURCE: Optika i spektroskopiya; sbornik statey. v. 1: Lyuminestsentsiya. Moscow, Izd-vo AN SSSR, 1963, 299-305

TOPIC TAGS: quantum yield, gamma radiation, photomultiplier, luminescence

ABSTRACT: The photometric method has been used to determine the absolute quantum yield of thermal luminescence of the phosphor $CaSO_4$-Mn, in the region 113 to 0.0048Å, under the excitation radiation of x-rays and gamma-rays. The relative yield was determined in three steps: soft and ultra-soft x-rays (113-1.54 Å), hard x-rays (0.473 to 0.085 Å), and gamma radiation (0.045-0.0048 Å). The absolute values were then obtained by comparing the relative results to excitation radiation with known wave lengths and given quantum yield and with a standard screen. It is shown that $CaSO_4$-Mn in conjunction with a photomultiplier can serve as an effective radiation criterion in the soft x-ray spectra. Some dataare also presented on the thermal luminescence spectra of $CaSO_4$-Mn. "The authors are grateful to M. A. Rumshi and

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L 19487-63
ACCESSION NR: AT3002238

A. P. Lukirskiy for their evaluation of the work." Orig. art. has: 6 formulas, 4 figures, and 1 table.

ASSOCIATION: none

SUBMITTED: 09Jan62 DATE ACQ: 19May63

SUB CODE: PH NO REF SOV: 007 ENCL: 00

OTHER: 003

Card 2/2

L 15594-63 EWT(1)/EPF(n)-2/BDS AFFTC/ASD/ESD-3/SSD Pu-4 68

ACCESSION NR: AT3006861 S/2560/63/000/015/0071/0080 66

AUTHOR: Kazachevskaya, T. V.; Arkhangel'skaya, V. A.; Ivanov-Kholodnyy, G. S.; Medvedev, V. S.; Razumova, T. K.; Chudaykin, A. V.

TITLE: Measurement of x- and ultraviolet radiation with thermoluminescent phosphorus $CaSO_4$ (Mn)

SOURCE: AN SSSR. Iskusst. sputniki Zemli, no. 15, 1963, 71-80

TOPIC TAGS: rocket investigation, solar ultraviolet radiation, solar radiation, thermoluminescent phosphorus, solar eclipse investigation, ionospheric penetrating radiation

ABSTRACT: A device based on the principle of recording short-wave radiation with $CaSO_4$ (Mn) thermoluminescent phosphorus has been developed by the Institut prikladnoy geofiziki (Institute of Applied Geophysics) to measure solar ultraviolet and x-radiation. The phosphorus stores up energy during irradiation and then reemits it in the visible region of the spectrum when heated. The brightness of the emission, as well as the total energy (light total), is proportional within broad limits to the energy of irradiation. It has been established that $CaSO_4$ (Mn) phosphorus is sensitive only to emission with wavelengths from 1 to 1300 Å and

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L 15594-63

ACCESSION NR: AT3006861

2

does not become saturated during irradiation intensity changes of even five orders. The phosphorus was used on a rocket to measure the intensity of penetrating radiation in the lower part of the ionosphere during the solar eclipse of 15 February 1961. Unlike the use of thermoluminescent phosphorus in rocket measurements in the U. S. A., where the phosphorus is reemitted in the laboratory after retrieval of the container, the phosphorus used in the test of 15 February 1961 was reemitted during the flight, thus reducing the error. Calibration measurement was performed in flight with the use of a constant-action etalon sample. The measurement error in determining the energy of UV radiation was 55%; for x-radiation it was 30%. The intensity of radiation at a height of 95 km was about 7×10^7 quanta cm^{-2} sec^{-1}, while at a height of 67 km it was 500 times lower. This radiation exceeds the theoretically computed maximal solar x-radiation by 50 to 100 times. "The authors thank S. V. Repolovskiy for help in developing the device and carrying out tests and also T. A. Krasnovaya for preparing calibrated luminescent substances." Orig. art. has: 4 tables, 3 figures, and 8 formulas.

ASSOCIATION: none

SUBMITTED: 10May62 DATE ACQ: 29Jul63 ENCL: 00

SUB CODE: AS NO REF SOV: 014 OTHER: 007

Card 2/2

ARKHANGEL'SKAYA, V.A.

Thermoluminescence of activated CaF_2, SrF_2, and BaF_2 single crystals Part 1. Opt. i spektr. 16 no. 4:628-637 Ap '64. (MIRA 17:5)

ACCESSION NR: AP4032867 S/0051/64/016/004/0628/0637

AUTHOR: Arkhangel'skaya, V.A.

TITLE: Thermoluminescence of activated CaF_2, SrF_2, and BaF_2 single crystals. 1. Classification of trapping levels and the recombination character of the thermoluminescence

SOURCE: Optika i spektroskopiya, v.16, no.4, 1964, 628-637

TOPIC TAGS: thermoluminescence, heat stimulated luminescence, glow curve, trapping center, electron trap, recombination luminescence, calcium fluoride, strontium fluoride, barium fluoride, rare earth activator, erbium 3+, holmium 3+, thulium 3+, dysprosium 3+

ABSTRACT: Whereas there have been numerous studies of thermoluminescence (heat stimulated emission) of common alkali halide crystals, there have been relatively few investigations of the corresponding characteristics of rare-earth-activated CaF_2 and its crystallochemical analogs SrF_2 and BaF_2. Accordingly, the present work was devoted to systematic investigation of the thermoluminescence of calcium, strontium, and barium fluorides activated by Er^{3+}, Ho^{3+}, Tm^{3+}, and Dy^{3+} with a view to elucidat-

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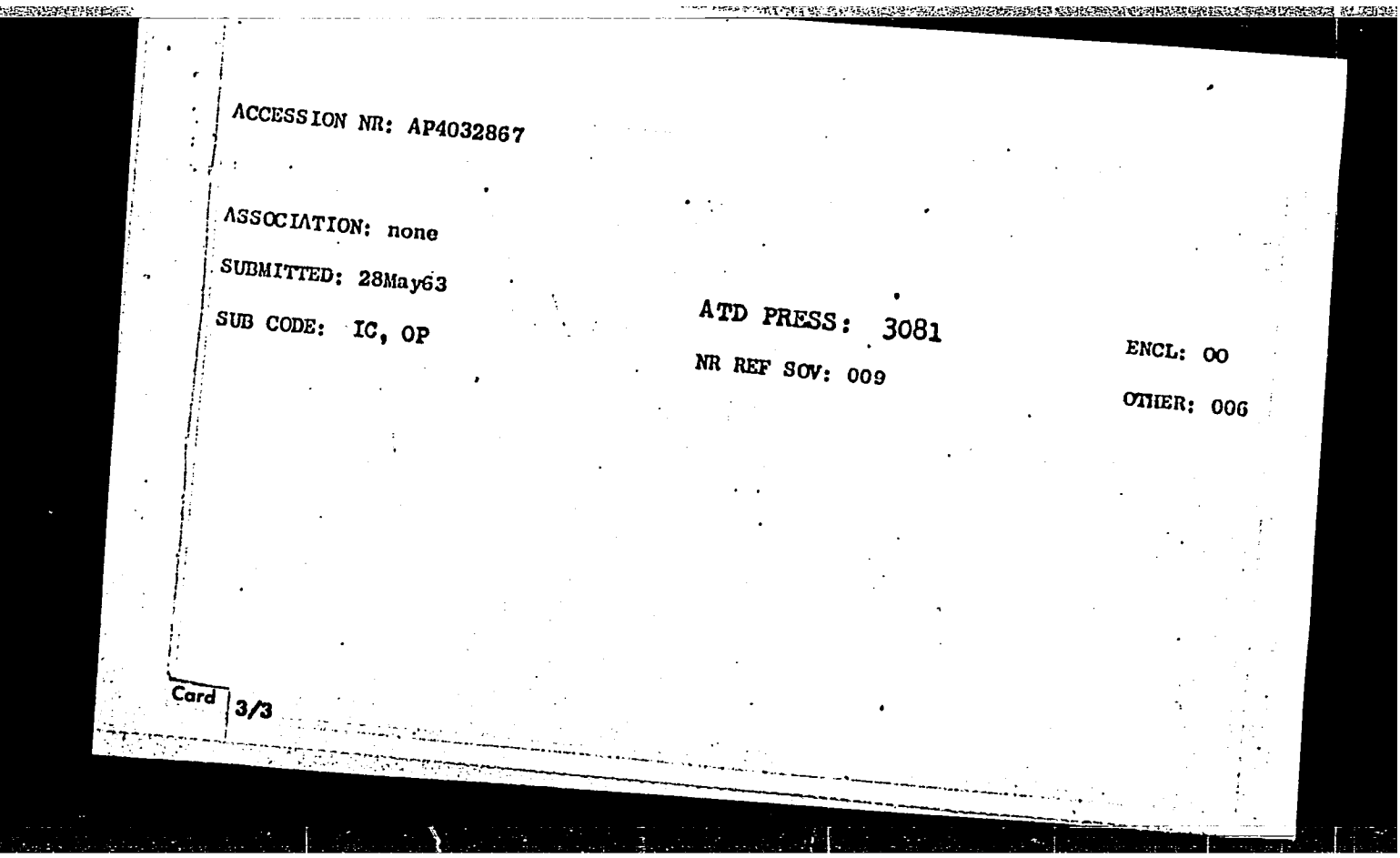
ing the thermoluminescence mechanism, determining the trap depths, etc. In addition to obtaining the comparative glow curves of the fluorides with different trivalent rare-earth ions, there was also investigated the activator concentration dependence of thermoluminescence. The glow curves were recorded by means of a photoelectric set-up consisting of an appropriate heater (warming rate - 0.4 degree/sec), a photomultiplier, a power amplifier and an EPP-09 recording potentiometer (automatic recording). The crystals were excited either by x-radiation from a tube with a tungsten target or by gamma-rays from a Co^{60} source. (In a few experiments the integral radiation from a spark between aluminum electrodes was employed.) The glow curves for the above-mentioned crystals with an activator concentration of about 0.2 mole percent are reproduced. Another figure shows the thermoluminescence of SrF_2:Tm for different values of the Tm concentration. The absorption spectra of SrF_2:Tm crystals after x-irradiation and heating to 150 and 260C are also reproduced. It is concluded that the afterglow is associated with the recombination mechanism. Analysis of the data indicates that, in addition to electron traps connected with thermal microdefects of the host, there are present in the investigated crystals "activator" traps with an estimated depth of 1.2 eV. Orig. art. has: 2 formulas and 8 figures.



ACCESSION NR: AP4032867

ASSOCIATION: none

SUBMITTED: 28May63

SUB CODE: IC, OP

ATD PRESS: 3081

NR REF SOV: 009

ENCL: 00

OTHER: 006

Card 3/3

L 62672-65 EWT(1)/EWP(e)/EWT(m)/EWP(i)/T/EWT(t) [illegible]
JD/JW/JG/GG

ACCESSION NR: AP5017345 UR/0181/65/007/007/2260/2262

AUTHOR: Arkhangel'skaya, V. A.; Maksakov, B. I.; Feofilov, P. P.

TITLE: Additively reduced divalent rare earths in fluorite crystals

SOURCE: Fizika tverdogo tela, v. 7, no. 7, 1965, 2260-2262

TOPIC TAGS: fluorite, rare earth ion, additive reduction, color center, absorption spectrum

ABSTRACT: The authors report that by heating CaF_2-TR^{3+} crystals in calcium vapor they converted the triply charged ions of Dy, Ho, and Tu to the divalent state. This method of reduction is analogous to the method of [illegible] color centers in ionic crystals and is called "additive" by analogy. [illegible] is claimed that [illegible] lead to practically complete [illegible] of the ions. [illegible] spectra [illegible] additively reduced ions, corresponding to [illegible] transitions within the [illegible] of the electron [illegible] $4f^x$, were found to be identical with the spectra of [illegible] crystals. It is therefore deduced that additive reduction is accompanied by the departure of [illegible] ions F^- from the crystals, compensating for the excess positive charge of the TR^{3+} ions which [illegible]. The absorption spectra of additively reduced crystals [illegible] from radiation-reduced samples, and [illegible] a difference in their visible coloring.

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It is suggested that the additional absorption of the radiatively reduced crystals is due at least in part to the absorption of "hole" centers which unavoidably accompany the formation of electronic "color centers" (in this case TR^{2+}) upon ir-

L 34870-65 EWT(l)/EWP(e)/EWT(m)/EPF(c)/EPR/EWP(t)/EWP(b) Pr-4/Ps-4 IJP(c)
ACCESSION NR: AP5005052 S/0051/65/018/002/0330/0333

AUTHOR: Arkhangel'skaya, V. A.; Kariss, Ya. E.; Feofilov, P. P. JD/JW/WH

TITLE: Long duration infrared luminescence of some color centers in fluorite crystals

SOURCE: Optika i spektroskopiya, vo. 18, no. 2, 1965, 330-333

TOPIC TAGS: fluorite, color center, infrared luminescence, line shift, absorption band, fluorescence time constant

ABSTRACT: In view of the lack of any models describing the structure of the centers responsible for the absorption bands observed in artificial fluorite, and in view of the lack of a classification, the authors observed the intense luminescence in the infrared part of the spectrum produced when fluorite crystals with blue coloring, due to the absorption bands with maxima near 560 and 380 nm, are excited in the region of the band with maximum near 580 nm. The luminescence appeared when the crystals were cooled to 77K, and the properties of the luminescence were the same for natural and synthetic crystals, regardless of the method used to obtain the coloring. The observed infrared luminescence spectrum consti-

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L 34870-65

ACCESSION NR: AP5005052

tuted a broad ball-shaped band with maximum near 1.32 μ, changing little on going from 77 to 4.2K. In addition to the unusually strong shift of the luminescence spectrum relative to the absorption spectrum, the infrared luminescence observed had a damping time constant 1 x 10-3 sec, which is some five orders of magnitude larger than the values obtained earlier for color centers in fluorite and other ionic crystals. Both anomalies suggest that the level scheme contains also metastable levels the transitions from which to the ground level are forbidden by some selection rules. Attempts to observe the band corresponding to the transition to this metastable level were not successful. While the authors do not present a well-founded model of the fluorite color centers, they are inclined to think that the luminescence and absorption at 580 mμ is due to complicated anisotropic centers, constituting electrons localized in defects of thermal origin. The possibility of using F-center models to explain the phenomena is still debatable. Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 31Mar64 ENCL: 00

NR REF SOV: 003 OTHER: 012 SUB CODE: OP

Card 2/2

L 21175-65 EWP(e)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JW/JG/WH

ACCESSION NR: AP5003027 S/0051/65/018/001/0092/0097

AUTHOR: Arkhangel'skaya, V. A.

TITLE: Thermal discoloring of subtractively colored cyrstal of the fluorite type due to bivalent rate earths

SOURCE: Optika i spektroskopiya, v. 18, no. 1, 1965, 92-97

TOPIC TAGS: rare earth activator, fluorite crystal, subtractive coloring, thermal discoloring, thermal stability

ABSTRACT: The author investigated the thermal stability of the bivalent state of rare-earth activators, obtained by irradiation with hard radiation, in the fluorite crystals CaF_2, SrF_2, and BaF_2. The crystals were activated with Nd, no, Er, and Tu. The set-up for the investigation of the thermal discoloring was built around a spectrophotometer. The sample was colored with gamma rays from Co^{60}, and was heated at a constant rate of 0.24 deg/sec. For most samples the discoloring exhibited a step-like character with more or less clearly pronounced individual stages. A hypothesis is advanced, based on the work by Ch. B. Lushchik (Tr. IFA AN ESSR v. 8, 75, 1958), wherein thermal discoloring of F-centers is governed by

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both "upper" thermal ionization and "lower" thermal ionization, the latter resulting from the motion of the holes, and also by complicated ionic processes which occur in impurity-containing crystals at temperatures close to half the melting temperature. "In conclusion the author thanks P. P. Feofilov for valuable advice and continuous interest." Orig. art. has: 3 figures.

ASSOCIATION: None

SUBMITTED: 16Nov63 ENCL: 00 SUB CODE: OP

NR REF SOV: 005 OTHER: 004

Card 2/2

ARKHANGEL'SKAYA, V.A.; KARISS, Ya.E.; FEOFILOV, P.P.

Prolonged infrared luminescence of certain color centers in fluorite crystals. Opt. i spektr. 18 no.2:330-333 F '65.
(MIRA 18:4)

L 49277-65 EPF(c)/EPR/EWT(l)/EWT(m)/T/EWP(b)/EWP(t)/EWA(c) Pr-4/Ps-4/Pi-4
IJP(c) JW/JD

ACCESSION NR: AP5009523 S/0048/65/029/003/0454/0459

AUTHOR: Arkhangel'skaya, V. A.

TITLE: Trapping centers in rare earth-activated calcium, strontium, and barium fluoride single crystals /Report, 12th Conference on Luminescence held in L'vov, 30 Jan-5 Feb 1964/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 3, 1965, 454-459

TOPIC TAGS: luminescence, thermoluminescence, alkaline earth compound, fluoride, rare earth, fluorescent crystal

ABSTRACT: The author reviews her earlier experimental work (Optika i spektroskopiya, 16, 628 (1964); 18, 92 (1965)) on the thermoluminescence and thermal bleaching of Er^{3+}, Ho^{3+}, Dy^{3+}, Nd^{3+}, and Tu^{3+} activated CaF_2, SrF_2, and BaF_2 single crystals, and on the basis of the reviewed results and other data in the literature discusses at some length the possible nature of [illegible] and the mechanism of their activation. It is concluded that the trapping centers and emission centers are spatially separated, and the thermoluminescence is accordingly due to a recombination process; that direct recombination of a negative charge

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L 49277-65
ACCESSION NR: AP5009523

carrier with an activator ion is excluded, and the luminescence is accordingly a sensitized process; and that the kinetics of the luminescence are pseudomonomolecular in nature. Orig. art. has: 5 figures.

ASSOCIATION: None

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

NR REF SOV: 007 OTHER: 017

Card 2/2

L 11122-66 EWT(1)/EWT(m)/EWP(t)/EWP(b) LJP(c) AT/JD/JW

ACC NR: AP6000889 SOURCE CODE: UR/0181/65/007/012/3682/3684

AUTHORS: Arkhangel'skaya, V. A.; Nikitinskaya, T. I.; Tyutin, M. S.

ORG: none

53

B

TITLE: Effect of oxygen on the ionic conductivity of fluorite crystals

SOURCE: Fizika tverdogo tela, v. 7, no. 12, 1965, 3682-3684

TOPIC TAGS: calcium fluoride, electric conductivity, impurity conductivity, crystal lattice vacancy, temperature dependence

ABSTRACT: The authors report an observed change in ionic conductivity 21,44,55 of CaF_2 crystals when O^{2-} ions are introduced in the lattice. The procedure and research apparatus were described in earlier papers by one of the authors (Nikitinskaya, FTT v. 1, 835, 1959; v. 3, 3224, 1961). The investigations were made at temperatures 350 -- 650K, in a region where the conductivity of CaF_2 is sensitive to structure.

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L 11122-66
ACC NR: AP6000889

The temperature dependence of the ionic conductivity of CaF_2 with or without rare-earth impurities (Er^{3+}, Ho^{3+}, Sm^{3+}, and Dy^{3+}), in concentrations up to 1.0 mol.%, can be described by the relation $\sigma = \sigma_0 \exp(-u/kT)$, where u = 23 kcal/mole = 1.0 ev for all the investigated samples. The fact that impurities do not affect the variation of the conductivity indicates that in the temperature region 350 -- 600K the conductivity is governed by anion vacancies, and not by interstitial anions. These vacancies are in all probability produced by the O^{2-} introduced in the crystal. The presently available data are insufficient to explain all the results. Orig. art. has: 2 figures and 1 formula.

SUB CODE: 20/ SUBM DATE: 10Jul65/ ORIG REF: 005/ OTH REF: 005

Card 2/2

L 16044-66 EWT(l)/EWP(e)/EWT(m)/ETC(f)/EWG(m)/EWP(t) IJP(c) RDW/JD/JW/WH

ACC NR: AP6005477 SOURCE CODE: UR/0368/66/004/001/0073/0075

AUTHOR: Arkhangel'skaya, V. A.; Feofilov, P. P. 47 B

ORG: none 21,44,55

TITLE: Thermoluminescence method for studying high excited states of lanthanide impurity ions in crystals

SOURCE: Zhurnal prikladnoy spektroskopii, v. 4, no. 1, 1966, 73-75

TOPIC TAGS: thermoluminescence, crystal phosphor, luminescence spectrum, rare earth element, single crystal, excited electron state, calcium fluoride

ABSTRACT: Thermoluminescent analysis is used for studying high excited levels of rare earth ions in crystals of the fluorite type (MeF_2; Me=Ca, Sr, Ba). The specimens for the study were artificial single crystals of CaF activated by trivalent Er, Tu and Pr ions. The specimens were excited by Co^{60} γ-radiation at room temperature. The thermoluminescence spectrum for Er-activated calcium fluoride shows a doublet in the 320 mμ region which corresponds to $^2P_{1/2}-^4I_{15/2}$ transitions. The thermal de-excitation spectrum for CaF with a Tu impurity shows a band at 286

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L 16044-66

ACC NR: AP6005477

mμ which corresponds to the $^3P_0 \rightarrow {}^3H_6$ transition. The band for a Pr impurity is located at about 250 mμ which is most probably interpreted as a $^1S_0 \rightarrow {}^3H_5$ transition. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 10Mar65/ ORIG REF: 002/ OTH REF: 001

FW

Card 2/2

L 15558-66 EWT(1)/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG
ACC NR: AP6004419 SOURCE CODE: UR/0051/66/020/001/0169/0171

AUTHOR: Arkhangel'skaya, V. A.; Feofilov, P. P.

ORG: none

TITLE: Radiation reduction of lanthanon ions in crystals of the fluorite type with two activators [paper presented at the Symposium on Spectroscopy of Crystals Containing Rare Earth Elements and Elements of the Iron Group held in Moscow, February 1965]

SOURCE: Optika i spektroskopiya, v. 20, no. 1, 1966, 169-171

TOPIC TAGS: rare earth element, crystal phosphor, fluorite, absorption spectrum, chemical reduction, single crystal

ABSTRACT: Radiation reduction of rare earth ions was studied in fluorite crystals containing a second rare earth activator. The specific properties of this process in a two-activator system are illustrated on the basis of reduction of the trivalent neodymium ion in the presence of Gd, Dy, Ho, Er and Tu. Strontium fluoride containing no other rare earth impurities was used as the base. The concentration of Nd ions was 0.15 mol.% in all cases; the concentration of the second activator was

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L 15558-66
ACC NR: AP6004419

varied from 0 to 1.0 mol.%. The single crystals were subjected to ionizing radiation from the Co^{60} isotope. An analysis of the absorption spectra for the exposed crystals showed that the concentration of reduced ions of the fundamental activator is considerably dependent on the presence and concentration of the secondary activator. It is found that the addition of Gd and Er ions "sensitizes" the formation of bivalent Nd ions, while Dy, Ho or Tu reduce the reduction capacity of trivalent Nd ions. Since gadolinium is incapable of entering fluorite crystals in the bivalent state, sensitization in this case is probably due to defects formed in heterovalent activation of metal fluoride crystals by trivalent rare earth ions. The differences in the action of the various coactivators are due to differences in the electron affinity of the various triply charged rare earth ions. The experimental data indicate that these ions may be arranged in the following descending series with respect to electron infinity in strontium fluoride crystals: Tu→Dy→Ho→Nd→Er. Each of the ions in this series may be considered an electron donor with respect to all other ions located to its left. The authors express their sincere gratitude to V. N. Baklanova and B. I. Maksakov who grew the single crystals studied in this work.

Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 09Mar65/ ORIG REF: 003/ OTH REF: 002

8C

Card 2/2

L 28909-66 EWT(1) GW

ACC NR: AP6019182 SOURCE CODE: UR/0030/65/000/008/0091/0092

AUTHOR: Arkhangel'skaya, V. M. (Candidate of physicomathematical sciences) 29 B

ORG: none

TITLE: Seismological investigations of the Institute of Physics of the Earth

SOURCE: AN SSSR. Vestnik, no. 8, 1965, 91-92

TOPIC TAGS: seismology, seismic wave

ABSTRACT: The Scientific Council on Seismology of the Earth Sciences Department of the Academy of Sciences annually holds two sessions (one in Moscow and one elsewhere) for review of recent seismological work. The council met in Moscow during the period 22-27 April and was devoted to a review of the work of the Institute of Physics of the Earth imeni O. Yu. Shmidt. The latter is the leading scientific establishment in the country in the field of seismology (except for tsunamis, which are studied primarily by the Sakhalin Complex Scientific Research Institute). The meeting was attended by 260 seismologists. The report of this meeting mentions no specific personalities or papers presented. It is noted that a communication was presented on study of the process of propagation of seismic waves from observations at internal points of a medium. These investigations make it possible to detect the parameters of the medium which influence wave fields and also to find the principles for constructing simplified models of real media. Analysis of seismic exploration data and theoretical computations for models of a medium,

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L 28909-66

ACC NR: AP6019182

used in seismology, shows that the study of the internal structure of the earth requires increased attention to the recording of reflected waves. In order to increase the detailed breakdown of real media spectral methods are being developed for interpretative purposes. The use of such methods makes it possible to obtain new information on the nature of seismic discontinuities in the crust, mantle and core. At this session much attention was devoted to the study of the earth's internal structure on the basis of body and surface waves, current problems in deep seismic sounding, computer interpretation of seismic observations, long-range seismic forecasting, dynamic characteristics of seismic waves and improvement and creation of new instruments for seismic stations. [JPRS]

SUB CODE: 08 / SUBM DATE: none

Card 2/2

L 41146-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD/JW/JG/GG

ACC NR: AP6025958 SOURCE CODE: UR/0051/66/021/001/0093/0095

AUTHOR: Arkhangel'skaya, V. A.; Alekseyeva, L. A.

ORG: none

TITLE: Universal ultraviolet band in extra-absorption spectra of MeF_2-TR^{3+} crystals exposed to γ radiation at 77°K

SOURCE: Optika i spektroskopiya, v. 21, no. 1, 1966, 93-95

TOPIC TAGS: UV absorption, gamma irradiation, dysprosium, crystal lattice defect, calcium fluoride, absorption spectrum

ABSTRACT: Extra-absorption spectra of fluorite-type crystals (MeF_2, Me-Ca, Sr, Ba), activated with trivalent rare earth ions (TR^{3+}) and irradiated with γ rays at 77°K, display (in addition to the known bands belonging to TR^{2+} ions formed during the irradiation) a very strong absorption in the near ultraviolet. Heating of the crystals to 300°K causes the band to disappear. The broad structureless band ($\Delta_{1/2} \approx 6500$ cm^{-1} at 77°K) whose maximum is at about 315 nm in CaF_2, 325 nm in SrF_2, and 345 nm in BaF_2 crystals, is undoubtedly due to defects inherent in the MeF_2 structure, since its position depends on neither the type nor the concentration of the rare earth activator introduced. However, the intensity of this band at a given irradiation dose as well as the intensity of the TR^{2+} bands increase with the TR^{3+} concentration. The faint colorability of MeF_2 crystals was found to be determined not only by the high energy of the

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ACC NR: AP6025958

lattice bond, but also by the thermal instability of the color centers formed. The "sign" of the observed universal band of extra absorption of fluorides was studied on x-irradiated CaF_2-Dy crystals by determining the optical decolorization. Radiation with $\lambda = 365$ nm at 77°K caused the destruction of Dy^{2+} centers, indicating a hole origin of the universal UV band of MeF_2. Whereas the decrease in the absorption of TR^{2+} centers may be due to recombination with holes, the increase of absorption in the shortwave range may be due to the recapture of free holes (formed by the decay of the autocatalyzed state) by the lattice defects of MeF_2. Orig. art. has: 2 figures. [27]

SUB CODE: 07/ SUBM DATE: 25Jun65/ ORIG REF: 003/ OTH REF: 003/ ATD PRESS: 5054

Card 2/2 LC

ARKHANGEL'SKAYA, Veronika Mikhaylovna; ZARETSKAYA, N.V., red.; ZENIN, V.V., tekhn. red.

[Elementary theory of numbers] Elementarnaia teoriia chisel; uchebnoe posobie. Saratov, Izd-vo Saratovskogo univ., 1962. 122 p. (MIRA 17:2)

ARKHANGEL'SKAYA, Veronika Mikhaylovna

[Dirichlet's L functions; a textbook on the analytical theory of numbers] L-funktsii Dirikhle; uchebnoe posobie po analiticheskoi teorii chisel. Saratov, Izd-vo Saratovskogo univ., 1962. 72 p. (MIRA 16:9)
(Series, Dirichlet's)

ARKHANGELSKAYA, V. M.

"Use of a New Wave Type for Determining the Azimuth of the Epicenter of a Close Earthquake".
Izv. AN Turk SSR, No 5, pp 52-61, 1954

Records of close and local earthquakes revealed a long period (2 to 7 sec) "wave A," starting 2 to 3 sec after the wave P. The "wave A" is represented as recorded by the seismograph of D. P. Dirnos. The oscillations look like surface waves and they are used for determining the azimuth of the epicenter. (RZhFiz, No 9, 1955)

SO: Sum No 812, 6 Feb 1956

ARKHANGEL'SKAYA, V. M.

ARKHANGEL'SKAYA, V. M.--"The Problem of the Limit of Natural Numbers of the 'Extratabular' Interval Representable as the Sum of Prime Components." Saratov State U imeni N. G. Cherniyshevskiy. Saratov, 1955. (Dissertation for the Degree of Candidate of Physicomathematical Sciences).

SO: Knizhnaya Letopis' No. 27, 2 July 1955

ARKHANGEL'SKAYA, V.M.

USSR/Physics of the Earth - Seismology, O-3

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 36378

Author: Arkhangel'skaya, V. M.

Institution: None

Title: Determination of the Direction of the Epicenter of an Earthquake from Records of the Surface Waves in the Case of Remote Earthquakes

Original Periodical: Tr. Geofiz. in-ta AN SSSR, 1955, No 30, 82-88

Abstract: An explanation of a method of determining the azimuth of an epicenter from records of the surface waves (Rayleigh and Love) for remote earthquake with a shallow focus. Prior to the arrival of a Rayleigh wave, one records the Love waves, and the azimuth of the epicenter is determined as the direction perpendicular to the direction of the displacements in the given wave. The direction of the epicenter is parallel to the horizontal displacements; allowance is made for the sign of the vertical components in the maximum, shifted backward by 1/4 period relative to the horizontal

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USSR/Physics of the Earth - Seismology, O-3

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 36378

Abstract: component. The criterion whether a given section of the record contains only a Rayleigh wave is whether the instants of the maximum displacements on the horizontal component and zero displacements on the vertical component coincide. Data on the interpretation of 33 earthquakes are given. The errors in the determination do not exceed on the average 1.5-2°, which exceeds the accuracy of determination of the azimuth using the 3-dimensional longitudinal and transverse waves.

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ARKHANGEL'SKAYA, V.M.

Using experimental data for the study of surface waves of earthquakes. Trudy Inst.fiz.i geofiz.AN Turk.SSR 2:175-194 '56. (MLRA 10:5)

(Seismic waves)

ARKHANGEL'SKAYA, V.M.

Use of surface wave records in the interpretation of seismograms.
Biul. Sov. po seism. no.6:81-88 '57. (MIRA 11:3)

1. Institut fiziki i geofiziki AN Turkmenskoy SSR, Ashkhabad.
(Seismic waves)

Vinogradov numbers (i.e. ... ers representable as a sum of three odd primes) in ... erval $10^7 < n < n_0$. He proves: (1) for each $x > x_0 = 10^{...}$ the interval $[x, x+(\ln x)^{15}]$ contains at least one Vinogradov number; (2) assuming the truth of the Riemann hypothesis for

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SOV/ 49-58-12-15/17

AUTHOR: Arkhangel'skaya, V. M.

TITLE: Extended Seminar of the Seismological Section of the Institute of Physics of the Earth, Academy of Sciences, USSR, on Determination of Seismic Surface Waves (Rasshirennyy seminar otdela seysmologii i seysmicheskoy sluzhby instituta fiziki zemli AN SSSR, posvyashchennyy izucheniyu poverkhnostnykh seysmicheskikh voln)

PERIODICAL: Izvestiya akademii nauk SSSR, Seriya geofizicheskaya, 1958, Nr 12, pp 1522-1529 (USSR)

ABSTRACT: The seminar took place on December 9-11, 1957 under the chairmanship of Ye. F. Savarenskiy, N. V. Zvolinskiy and D. P. Kirnos. In the introductory speech, Savarenskiy defined the surface waves as being produced by the interference of the longitudinal and transverse waves in a hard isotropic uniform medium. This interference is caused by the deflection of waves from the boundary surface between stratifications. An example of this phenomenon can be shown by an elastic layer with a loose cover lying on top of it. The transverse waves of SH type are produced in the top and bottom layers. It can be seen that the waves are fully deflected from the cover, forming a large amplitude, while the waves which are deflected from the bottom layer will produce a

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Extended Seminar of the Seismological Section of the Institute of Physics of the Earth, Academy of Sciences, USSR, on Determination of Seismic Surface Waves

node. It is evident, then, that the waving energy is limited by the elastic layer and its magnitude is adversely proportional to the epicentric distance. This explains why the amplitude remains relatively large with the distance. The relation of the phase velocity to the frequency depends on the thickness of the layer and the velocity of wave propagation. In the case of the SV type of waves (longitudinal or transverse), complications arise due to the presence of two different waves simultaneously. The surface waves are the most interesting from the seismology point of view and their investigation is important. Work on these waves started in the USSR only recently. N. V. Zvolinskiy described "Some basic problems in the theory of surface waves". The propagation of the wave can be calculated from the function:

$A(x, y, z)F(t - \phi(x, y, z,))$. The spherical wave can be

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expressed as: $\exp\left[ip\left(t - \frac{r}{a}\right)\right]/r$, the plane sinusoidal wave $\exp\left(izp\sqrt{\frac{1}{a^2} - \frac{1}{V^2}}\right) \cos p\left(t - \frac{x}{V}\right)$ and its apparent velocity along the surface $z = \text{const}$ is $V > a$; the plane surface sinusoidal wave :

$$\exp\left(-zp\sqrt{\frac{1}{V^2} - \frac{1}{a^2}}\right) x \cos p\left(t - \frac{x}{V}\right)$$

and its apparent velocity $V < a$ with decreasing amplitude when z increases. The properties of the surface wave can be summarised as follows: 1) its apparent velocity is smaller than that of propagation, 2) the amplitude decreases with an increase of distance from the boundary surface, 3) the motion is uniform

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with no breaks (fronts). The shape of the wave is not quite sinusoidal, therefore the variations of the amplitude are not necessarily exponential. The mathematical form of the wave is comparatively simple but the solutions are difficult. The main problems requiring further investigations are the determination of the earth crust in relation to the dispersion of wave energy, an effect of damping of various layers on the accuracy of determination, the relation of the dispersion to the structure of the earth's top layers, the effect of the variations in motion of the surface waves, and the effect of the spherical shape of the globe. D. P. Kirnos spoke on "Seismographs for registration of long seismic waves". The seismographs are required to register vibrations with periods above 100 sec. The best apparatus are produced in the USA, which are mostly of galvanometric type. In the USSR the seismograph devised by Ostrovskiy is also of galvanometric type

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with magnification as shown in column Nr 1 of the table on p 1524. The other type, produced in 1957 by the Institute of Physics of the Earth, has various magnifications (see Table, columns nrs 2-5) depending on a period of registered waves. Ye. F. Savarenskiy, O. N. Solov'yev, B. Shechkov discussed the problem of "Observation of Love waves by the Moscow seismic station in relation to the construction of the earth's crust in Eurasia". They gave an example of how to determine the thickness of the earth crust at a distance from Moscow to Japan by means of surface waves of Love type. Eq.(1) was used where c_1 and c_2 - velocities, ρ_1 and ρ_2 - densities. The curve of velocity could be defined from the expression $C = C(T)$. The observed values of C and T are given in the top table on p 1525. The earth parameters (densities and velocities) are shown in the lower table. The thickness of 40 km was defined from the Matuzawa expression (bottom of p 1525 and top of p 1526) where 1 and 2 refer to the 2 layers of crust, 3 - the base. By comparison of the experimental and the theoretical values of C(T) it was

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established that the crust of the northern part of the USSR is built of granite, while the southern part is thinner and formed mainly of basalt. This result agrees with those obtained for the continental part of the USA. V. I. Keylis-Borok spoke on "Surface waves in a multi-layer crust". Calculations are based on the dispersion and resonance properties in the relation to electricity and strength of the layers. The effect of damping on the amplitude could be calculated from the expression $1/\sqrt{r/\lambda}$ (where r - distance, λ - wave length), which becomes $1/\sqrt{r}$ for the mean frequencies. In this case the extreme waves are excluded with their damping effect equal to: $r^{-\frac{k\pm4}{2(k\pm1)}}$

(k - order of zerorising $V'(\lambda)$). This type of calculation is best performed on electric machines. T.B.Yanovskaya

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spoke on "The application of surface waves for determination of the direction of radiation from the focus of an earthquake". A theoretical consideration and a practical calculation show that the results can be very exact. As an example, the earthquake on March 9, 1952 at 17 hours was considered. The dynamical parameters were known. The Rayleigh and Love waves were registered by 7 stations. The relations of the amplitudes of both the Love waves A_Q and the horizontal component of Rayleigh waves A_R to the period were determined. Thus the relationship A_Q/A_R was defined for a given period. This relationship was considered for the periods of 20 and 24 sec. The graphs of A_Q/A_R related to the station azimuth defined the direction of 180° as the direction of the focus forces. The data required for the calculation were the group velocity, C , its relation to the period $\partial C/\partial T$ and the phase velocity V . The relation V_Q/V_R could be determined theoretically but $\partial C_Q/\partial T$ and $\partial C_R/\partial T$ was found experimentally. There-

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fore, it was important that the experimental error was kept to the minimum. V. M. Arkhangel'skaya spoke on "Some results of experimental determination of surface waves". The dispersion of the Love and Rayleigh waves registered at many stations in the USSR were investigated. From the graphs of dispersion the thickness of the earth crust was calculated. It was found that the crust of the Profile Japan-Moscow is 28 ± 2 km thick. But the mean thickness of the profile N.E.Siberia - Central Siberia - East European plain is 38 ± 3 km thick. The great value of the determination of the earth crust lies in the phase velocity. This was investigated at 3 stations situated near each other. The data of the distant earthquakes were analysed. The phase velocity c was calculated from the expression:

$$c = \frac{a \sin A}{t_2 - t_1}$$ where a - distance between stations,

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A - angle of front wave, $(t_2 - t_1)$ - difference of mean time of entrance of period in the relation to station Nr 1. The calculated phase velocities are shown in the table on p 1528. Ye. F. Savarenskiy and Sh. Ragimov - "Determination of group velocity and bearing of epicentre from Rayleigh waves of 3 near stations" (published in this issue, p 1485). D. I. Sikharulidze - "Determination of dispersion of Love waves of near earthquakes". Assuming that Love waves are produced by the interference of frequently reflected SH-waves, its determination can be confined to the layer near the earth's surface and the sediment-granite layer. The dispersions in these layers were defined as 2.60 and 3.40 km/sec respectively, the density of sediment $\rho_1 = 2.30$ g/cm^3, granite $\rho_2 = 2.70$ g/cm^3, $\mu_2/\mu_1 = 2$. I. P. Popov - "Surface waves observed in the Crimea". The analysis based on the data of 3 existing Crimean stations was made in order to define the surface waves from past observations or from 3 stations having distances between them smaller than the wave length (Simferopol'-Alushta-Yalta). S. I. Nikonov - "An

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experiment of registration of surface waves by means of a long-period pendulum". The surface waves of the periods 10 - 20 sec to several minutes were recorded with great success by the horizontal Golitsyn seismograph made for registration of strong earthquakes. The apparatus was connected with a galvanometer of electrodynamic type. The characteristics were as follows: pendulum period 70 sec, galvanometer period 35 sec, galvanometer damping 10.0, inductive magnification period 35 sec, magnification per 100 sec - 400, per 200 sec - 100, per 300 sec - 36. A. A. Kurditskaya - "Some properties of vibration of seismic surface waves". Investigations on the propagation of surface waves as carried out in connection with the earth-

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quake on August 11, 1953 were described. Ye. M. Butovskaya - "Surface waves from nearby earthquakes". The method of analysis of seismograms at the station Tashkent was described. There are 4 tables.

ARKHANGEL'SKAYA, V.M.

Surface wave dispersion and crustal structure. Izv.AN SSSR.Ser. Geofiz. no.9:1360-1391 S '60. (MIRA 13:9)
(Seismic waves) (Earth--Surface)