KATS, M.E., inzh.; CHERNETENKO, B.N., inzh.

Experimental industrial production of two-layer ceramics. Stek.i ker. 22 no.10:30-33 O '65. (MIRA 18:12)

1. Kombinat stroitel'nykh materialov "Pobeda".

KATS, M.E., inzh.

Two-layer face brick. Stroi.mat. 10 no.8:35-36 Ag '64. (MIRA 17:12)

Location + Aids & Navigation

W.E.

KATS, M.I.

3128

535.37

The Nature of Centres of Luminescence in Photochemically-Coloured Alkali-Halide Crystals. M. I. [illegible] (*Zh. eksp. teor. Fiz.*, Feb. 1948, Vol. 18, No. 2, pp. 104-173. In Russian.)

1948

KATS, M.I.; SEMENOV, B.Z.

Investigation of the absorption and luminescence spectra of nickel-activated alkali-halide crystals. Opt. i spektr. 4 no.5: 637-642 My '58. (MIRA 11:6)

1. Saratovskiy gosudarstvennyy universitet.
(Phosphors) (Luminescence)

KANER, B.L.; KATS, M.I.

"Fundamentals of safety and fire prevention techniques in the chemical industry," by N.V.Solov'ev, P.I.Ermolov, N.A.Strel'chuk. Rreviewed by B.L.Kaner, M.I.Kats. Khim. prom. no. 7:615-616 O-N '60. (MIRA 13:12)

(Chemical industries--Safety measures)
(Solov'ev, N.V.) (Ermolov, P.I.) (Strel'chuk, N.A.)

KATS, M.I.; STRIZHAK, N.S.; YAKIMOV, S.Ya., red.

[Safety measures and industrial sanitation in the chemical industry; rules, regulations, standards, and instructions] Tekhnika bezopasnosti i proizvodstvennaia sanitariia v khimicheskoi promyshlennosti; sbornik postanovlenii, pravil, norm i instruktsii. Moskva, Izd-vo "Khimiia," 1964. 653 p. (MIRA 17:5)

FAYERSHTERN, Natan Davidovich; KATS, Mikhail L'vovich; IVANISOV, Aleksandr Ivanovich; POMAZKOV, N.S., prof., doktor ekonom.nauk, retsenzent; GRUNKIN, M.N., dotsent, kand.ekonom.nauk, red.; VARKOVETSKAYA, A.I., red.izd-va; SPERANSKAYA, O.V., tekhn.red.

[Method of planning and rules for accounting in industrial management without workshops; from the work practice of the Leningrad Building Machinery Plant] Planirovanie i normativnyi metod ucheta pri bestsekhovom upravlenii proizvodstvom; iz opyta raboty Leningradskogo zavoda stroitel'nykh mashin. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit. lit-ry, 1960. 69 p. (MIRA 13:6)
(Leningrad--Building machinery industry--Accounting)

KATS, Mikhail Isayevich; KORF, Esfir' Isaakovna; KUSHELEV, V.F., nauchn. red.; BYKOVA, I.V., red.; GUREVICH, I.F., red.

[Safety measures in the enterprises of the chemical industry; what an operator of chemical equipment should know about the safety of work conditions] Tekhnika bezopasnosti na predpriiatiiakh khimicheskoi promyshlennosti; chto dolzhen znat' apparatchik khimicheskogo proizvodstva o bezopasnykh usloviiakh raboty. Moskva, Vysshaia shkola, 1964. 91 p. (MIRA 18:2)

KATZ, M. L.

2618. Weak Ultra-Violet Phosphorescence Intensities by Photo-Counter Tube Method. M. L. Katz. *Phys. Zeits. d. Sowjetunion*, 9. 2-3. pp. 254-258, 1936. *In German.*—The author demonstrates that the photo-counter tube may be employed for the investigation of weak u.v. phosphorescence, since for extremely weak intensities the photographic method has failed. It has been found that the photo-counter tube enables phosphorescence intensities to be observed which are 2000 times weaker than can be examined by the best photo-cell arrangement. Full details are given of the investigation of the u.v. phosphorescence of blue fluorspar, whereby an extremely characteristic anti-Stokes phenomenon is established; the emitted phosphorescent radiation has a shorter wave by more than 1000° Å than that of the exciting light.

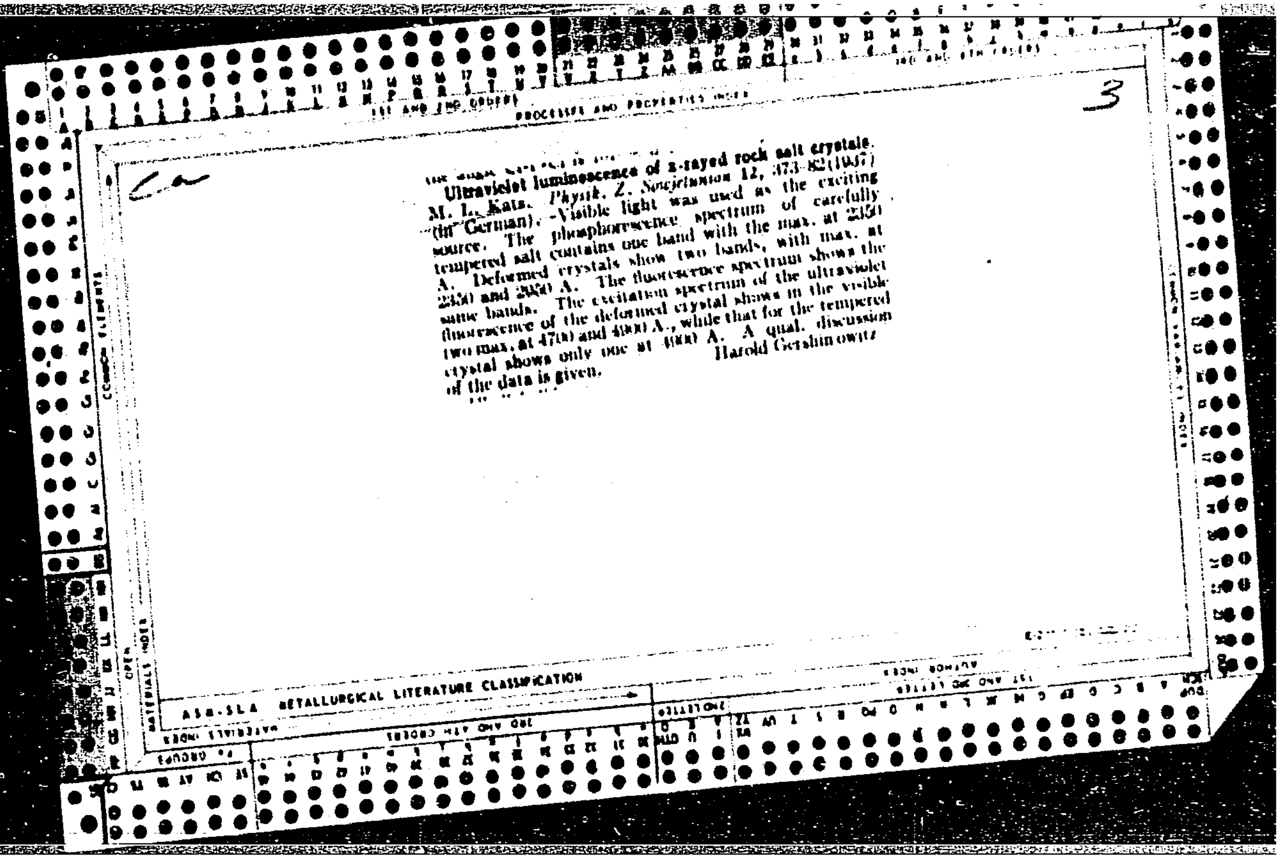
H. H. Ho.

8

4861. Luminescence and photoconduction of cadmium 535.371 : 537.312.5

4751 [illegible] D. V. Gurevich, N. A. T[illegible] and P. P.

[illegible]

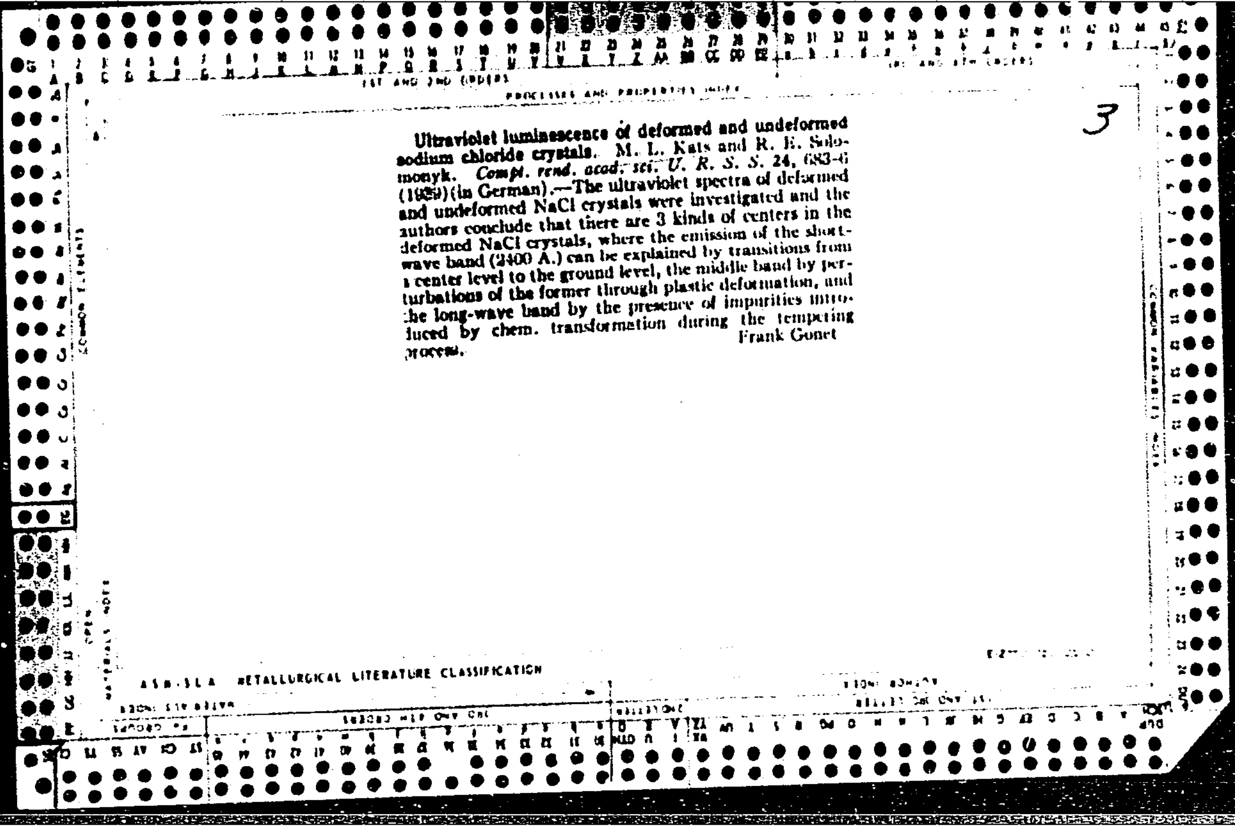


3

Ca

Ultraviolet luminescence of x-rayed rock salt crystals. M. L. Kats. *Physik. Z. Sowjetunion* 12, 473-82(1937) (in German).—Visible light was used as the exciting source. The phosphorescence spectrum of carefully tempered salt contains one band with the max. at 2350 A. Deformed crystals show two bands, with max. at 2350 and 2850 A. The fluorescence spectrum shows the same bands. The excitation spectrum of the ultraviolet fluorescence of the deformed crystal shows in the visible two max. at 4700 and 4000 A., while that for the tempered crystal shows only one at 4000 A. A qual. discussion of the data is given.

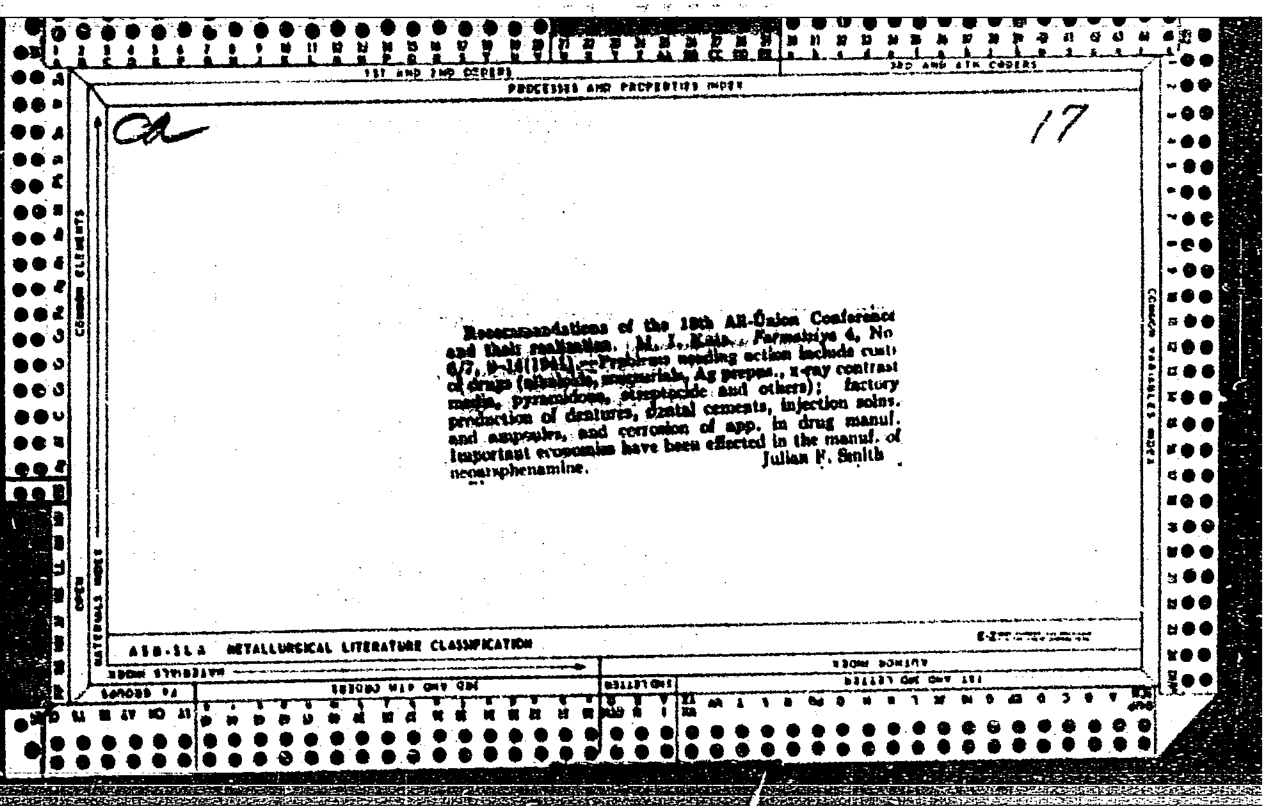
Harold Gershinowitz



3

Ultraviolet luminescence of deformed and undeformed sodium chloride crystals. M. L. Kats and R. E. Solomonyk. *Compt. rend. acad. sci. U. R. S. S.* 24, 683-6 (1939) (in German).—The ultraviolet spectra of deformed and undeformed NaCl crystals were investigated and the authors conclude that there are 3 kinds of centers in the deformed NaCl crystals, where the emission of the short-wave band (2400 A.) can be explained by transitions from a center level to the ground level, the middle band by perturbations of the former through plastic deformation, and the long-wave band by the presence of impurities introduced by chem. transformation during the tempering process.

Frank Gonet

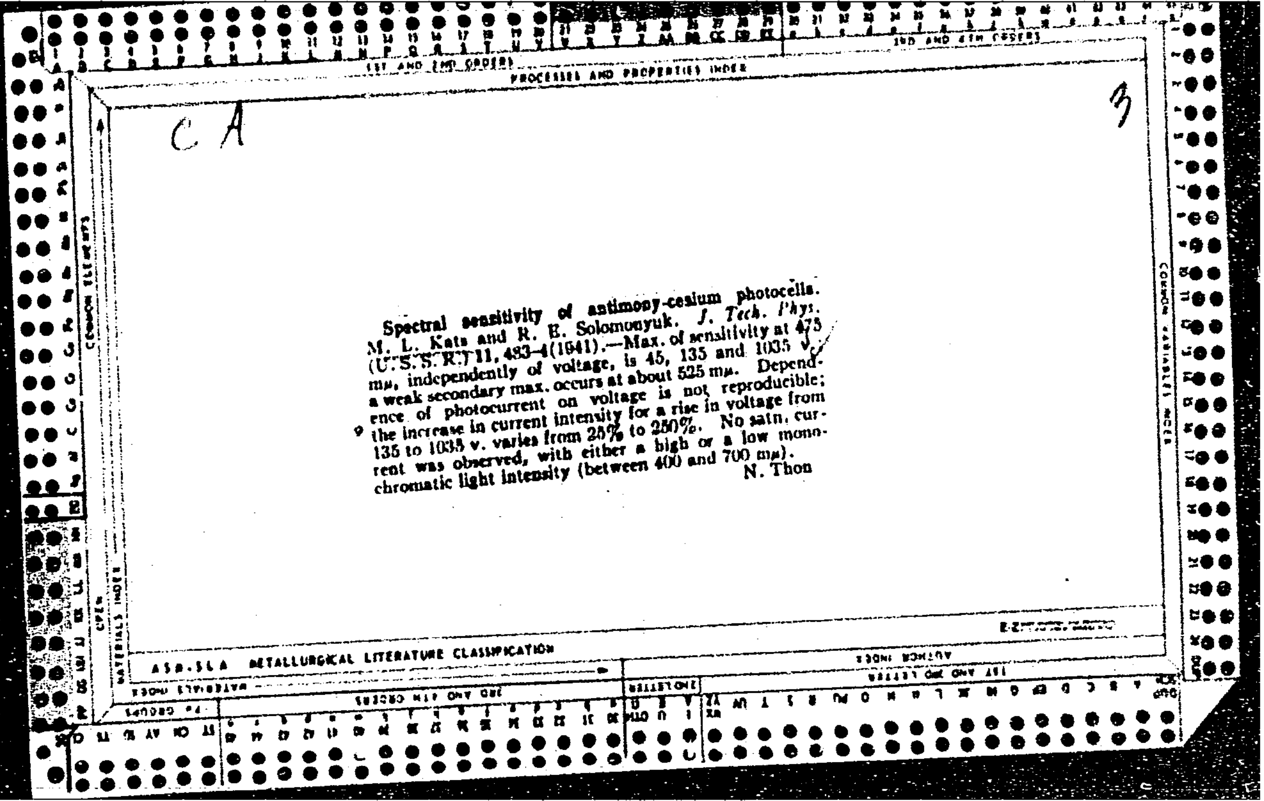


Ca

17

Recommendations of the 10th All-Union Conference and their realization. M. I. Kats. *Farmatsiya* 4, No 6/7, 9-14(1941).—Problems needing action include cust of drugs (alkaloids, mercurials, Ag preps., x-ray contrast media, pyramidone, streptocide and others); factory production of dentures, dental cements, injection solns. and ampoules, and corrosion of app. in drug manuf. Important economies have been effected in the manuf. of neoarsphenamine.

Julian F. Smith



C A

3

Spectral sensitivity of antimony-cesium photocells. M. L. Kats and R. B. Solomonyuk. *J. Tech. Phys.* (U.S.S.R.) 11, 483-4(1941).—Max. of sensitivity at 475 mμ, independently of voltage, is 45, 135 and 1035 v. a weak secondary max. occurs at about 525 mμ. Dependence of photocurrent on voltage is not reproducible; the increase in current intensity for a rise in voltage from 135 to 1035 v. varies from 25% to 250%. No satn. current was observed, with either a high or a low monochromatic light intensity (between 400 and 700 mμ).

N. Thon

KATS, M. L.

RT-856 (Ultraviolet luminescence of KCl and KBr single crystals irradiated by X-rays at low temperature) Ul'trafioletovaia liuminestsentsiia monokristallov KCl i KBr, rentgenizovannykh pri nizkoi temperature.
DOKLADY AKADEMII NAUK SSSR, 58(9): 1935-1938, 1947

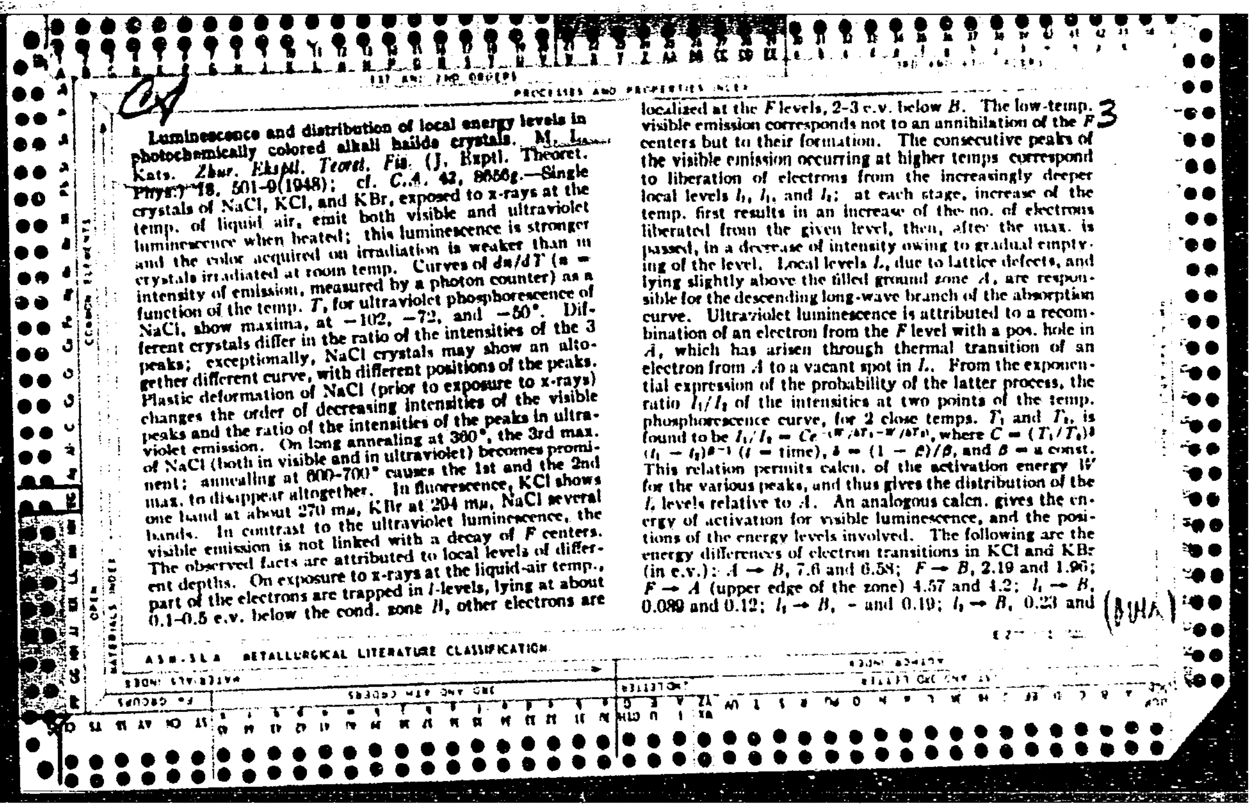
1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

Nature of the luminescence centers in photochemically colored alkali halide crystals. M. L. Kats. *J. Exptl. Theoret. Phys.* (U.S.S.R.) 18, 164-73(1948).—The *F*-centers responsible for the coloring of chemically pure alkali halide crystals irradiated by x-rays or by visible light, are interpreted as either alkali metal ions changed to quasineutral atoms by union with one addnl. electron (therefore called "atomic centers," Frenkel, Pohl, and von Hippel), or as electrons at points in the defective lattice where neg. halogen ions are missing ("nonatomic centers," Mott and De Boer). The usual quantum-mech. energy-level schemes for the luminescence and phosphorescence of colored crystals under the action of an activating radiation, or of heat or mech. deformation is supplemented on the assumption of localized intermediate *L*-levels, and *F*-levels for the electrons in the transition state, which are able to explain the whole complex of radiation and discoloring phenomena in halide crystals. The probability for the reunion of an electron with energy-level defects is very much superior for *F*-centers of the 2nd kind, while those of the 1st sort are much more stable. The "atomic" *F*-centers are found in KCl to form 99.9% of all available centers, while the "nonatomic" centers form only 0.1%. The corresponding relation for NaCl is 99.91% of the atomic, 0.09% of the nonatomic kind. While the mechanism of thermoluminescence and of phosphorescence is immediately apparent from the energy-level scheme, the action of a mech. deformation on triboluminescence necessitates the introduction of the energy of crystal deformation. The exptl. results in this paper and in previous publications are in complete agreement with the quantum-mech. theory given, especially concerning the spectral distribution not only of the emitted radiation of the *F*-centers but also of the activating visible light. It is evident that contaminations by foreign metals are not involved in these phenomena.

W. Eitel

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

CA

3

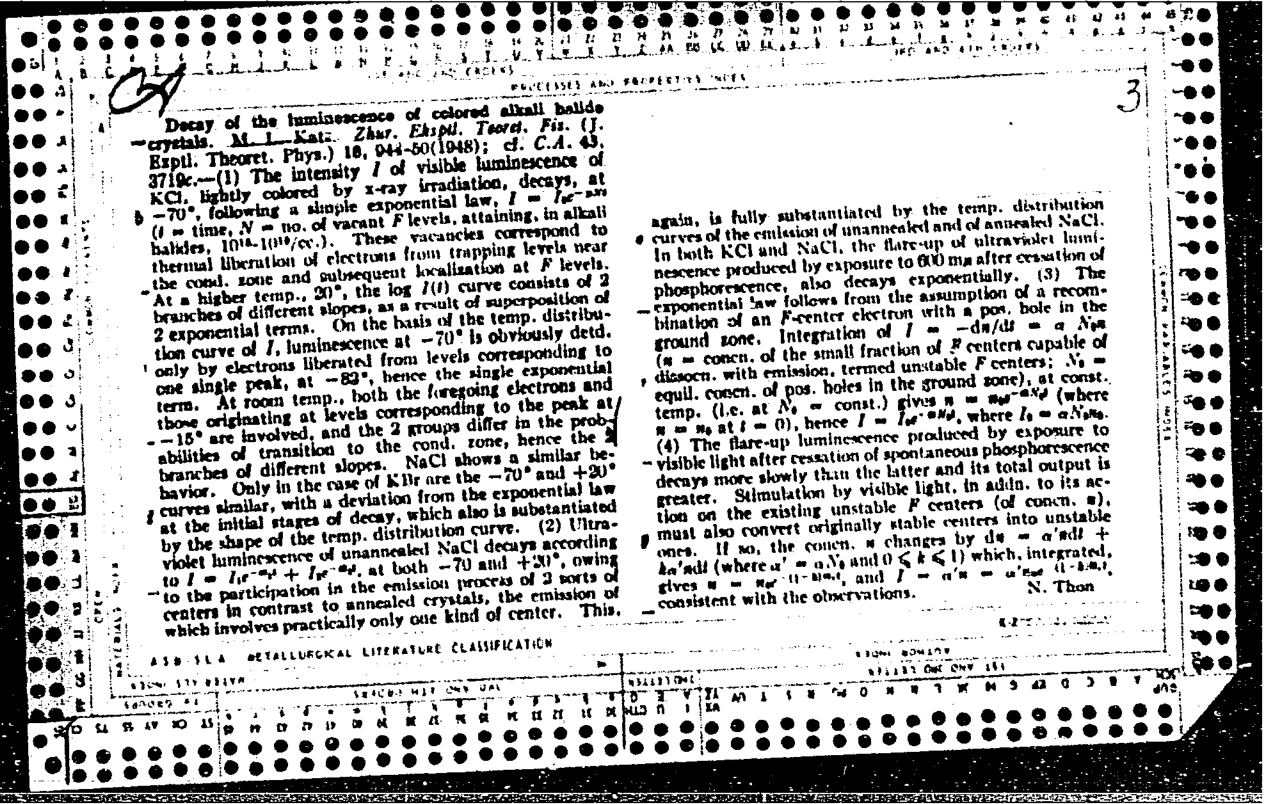
Luminescence and distribution of local energy levels in photochemically colored alkali halide crystals. M. L. Kats. *Zhur. Eksptl. Teoret. Fiz.* (J. Exptl. Theoret. Phys.) 18, 501-9(1948); cf. *C.A.* 42, 8656g.—Single crystals of NaCl, KCl, and KBr, exposed to x-rays at the temp. of liquid air, emit both visible and ultraviolet luminescence when heated; this luminescence is stronger and the color acquired on irradiation is weaker than in crystals irradiated at room temp. Curves of dn/dT (n = intensity of emission, measured by a photon counter) as a function of the temp. T, for ultraviolet phosphorescence of NaCl, show maxima, at −102, −72, and −50°. Different crystals differ in the ratio of the intensities of the 3 peaks; exceptionally, NaCl crystals may show an altogether different curve, with different positions of the peaks. Plastic deformation of NaCl (prior to exposure to x-rays) changes the order of decreasing intensities of the visible peaks and the ratio of the intensities of the peaks in ultraviolet emission. On long annealing at 300°, the 3rd max. of NaCl (both in visible and in ultraviolet) becomes prominent; annealing at 600-700° causes the 1st and the 2nd max. to disappear altogether. In fluorescence, KCl shows one band at about 270 mμ, KBr at 204 mμ, NaCl several bands. In contrast to the ultraviolet luminescence, the visible emission is not linked with a decay of F centers. The observed facts are attributed to local levels of different depths. On exposure to x-rays at the liquid-air temp., part of the electrons are trapped in l-levels, lying at about 0.1-0.5 e.v. below the cond. zone B, other electrons are localized at the F levels, 2-3 e.v. below B. The low-temp. visible emission corresponds not to an annihilation of the F centers but to their formation. The consecutive peaks of the visible emission occurring at higher temps correspond to liberation of electrons from the increasingly deeper local levels l_1, l_2, and l_3; at each stage, increase of the temp. first results in an increase of the no. of electrons liberated from the given level, then, after the max. is passed, in a decrease of intensity owing to gradual emptying of the level. Local levels L, due to lattice defects, and lying slightly above the filled ground zone A, are responsible for the descending long-wave branch of the absorption curve. Ultraviolet luminescence is attributed to a recombination of an electron from the F level with a pos. hole in A, which has arisen through thermal transition of an electron from A to a vacant spot in L. From the exponential expression of the probability of the latter process, the ratio I_1/I_2 of the intensities at two points of the temp. phosphorescence curve, for 2 close temps. T_1 and T_2, is found to be $I_1/I_2 = Ce^{-(W/kT_1 - W/kT_2)}$, where $C = (T_1/T_2)^b (t_1 - t_2)^{\beta - 1}$ (t = time), $b = (1 - \beta)/\beta$, and β = a const. This relation permits calcn. of the activation energy W for the various peaks, and thus gives the distribution of the L levels relative to A. An analogous calcn. gives the energy of activation for visible luminescence, and the positions of the energy levels involved. The following are the energy differences of electron transitions in KCl and KBr (in e.v.): $A \rightarrow B$, 7.6 and 6.58; $F \rightarrow B$, 2.19 and 1.96; $F \rightarrow A$ (upper edge of the zone) 4.57 and 4.2; $l_1 \rightarrow B$, 0.089 and 0.12; $l_2 \rightarrow B$, - and 0.19; $l_3 \rightarrow B$, 0.23 and

(BUHA)

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

0.20; $A \rightarrow L_1$, < 0.40 and < 0.38; $A \rightarrow L_3$, 0.40 and 0.38; $A \rightarrow L_4$, – and 0.40.

N. Thon



PROCESSES AND PROPERTIES INDEX

C4

3

Decay of the luminescence of colored alkali halide
crystals. M. I. Katz. *Zhur. Eksptl. Teoret. Fiz.* (J.
Exptl. Theoret. Phys.) 18, 944-50(1948); cf. *C.A.* 43,
3719c.—(1) The intensity *I* of visible luminescence of
KCl, lightly colored by x-ray irradiation, decays, at $I = I_0e^{-aNt}$
−70°, following a simple exponential law,
(t = time, N = no. of vacant *F* levels, attaining, in alkali
halides, 10^{18}-10^{19}/cc.). These vacancies correspond to
thermal liberation of electrons from trapping levels near
the cond. zone and subsequent localization at *F* levels.
At a higher temp., 20°, the log $I(t)$ curve consists of 2
branches of different slopes, as a result of superposition of
2 exponential terms. On the basis of the temp. distribu-
tion curve of *I*, luminescence at −70° is obviously detd.
only by electrons liberated from levels corresponding to
one single peak, at −83°, hence the single exponential
term. At room temp., both the foregoing electrons and
those originating at levels corresponding to the peak at
−15° are involved, and the 2 groups differ in the prob-
abilities of transition to the cond. zone, hence the 2
branches of different slopes. NaCl shows a similar be-
havior. Only in the case of KBr are the −70° and +20°
curves similar, with a deviation from the exponential law
at the initial stages of decay, which also is substantiated
by the shape of the temp. distribution curve. (2) Ultra-
violet luminescence of unannealed NaCl decays according
to $I = I_1e^{-a_1t} + I_2e^{-a_2t}$, at both −70 and +20°, owing
to the participation in the emission process of 2 sorts of
centers in contrast to annealed crystals, the emission of
which involves practically only one kind of center. This,
again, is fully substantiated by the temp. distribution
curves of the emission of unannealed and of annealed NaCl.
In both KCl and NaCl, the flare-up of ultraviolet lumi-
nescence produced by exposure to 600 mμ after cessation of
phosphorescence, also decays exponentially. (3) The
exponential law follows from the assumption of a recom-
bination of an *F*-center electron with a pos. hole in the
ground zone. Integration of $I = -dn/dt = \alpha N_0 n$
(n = concn. of the small fraction of *F* centers capable of
dissocn. with emission, termed unstable *F* centers; N_0 =
equil. concn. of pos. holes in the ground zone), at const.
temp. (i.e. at N_0 = const.) gives $n = n_0e^{-\alpha N_0 t}$ (where
$n = n_0$ at $t = 0$), hence $I = I_0e^{-\alpha N_0 t}$, where $I_0 = \alpha N_0 n_0$.
(4) The flare-up luminescence produced by exposure to
visible light after cessation of spontaneous phosphorescence
decays more slowly than the latter and its total output is
greater. Stimulation by visible light, in addn. to its ac-
tion on the existing unstable *F* centers (of concn. n),
must also convert originally stable centers into unstable
ones. If so, the concn. n changes by $dn = \alpha' n dt +$
$k\alpha' n dt$ (where $\alpha' = \alpha N_0$ and $0 \leqslant k \leqslant 1$) which, integrated,
gives $n = n_0e^{-(1-k)\alpha' t}$, and $I = \alpha' n = \alpha' n_0e^{-(1-k)\alpha' t}$,
consistent with the observations. N. Thon

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

CA

3

Thermoluminescence of colored single crystals of potassium chloride in the visible region. M. L. Kats and A. S. Andryanov. *Doklady Akad. Nauk S.S.S.R.* 61, 817-20(1948).—The temp. luminescence intensity curve of an x-ray colored KCl single crystal, heated at a uniform rate (0.75°/sec.) from −180° upwards, plotted as a function of the temp., shows 6 distinct peaks, 4 of which are comprised in the temp. interval from −180° to 0° (1st interval), 2 between 0° and 200° (2nd interval). The peaks of the 1st interval can be obtained either by irradiating the crystal with x-rays at low temp. and then heating it up without first acting on it with visible light, or else by irradiating with visible light, at the temp. of liquid O_2, of a crystal preliminarily x-rayed at room temp. In the 2nd case, the curve of the 1st interval can be reproduced repeatedly, by repeated cooling of the colored crystal followed by short illumination with visible light. However, if the crystal is heated through the 2nd interval, and is allowed to give the complete curve, repetition of cooling and illumination in the visible will fail to repeat the 1st-interval curve. This is obviously the result of decoloration on heating to 200°, and indicates that, in contrast to visible luminescence at low temps., the same luminescence at high temps. is linked with annihilation of color centers. In the 2nd interval, the mechanism of luminescence at high temps. appears to be the same as at low temps., but with the difference that, at high temps., the electrons released into the cond. zone originate in filled local *F*-levels deeper than the levels lying close (0.1-0.5 e.v.) to the cond. zone. Electrons released from *F*-levels can either recombine with halogen atoms or be trapped again on a vacant *F*-level, with emission in the visible. The ratio of the intensities of the peaks changes on annealing, and, moreover, depends on the length of the irradiation with x-rays. Thus, with the length of the irradiation increasing from 5 to 30 to 180 min., the height of the peak at 160° increases much faster than that of the peak at 100°. The shape of the 2nd-interval curve is strongly affected by very short (10 sec.) exposure to visible light following the irradiation with x-rays; the peak at 160° disappears and that at 100° becomes higher, the sum total of emitted light remaining unchanged. Consequently, exposure to visible light causes some transformation of emission centers into an equal no. of centers of a different kind. N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

PA 24/49T115

KATS, M. L.

Aug 48

USSR/Physics
Spectra - Intensity
Crystal

"Thermoluminescence of Colored Multicrystalline KCl in the Visible Part of a Spectrum," M. L. Kats, A. S. Andrianov, Phys Inst, Saratov State U, 4 pp

"Dok Ak Nauk SSSR" Vol LXI, No 5

Investigates intensity of temperature luminescence in a colored KCl crystal as a function of temperature (in the range -180 to 200° C). Graph of this dependence shows six distinct peaks.

24/49T115

[redacted]

Nov 48

USSR/Physics
Luminescence
Phosphors

"The Influence of Excitation Conditions on the Temperature Intensity of Luminescence in ZnS-Cu Phosphors," M. L. Kats, N. V. Zhukova, Inst of Phys Saratov State U, 3 3/4 pp

"Dok Ak Nauk SSSR" Vol LXIII, No 3

As a result of measurements, it may be assumed that deep accentuated levels form only a small fraction of the total number of small levels in ZnS-Cu and that, therefore, differences cited in intensity of luminescence in weak and complete

55/49T100

[redacted]

Nov 48

USSR/Physics (Contd)

excitation are obviously unimportant. Submitted by Acad S. I. Vavilov 1 Oct 48.

55/49T100

[redacted]

KATS, M. L.

Jan/Feb 49

USSR/Physics
Luminescence
Crystals - Color

"Luminescence of Colored Monocrystals of Alkali-Haloid Compounds," M. L. Kats, Phys Inst, Saratovskiy State U, 12 pp

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

Studied luminescence of photochemically colored alkali-haloid monocrystals, and their temperature dependence in connection with the spectrum of local energy levels. Studied luminescence light-sums versus concentration of color centers for

36/49T85

[redacted]

Jan/Feb 49

USSR/Physics (Contd)

natural NaCl crystals and pure monocrystals of KCl and KBr.

36/49T85

KATS, M. L. [redacted]

KATS, M. L.

PA 156T95

USSR/Physics - Luminescence
Crystallography

Feb 50

"Luminescence of NaCl Monocrystals Subjected to Heat Treatment," M. L. Kats, Inst of Phys, Saratov State U, 9 pp

"Zhur Eksper i Teoret Fiz" Vol XX, No 2

Results of investigation into luminescence of rock salt crystals colored by X-rays, subjected and not subjected to heat treatment. In both cases, luminescence is due to liberation of electrons from one local energy level, but heat treatment leads to sharp increase in the

156T95

USSR/Physics - Luminescence (Contd) Feb 50

intensity of luminescence and the light sum. Also establishes that under action of visible light some light (luminescence) centers are converted to other centers with less thermal activation energy. Submitted 6 Jul 49

156T95

CA

3

Luminescence of sodium chloride single crystals subjected to thermal treatment. M. I. Kats (Phys. Inst., Saratov State Univ.). *Zhur. Eksptl. Teoret. Fiz.* 20, 100-7(1950); cf. C.A. 43, 5006e.—The intensity of luminescence, I, curve of an x-rayed natural NaCl, as a function of the temp., shows 2 distinct peaks, at 351-73 and at 427-30°K. If the crystal is heated in air prior to the exposure to x-rays, I in both peaks increases, the more the longer the thermal treatment at the given temp. At 773°K., satn. of I is reached in about 2 hrs., longer heating having no further effect. In all cases, I attains its limit in no longer than 3 hrs. In both peaks, the limiting I increases with the temp. of the heat-treatment, and so does the total light stored, L; the positions of the peaks remain unchanged. X-rayed NaCl crystals, unheated and after 3 hrs.' treatment at 573, 673, 773, 873, and 973°K., showed, in the 1st and in the 2nd peak, the following values of I, and the following total L: 6.6, 6.3, 2.35; 34, 24, 7.90; 71, 65, 16.81; 349, 322, 79.29; 365, 426, 89.22; 427, 696, 111.40. If, after exposure to x-rays, the crystal, previously heat-treated at 973°K., is left in the dark for up to 3 hrs., I and L in the 1st peak decrease, the more the longer the crystal is kept in the dark, but remain unchanged in the 2nd peak. This clearly indicates the different nature of the centers responsible for the 2 peaks. The heat-treatment is effective only if done in air, not in vacuo. However, the unchanged position of the temp. peaks indicates clearly that the effect cannot be due to centers belonging to the gas which penetrates into the lattice. Rather, the increase of I and of L must be detd. either by an increase of the concn. of the electrons at the levels corresponding to the 2 peaks, or of the yield of luminescence, owing to a disruption of the lattice by the gas. This is borne out by the observation of a similar increase of I and of L if the untreated single crystal is ground to a powder; a very thin layer of the powder, not more than 0.1 of the wt. of the original single crystal, shows considerably increased I and L in both peaks. The analogy is, however, not complete, as, with the powder, the maxima are more diffuse than with the heat-treated single crystal. Further, if a heat-treated x-rayed crystal is crushed to a powder, I and L increase again. If a heat-treated and x-rayed crystal is exposed to visible light, I in the 1st peak increases, and decreases in the 2nd peak.

with the total *L* remaining essentially unchanged; this is illustrated by the following data of *I* in the 1st and 2nd peak, and of *L*, with the values found on exposure to visible light in parentheses: treated at 673°K., 30 (50), 31 (24), 17.22 (20.20); at 773°K., 321 (338), 229 (193), 92.53 (93.20); at 873°K., 415 (487), 447 (320), 92.87 (90.30); at 973°K., 344 (502), 600 (460), 100.00 (105.10). Visible (white or blue) light is, however, without any effect if the crystal is exposed to it at the temp. of liquid air. Exposure to red light produces the same effects as keeping in the dark after exposure to x-rays. That the 2nd peak is detd. by *F*-centers, follows from the fact that the color of the crystal disappears only after emission of the 2nd peak, but is preserved after only the 1st peak has been emitted; further, centers of the 2nd peak can be transformed into centers of the 1st peak by absorption of light corresponding to the *F*-band. The centers of the 1st peak, although they are created from those of the 2nd peak by *F*-band absorption, and are annihilated by red light, cannot be identified with the *F'*-centers, as the latter cannot be produced by exposure to x-rays only. Most probably, the 1st peak is detd. by *M*-centers. However, the very nearly 1:1 ratio of the intensities in the 2 peaks, despite the 1:25 ratio of the absorption coeffs. in the *M*- and *F*-bands of NaCl, remains unaccounted for. N. T.

cA

Ultraviolet luminescence mechanism of x-rayed alkali-halogen crystals. M. L. Kats (N. G. Chernyshevskogo State Univ., Saratov). *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* **15**, 667-8(1951).—Two types of color centers have been discovered in ultraviolet absorption spectra of x-rayed alkali-halogen crystals, *D* (hole) and *E* (electrons). D_1 centers (3000-A. band in KCl) are observed at low temp. only, D_2 (2320 A.) and D_3 (2155 A.) also at room temp. At low temp. glow curves are due to a recombination of *E* and D_1 centers; light can also liberate holes from D_1 centers for recombination. Phosphorescence is due to a recombination of *E* and D_2 centers made possible by a tunneling effect of *E*-electrons. S. Pakswer

CA

22

Fluorescence spectra of petroleum and its fractions in liquid condition and in a chromatographic column. M. L. Kats and N. K. Sidorov (N. G. Chernyshev Saratov Univ.). *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.*, 15, 777-81(1951).—In crude oil and in the distn. residue above 400°, the fluorescence maxima occur at 472, 510, 539, and 625 mμ with intensities depending on the type of the oil. In fractions 200-400° these maxima are absent and 2 maxima for each fraction, 431-445 and 454-458 mμ, appear; the max. shift slightly to longer waves with increased distn. temp. In the spectra of crude oil adsorbed on Al_2O_3 in a chromatographic column all lines appear, the lines of shorter wavelength appearing progressively towards the bottom. The intensity of fluorescence is much higher in the chromatographic column; exposures required are 15-20 min. Thus this method can be used for identification and qual. analysis of crude oil. S. Pakswer

1. M. L. KATS
2. USSR (600)
4. Alkyl Halides
7. Mechanism of luminescence in X-rayed cyrstals of alkyl halide compounds in the ultraviolet range. Izv. AN SSSR. Ser. fiz. 15 no. 5. 1951

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

CA

Electronic Phenomena
3

Effect of the excitation conditions on the luminescence of colored alkali halide crystals in the ultraviolet region. M. L. Kats (Saratov State Univ.). *Zhur. Eksptl. Teoret. Fiz.* 22, 78-84(1952).—The high stability of the coloring imparted to alkali halide crystals by irradiation with x-rays suggests that, in analogy with electrons in *F*-centers, pos. holes are also localized, namely at vacancies of pos. alkali metal ions. The observed *V* luminescence bands are attributed to such localized pos. holes. There are, consequently, 2 kinds of centers in alkali halides: electronic *F*-centers, comprising the *F*, *M*, and *N* centers, and "hole" color centers *D*, responsible for the *V* bands. Measurements of the total light *L* emitted in the luminescence at 20° of NaCl exposed to x-rays at −180, −72, and +20°, always to the same *F*-center concn., showed that *L* decreases with increasing temp. of the irradiation; if *L* at −180° is taken = 100%, the values of *L* for crystals x-rayed at −72 and at +20° are 41.5 and 5%, resp. A similar behavior was found with KCl and KBr. These phenomena are consistent with the conclusion that, while D_2 and D_3 centers (i.e. V_2 and V_3 bands) arise, in exposure to x-rays, also at room temp., D_1 centers (i.e. the V_1 band) appear only at low temps. D_1 centers are conceived as a vacant cation point with a localized hole (neutral halogen atom); a D_2 center is a D_1 center localized beside a pair of vacancies of ions of opposite signs. When a crystal which has been exposed to x-rays at a low temp. is heated up to room temp., the D_1 centers free holes which can recombine with *F*-centers, with resulting ultraviolet emission; this conclusion is borne out by the fact that about 60% of the *F*-centers are spent in this process. Further evidence that the low-temp. ultraviolet luminescence is due to D_1 centers is drawn from the flash which arises when crystals x-rayed at a low temp. are irradiated at the same temp. with monochromatic light from the V_1 absorption band. This is due to [illegible] liberation of holes from the D_1 centers. It does [illegible] with crystals x-rayed at room temp.; however, ir[illegible] with light from the *F*-band region does give rise to a [illegible] cases, the flash is the result of a recombination [illegible] *D* centers; in the 1st instance, holes from *D* centers are set free to recombine with *F*, whereas in the 2nd instance electrons from *F* centers are liberated to recombine with holes localized in D_2. Upon x-irradiation at room temp., the total light emitted in the flash on irradiation with visible light, decreases when the crystals have been left to stand in the dark, at room temp. (but not if kept at liquid-air temp.); this phenomenon must in some way be linked with changes in the D_2 centers, inasmuch as the *F* band remains unchanged. The temp. emission curves of crystals x-rayed at liquid-air temp. shows 2 low-temp. peaks, at about 170 and 200°K., with a max. at 2950 A., and 1 high-temp. peak at about 225°K., max. around 2400 A. The latter band is observed also in crystals x-rayed at room temp. and, consequently, it is attributed to recombination of electrons with D_2 centers; by the same reasoning, the 2950-A. band corresponds to a recombination of pos. holes from D_1 with *F* centers. The mechanism of recombination of electrons with D_2 centers calls for an exponential decay of the after-glow. Observations show exponential decay in weakly x-rayed NaCl crystals (1.2×10^{16} *F*-centers/cc.), but deviations from the exponential at the initial stages of the decay in strongly x-rayed crystals (8.8×10^{17}/cc.). In the 1st instance the emission is all 2400 A., whereas in the 2nd instance there is also some 2950 A., indicating some amt. of D_1 centers. This is the case also with plastically deformed NaCl crystals.

N. Thon

KAD M.L.

USSR.

535.371

313. **Luminescence of ionic and atomic silver centres in X-rayed phosphors NaCl-Ag.** M. L. Kats. *Zh. eksper. teor. Fiz.*, 23, *No.* 6 (12), 720-7 (1952) *In Russian.*

It is established that in the phosphors NaCl-Ag two types of atomic centres of silver exist, which differ by their thermal stability and the fluorescent spectrum. It is shown that the brightness of the spectral band 450 mμ, caused by the ionic centres, decreases, and of the 630 mμ, caused by the atomic centres of silver, increases with an increase in the duration of the X-raying of the phosphor. It was found that the form of the luminescent curves and the intensity of coloration, characteristic of the *F*-centres, depend on the concentration of the activator. On the basis of the experimental data obtained ideas are proposed regarding the nature of the luminescent centre of NaCl-Ag.

E. RASKIN

235T90

USSR/Physics - Luminescence Centers 21 Jul 52

"Luminescence of Atom and Ion Centers of Silver in NaCl-Ag Phosphors," M. L. Kats

"Dok Ak Nauk SSSR" Vol 85, No 3, pp 539-542

Presents results of an investigation of NaCl + AgCl phosphors grown in the form of a single crystal /monocrystal/ from a fusion, carefully kept free of impurities. The photometry of luminescence in the visible range was conducted with a vacuum photoelement and amplifier of 10^5 amplification; and in the ultraviolet region, with a photon counter having

235T90

a platinum photocathode. Acknowledges assistance of N. A. Grigor'yev in measurements. Submitted by Acad G. S. Landsberg 22 May 52.

235T90

KATS, M. L.

CA

Electronic Phenomena
3

Fluorescence of ionic and atomic copper centers in NaCl-Cu phosphors. M. L. Kats (N. G. Chernyshevskiĭ State Univ., Saratov) *Doklady Akad. Nauk S.S.S.R.* **85**, 757-60(1952); cf. *C.A.* **46**, 9003a.—In NaCl-CuCl phosphors, grown by simultaneous crystn. from the melt, light corresponding to the selective absorption band of Cu$^+$ ions (max. at 255 mμ) excites blue-violet fluorescence extending into the near ultraviolet. The brightness of the fluorescence is decreased by irradiation with x-rays, the more the longer the exposure, down to a definite limit beyond which further prolonged exposure to x-rays does not change the brightness any further. X-ray irradiation further gives rise to the appearance of 2 new excitation bands, one at 300 mμ (*A* centers), the other at 300 mμ (*A'* centers), producing orange-yellow and red fluorescence the brightness of which increases with the length of exposure to x-rays. This increase, too, tends to a limit which lies at about the same length of time of irradiation as the limit of the fall of the blue-violet fluorescence of the Cu$^+$ ions. Thus, the reduction of the no. of the ionic, and the production of the at. centers, run parallel. The 300 and 300 mμ excitation bands coincide with absorption bands of additively colored NaCl-Cu crystals reported by Blau (*C.A.* **29**, 8217^{1}) and attributed to at. Cu by Toporets (*Doklady Akad. Nauk. S.S.S.R.* **4**, 23(1935)). Thus, in NaCl-Cu as in NaCl-Ag, x-rays convert part of the activator ions to atoms. In terms of the concn. of the activator, the optimum activator contents giving max. brightness of the fluorescence are 0.1 mol % CuCl and 1.0 mole % AgCl. Only Cu$^+$ ions lying in immediate neighborhood of halide vacancies can be converted into *A* centers; in fact, no amt. of x-ray exposure can convert all the Cu$^+$ ions into *A* centers. That the limiting concn. of the usual *F* centers is lower in x-rayed NaCl-Cu than in nonactivated NaCl crystals, is borne out by the observation that the yellow coloring produced by x-rays, and characteristic of *F* centers, is much weaker in NaCl-Cu than in NaCl. Also, the 2nd thermoluminescence peak of NaCl at 427-436°K. is absent in NaCl-Cu, on account of the low concn. of *F* centers. This peak begins to appear faintly when the concn. of CuCl is lowered sufficiently. X-ray irradiated NaCl-Cu also shows phosphorescence in the blue-violet and a weak ultraviolet phosphorescence. The visible emission is the same as with nonirradiated NaCl-Cu excited with 255 mμ. This means that, in the recombination, the electron falls first on an excited level of the activator, and emission is due to its return to the ground state from that level. N. Thon

(PA 56 no. 671: 7588 '53)

[illegible]

KATS M.L.

K-5

Category : USSR/Optics - Physical Optics

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4981

Author : Kats, M.L., Sidorov, N.K.
Title : Fluorescence Spectra of Petroleums and Their Fractions in the Liquid State and in a Chromatographic Column.

Orig Pub : Uch. zap. Saratovsk. un-ta, vyp. fiz., 1954, 40, 3-59

Abstract : Three specimens of petroleum were investigated. Distillation into fractions were carried out in the Gadaskin apparatus, and the chromatography in Al_2O_3 columns. The luminescence spectrums of the petroleums and their fractions were obtained photographically in the test tubes or directly in the columns, the excitation being with a PRK-4 tube with a FS-4 filter. The energy distribution in the spectra was not determined, and only micro-photograms were considered. It was established that the fluorescence spectra of raw petroleum in the visible region are characterized by the presence of the 472-476, 505-510, 540-545, and 620-625 millimicron bands. The first band is ascribed to oils, the second and third to tars, and the fourth to asphaltenes; analogous maxima were found also in the spectra of the fractions in the columns. The investigated specimens of

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Category : USSR/Optics - Physical Optics K-5

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4981

the petroleums differ from each other by the ratios of the intensities of the bands.

Fractions with a boiling temperature below 200° do not glow; the increase in the intensity of the luminescence of the remaining fraction that is produced by increasing their boiling temperature is connected with a corresponding increase in the contents of the aromatic compounds, responsible for the glow. In the columns, the color of the glow of the zones varies in all cases downward from orange to violet. A connection was established between the relative intensities of the glow of the components and their relative concentration, on the basis of which it is indicated that it is possible to work out a fluorescent procedure for a quantitative component analysis of petroleums. The authors reach the conclusion that the absorption spectra of petroleums in the visible region are not characteristic and cannot serve for their identification.

Card : 2/2

KATS, M.L.

"Photon Counter for Investigation of Weak Intensity Radiation in the Ultraviolet Region of the Spectrum," by M. L. Kats, Uch. zap. Sarat. Un-ta (Scientific Notes of Saratov University), 1954, 40, pp 61-105 from Referativnyy Zhurnal -- Fizika, No 10, Oct 56, Abstract No 29992)

The counters designed by the writer are described as well as the technology of their manufacture. The counter cathodes were made of platinum, tungsten, aluminum, silver, zinc, copper, and cadmium. The dark background of a platinum counter consisted of about 1.4 pulses/min. Within the band of 3200 to 2600 Å wavelength, the quantum output of a platinum counter increases from $2.7 \cdot 10$ el/kv to $3.18 \cdot 10^{-4}$ el/kv; it concurs well with the quantum yield of massive platinum layers.

SUM. 1287

USSR/Optics - Physical Optics, K-5

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35775

Author: Zhukova, N. V., Kats, M. L.

Institution: None

Title: Temperature Glow of ZnS-Cu Luminophors

Original Periodical: Uch. zap. Saratovsk. un-t, 1954, 40, 115-120

Abstract: Two peaks, -150° and -63°, were observed on the curves of the thermal glow of a ZnS-Cu phosphor, excited at temperature of liquid oxygen, in the investigated temperature range (up to 0°). If the same phosphor is excited at room temperature and then cooled to the temperature of liquid oxygen, the curve of the thermal glow had only one very weak peak around -4°. The light sum in this case is approximately 7% of the total light sum stored by the phosphor, excited at low temperatures. From this it follows that the number of the acceptor levels, at which the electrons are localized at low temperature, amounts to an

Card 1/2

USSR/Optics - Physical Optics, K-5

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35775

Abstract: insignificant fraction of the total number of the shallower levels, on which they are localized at low temperature. The depth of these levels, calculated using the method by V. V. Antonov-Romanovskiy (Izv. AN SSSR, ser. fiz., 1946, 10, 474) is 0.3 ev.

Card 2/2

KATS, M. L.

K-5

Category : USSR/Optics - Physical optics

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2382

Author : Kats, M.L., Mel'tser, I.I.
Title : Effect of Roasting on the Spectrum of the Local Acceptor Levels of the ZnS-Cu luminophor.

Orig Pub : Uch. zapiski (Sarat. un-t), 1954, 40, 121-126

Abstract : The thermal-glow curve method was used to study the effect of heat treatment
on the spectrum of the acceptor local levels in the ZnS-Cu phosphor over the
90--375°K range.. Phosphors roasted at 700 and 800° (lattice of the sphalerite
type) and excited at 90°K display, in addition to the peak located nearly at
90°K, a second peak at 207°K. In the case of high-temperature roasting (900-
-1100°, lattice of the wurtzite type) discloses a third peak at 290°K, in ad-
dition to the first peak and the second somewhat-displaced peak (~ 237°K).
Increasing the roasting temperature from 900 to 1100°C does not change the
spectrum of the local levels, but their number of the light-sum increase. The
light-sum of phosphors excited at room temperatures and then rapidly cooled
is different for wurtzite and for sphalerite. In the first case the thermal
displays a peak at 288°K with an intensity that increases with roasting tem-
perature. In the second case the specimens luminesce only weakly, since unlike
the high-temperature form, they do not contain the third, deepest group of

Card : 1/2

KATS, M.L.

USSR/Physics

Card 1/1

Authors : Kats, M. L.

Title : Letter to the editor with regard to the report by F. Daniels, Ch. Boyd and D. Saunders entitled "Thermo-luminescence as a means of scientific investigation".

Periodical : Usp. Fiz. Nauk, 52, Ed. 4, 660 - 661, April 1954

Abstract : The author of the letter complains that the USA report entitled "Thermo-luminescence as a means of scientific investigation" (Science 117, 343, 1953) makes little or no mention of the contributions of Soviet scientists regarding the investigation of local electron levels of entrapment in crystal phosphorus and the development of the method of thermal luminescence curves which is the basic method of their investigation. It is the general tendency of some American scientists (he claims) to belittle the work of Soviet physicists and often by translating and developing a Soviet work they fail to give any references or give it so unwillingly and in such form that it seriously implore their value.

Institute : .....

Submitted : .....

KATS, M. L.

USSR/Physics

Card 1/1

Authors : Andrianov, A. S., and Kats, M. L.

Title : Change of absorption spectra of tin activated alkali-halide phosphori under the effect of x-rays

Periodical : Dokl. AN SSSR, 96, Ed. 2., 253 - 256, May 1954

Abstract : A study of the changes of absorption spectra of tin activated alkali-halide phosphori brought out the following facts: 1) an increase in continuation of x-raying reduces the absorption in the short wave group of maxima; 2) in the spectral zone in which the long wave group of maxima is situated, the absorption increases with the increase in continuation of x-raying; 3) in intensively x-rayed crystals, the short wave group transforms into one band with a maximum at 228 mμ. The two adjacent maxima appearing at 224 and 240 mμ disappear in this case. Analogous effects are also caused in other tin activated alkali-halide phosphori. Six references; 4 USSR since 1948. Graphs.

Institution : The N. G. Chernyshevskiy State University, Saratov.

Presented by : Academician G. S. Landsberg, February 27, 1954.

KaTs, M.L.

K

USSR / Optics

Abs Jour: Referat Zhur-Fizika, 1957, No 4, 10372

Author : Kats, M.L.
Inst : Saratov University, USSR
Title : Effect of Non-Activizing Ca and Sr Ions on Thermal Glow of NaCl-Ag Phosphors Exposed to X-Rays.

Orig Pub: Optika i spektroskopiya, 1956, 1, No 2, 198-203

Abstract: An investigation is made of the thermal glow (TG) of NaCl, NaCl with Ca^{++} and Sr^{++} impurities, and of NaCl-Ag with the same impurities, exposed to X-rays at 5-6°. For NaCl the TG has two peaks at 62 and 165°. These correspond to the M and F centers. In the presence of Ca^{++} and Sr^{++} one observes an additional peak at 127 -- 128°. In NaCl-CaCl$_2$ it predominates over the peak of the F centers. In NaCl-Ag there appears a new intense peak at 32°, due to the silver. The peaks are retained for the M and F centers, but they are less intense. Addition of Ca^{++} and Sr^{++} does not cause substantial changes in the spectrum of

Card : 1/2

[illegible] of nickel in sodium [illegible]

KATS, M.L.

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/)

Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po spektroskopii. Ed.: Gazer, S.L.; Tech. Ed.: Saranyuk, T.V.; Editorial Board: Landsberg, G.S., Academician (Resp. Ed., Deceased), Neporent, B.S., Doctor of Physical and Mathematical Sciences, Fabelinskiy, I.L., Doctor of Physical and Mathematical Sciences, Fabrikant, V.A., Doctor of Physical and Mathematical Sciences, Kornitskiy, V.G., Candidate of Technical Sciences, Rayskiy, S.M., Candidate of Physical and Mathematical Sciences, Klimovskiy, L.K., Candidate of Physical and Mathematical Sciences, Miliyanchuk, V.S., Candidate of Physical and Mathematical Sciences, and Klauberman, A. Ye., Candidate of Physical and Mathematical Sciences.

Card 1/30

KATS, M.L.

51-6-8/25

AUTHOR: Kats, M. L.

TITLE: Atomic Centres of Absorption and Emission in Alkali-Halide Phosphors Activated with Ions of Heavy Metals, and their Formation by High Energy Irradiation. (Atomarnyye tsentry pogloshcheniya i svecheniya v shchelochno-galoidnykh fosforakh, aktivirovannykh ionami tyazhelykh metallov, i ikh obrazovaniye pod deystviyem zhestkogo izlucheniya.)

PERIODICAL: Optika i Spektroskopiya, 1957, Vol. III, Nr. 6, pp.602-609. (USSR)

ABSTRACT: The author investigated alkali-halide crystal phosphors activated by ions of silver, nickel and tin. The absorption spectra of these phosphors were obtained in two ways: photographically (using a quartz spectrograph ИСП-22) and spectrophotometrically (using a quartz spectrophotometer СФ-4). The emission spectra were recorded in the ultraviolet region by means of a quartz spectrograph ИСП-66, and in the visible region employing a ИСП-51-type spectrograph. X-ray diffraction examination showed that alkali-halide

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51-6-8/25

Atomic Centres of Absorption and Emission in Alkali-Halide Phosphors Activated with Ions of Heavy Metals, and their Formation by High-Energy Irradiation.

phosphors activated with ions of heavy metals are solid solutions of substitution (Ref.4). The absorption spectra of such solutions consist of bands characteristic of the activating impurity. These bands are due to electron transitions between the energy levels of the activator ions, which are always displaced compared with the levels of the free impurity, and sometimes they are split by the lattice field (Ref.5). The absorption spectra of non-irradiated phosphors are shown in Fig.1 (curve 1) for KCl-Sn, and in Fig.2 for NaCl-Ni. Under the action of light of wavelength corresponding to the absorption bands of the activator, fluorescence of definite spectral composition was observed in all phosphors except those activated with nickel. Emission of phosphors activated by Ni may depend on the method of preparation. Thus NaCl-Ni activated electrochemically has strong orange-red fluorescent emission when excited by 330-400 mμ light,

Card 2/4

51-6-8/25

Atomic Centres of Absorption and Emission in Alkali-Halide Phosphors Activated with Ions of Heavy Metals, and their Formation by High-Energy Irradiation.

while NaCl-Ni grown from melt does not emit when excited by 330-400 mμ or by shorter wavelengths. Under the action of X-rays and γ-rays, the absorption spectra of alkali-halide phosphors change very considerably. In addition to the known bands in the visible region due to F-centres, some new absorption bands appear, mainly in the ultraviolet region. These new absorption bands are due to the activator centres whose structure was altered by the high-energy irradiation. New emission bands also appear on irradiation with X-rays and γ-rays. The effects of such irradiation on the absorption spectra are shown in Fig.1 (curves 2-4) for KCl-Sn, Fig.3 for KCl-Ag, Fig.5 for KBr-Sn and Fig.6 for NaCl-Ag. Figs. 4 and 7 show the effect of irradiation with light of 435, 465 and 565 mμ on the absorption spectra of X-ray-treated KCl-Ag and NaCl-Ni respectively. Investigation of the absorption and luminescence spectra, of the bleaching action of monochromatic light and of other properties of absorption

Card 3/4

AVAILABLE: Library of Congress.

KATS, M.L.

48-4-30/48

SUBJECT: USSR/Luminescence

AUTHOR: Kats M.L.

TITLE: Atomic Absorption and Luminescence Centers in Alkali-Haloid Phosphors Activated by Heavy Metal Ions, and their Formation under Action of Hard Radiation (Atomarnyye tsentry pogloshcheniya i svecheniya v shchelochnogaloidnykh fosforakh, aktivirovannykh ionami tyazhelykh metallov, i ikh obrazovaniye pod deystviyem zhestkogo izlucheniya)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21, #4, pp 550-551 (USSR)

ABSTRACT: Absorption spectra of alkali-haloid phosphors considerably change under the action of X- and gamma-rays; a number of new bands, mainly in ultraviolet region, arise. They are due to activator centers, but modified by hard radiation.

In some cases (Ag, Cu, Sn, Pb etc) new spectral bands of luminescence arise, which are due to modified activator centers. In individual cases the luminescence ability arises only after irradiation of a phosphor by X-rays, as for instance in NaCl-Ni phosphor.

Card 1/3

48-4-30/48

TITLE: Atomic Absorption and Luminescence Centers in Alkali-Haloid Phosphors Activated by Heavy Metal Ions, and their Formation under Action of Hard Radiation (Atomarnyye tsentry pogloshcheniya i svecheniya v shchelochnogaloidnykh fosforakh, aktivirovannykh ionami tyazhelykh metallov, i ikh obrazovaniye pod deystviyem zhestkogo izlucheniya)

The study of absorption and luminescence spectra has shown that new centers arise as a consequence of free electrons capture by activator ions.

In the cases of alkali-haloid phosphors activated by silver, individual spectral bands, such as at 288 mμ in KCl-Ag, are due to centers in which one of the 6 cations adjacent to a haloid vacancy is a silver ion.

The band at 440 mμ is due to colloid silver particles, and bands at 315 and 340 mμ can be due to particles intermediate between atomic and colloids composed of small groups of atoms.

Non-activating impurities in alkali-haloid phosphors, such as ions of Alkali-earth metals, can serve as capture centers.

These capture centers manifest themselves as characteristic bands in absorption spectra and corresponding peaks in thermal de-luminescence curves.

Card 2/3

KATS, M.L.

48-4-31/48

SUBJECT: USSR/Luminescence

AUTHORS: Andrianov A.S. and Kats M.L.

TITLE: X-Ray Action on Absorption and Luminescence of Alkali-Haloid Phosphors Activated by Tin (Deystviye rentgenovykh luchey na pogloshcheniye i svecheniye shchelochno-galoidnykh fosforov, aktivirovannykh olovom)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21, #4, p 552 (USSR)

ABSTRACT: Alkali-haloid phosphors activated with tin have 6 spectral bands. In the case of KCl-Sn these bands have maxima at 224, 232, 240 252, 276, and 296 mμ.

After irradiating this phosphor by X-rays, the absorption sharply decreases in 224, 232 and 246 mμ maxima and increases in the region with the long wavelength maxima. In phosphors subjected to a strong action of X-rays, the group of short wavelength bands transforms into one band having one diffused maximum. These changes are reversible; after heating the absorption intensity in the region of short wavelength bands increases and the former shape of absorption curve is restored.

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49-4-31/48

TITLE: X-Ray Action on Absorption and Luminescence of Alkali-Haloid Phosphors Activated by Tin (Deystviye rentgenovykh luchey na pogloshcheniye i svecheniye shchelochno-galoidnykh fosforov, aktivirovannykh olovom)

These changes are due to the capture of additional electrons by some activator ions.

Alkali-haloid phosphors activated with tin and irradiated by X-rays possess also thermoluminescence, but with other luminescence spectrum than for fluorescence. The difference is caused by other mechanism of origination. In the case of thermoluminescence, this mechanism is apparently the capture of additional electrons by activator ions which are transformed thereby into ionized or quasi-neutral atomic tin centers.
No references are cited.

INSTITUTION: Saratov State University im. Chernyshevskiy

PRESENTED BY:

SUBMITTED: No date indicated

AVAILABLE: At the Library of Congress.

Card 2/2

Kats, M.L.

48-4-32-48

SUBJECT: USSR/Luminescence

AUTHORS: Kats M.L. and Nikol'skiy V. K.

TITLE: On the Mechanism of Selective Absorption of Activator in KCl-Ag Phosphors (O mekhanizme selektivnogo pogloshcheniya aktivatora v fosforakh KCl-Ag)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21, #4, pp 553-554 (USSR)

ABSTRACT: The spectrum of selective absorption of the activator in the KCl-Ag phosphor consists of 2 intensive bands with sharp maxima at 216 and 228 mμ and one very weak band with the maximum at 245 mμ.

After irradiating the KCl-Ag phosphor with X-rays a series of new strong absorption bands arise in the long wavelength region, and 2 strong bands with maxima at 222 and 235 mμ and one weak band at 260 mμ arise in the short wavelength region. These bands can be ascribed to certain electron transitions.

From a comparison of spectra from phosphors subjected to the X-ray action and not subjected a conclusion can be drawn, that absorption bands of some part of silver ions are displaced

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48-4-32/48

On the Mechanism of Selective Absorption of Activator in KCl-Ag Phosphors (O mekhanizme selektivnogo pogloshcheniya aktivatora v fosforakh KCl-Ag)

toward longer wavelengths under the action of X-rays. This displacement can be caused by some lattice defects (anion and cation vacancies, positive holes) some part of which are localized near the activator ions.

The report was followed by a short discussion.

No references are cited.

INSTITUTION: Saratov State University im Chernyshevskiy

PRESENTED BY:

SUBMITTED: No date indicated

AVAILABLE: At the Library of Congress.

Card 2/2

KATS, M.L.

51-4-3-11/30

AUTHORS: Kats, M.L. and Nikol'skiy, V.K.

TITLE: Absorption and Luminescence Spectra of the KBr-In Phosphor and Their Change Under the Action of X-Rays. (Spektry pogloshcheniya i lyuminestsentsii kristallofosfora KBr-In i ikh izmeneniye pod deystviyem rentgenovykh luchey.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.3, pp.354-357 (USSR)

ABSTRACT: Since In^+ and Sn^{++} ions have iso-electron shells with identical electron configurations, therefore comparison of properties of alkali-halide phosphors containing these ions as activators is of great interest. The absorption and luminescence spectra of alkali-halide phosphors, activated with tin were reported in Refs.1-4. The present paper reports results of measurements of the absorption, excitation and luminescence spectra of KBr-In and the effect of irradiation of X-rays on the absorption spectra of this phosphor. The absorption spectra were measured by means of a quartz photoelectric spectrophotometer SF-4 and the fluorescence spectra were photographed on an ISP-51 spectrograph. The

Card 1/3

51-4-3-11/30

Absorption and Luminescence Spectra of the KBr-In Phosphor and Their Change Under the Action of X-Rays.

excitation spectra were studied using a monochromator from the SF-4 spectrophotometer together with a FEU-19 photomultiplier. The samples were presented by L.M. Shamovskiy and Yu.N. Zhvanko. The results are given in Figs.1-4. Fig.1 shows the absorption spectra of KBr-In (curve a) and KBr-Sn (curve b). Fig.2 shows the absorption spectra of KBr-In before (curve a) and after (curve b) irradiation with X-rays. Curve v in Fig.2 shows the effect of illumination with F-band light after X-irradiation; curves g and d show the additional absorption bands produced by X-rays. The fluorescence spectrum of KBr-In is shown in Fig.3, while Fig.4 shows the excitation spectrum of the same phosphor. From the results obtained and those given in Refs.1-4 it was found that KBr monocrystals activated with In^+ and Sn^{++} exhibit many similarities in the absorption, excitation and luminescence spectra as well as in other properties. These similarities suggest that in the phosphors studied absorption processes are related to transitions of electrons between levels of activator ions. These activator levels are displaced by the

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51- 4 -3-11/30

Absorption and Luminescence Spectra of the KBr-In Phosphor and Their Change Under the Action of X-Rays.

action of the internal crystalline field. Changes in the absorption spectra under the action of X-rays are due to the formation of atomic centres on capture of free electrons by activator ions. There are 4 figures and 7 references, of which 4 are Soviet, 1 German, 1 English and 1 translation of a Western work into Russian.

ASSOCIATION: Saratov State University (Saratovskiy gosudarstvennyy universitet.)

SUBMITTED: May 21, 1957.

1. Alkali-halide phosphors--Absorption--Spectrographic analysis
2. Alkali-halide phosphors--Luminescence--Spectrographic analysis
3. Indium ions--Chemical effects 4. X-rays--Applications

Card 3/3

AUTHORS: Kats, M.L. and Semenov, B.Z. 51-4-5-12/29

TITLE: Investigation of the Absorption and Luminescence Spectra of Alkali-Halide Crystals Activated with Nickel (Issledovaniye spektrov pogloshcheniya i lyuminestsentsii shchelochno-galoidnykh kristallov, aktivirovannykh nikelem)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol IV, Nr 5, pp. 637-642 (USSR)

ABSTRACT: The authors studied absorption, emission and excitation spectra of alkali-halides activated with nickel and the changes in these spectra following X-ray irradiation. The authors also studied the effect of addition of the nickel activator in the form of various nickel compounds: $NiCl_2$, $NiBr_2$ and Ni_2O_3. The absorption spectra were measured using a quartz photoelectric spectrophotometer SF-4, and the fluorescence spectra were photographed using a spectrograph ISP-51 or the Koenig-Martens spectrophotometer. Excitation spectra were observed using a photomultiplier FEU-19. The crystals studied were irradiated with X-rays from a tube working at 60 kV and 4 mA. The absorption spectra were obtained for crystals of NaCl-Ni, KCl-Ni (Fig 1) and KBr-Ni (Fig 2) grown from melts of $NaCl+NiCl_2$, $KCl+NiCl_2$, $KBr+NiBr_2$ and $KBr+Ni_2O_3$ respectively. Fig 3 shows the

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51-4-5-12/29

Investigations of the Absorption and Luminescence Spectra of Alkali-Halide Crystals Activated with Nickel

fluorescence spectrum of X-ray irradiated $KCl+NiCl_2$, excited by the 365 mμ line. Fig 4 gives the absorption by KCl-Ni subjected to X-rays. Fluorescence of KBr-Ni grown from a melt of $KBr+Ni_2O_3$ is shown in Fig 5 and the excitation spectrum of the same phosphor is shown in Fig 6. From the results obtained the authors make the following conclusions. In nickel-activated alkali-halide crystals several types of activator centres can exist. The absorption spectra in crystals before X-ray irradiation indicate one type of centres which absorb but do not emit light. These centres are Ni^{++} ions which are uniformly distributed in the crystal and which replace cations of the base at the lattice sites. After X-ray irradiation some Ni^{++} ions capture free electrons and thus they become centres of a new type with new absorption bands and fluorescence in the orange-red region. In KBr-Ni crystals grown from melts in which the activator was added in the form of Ni_2O_3, a further type of centres was observed.

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51-4-5-12/29

Investigations of the Absorption and Luminescence Spectra of Alkali-Halide Crystals Activated with Nickel

These centres are characterized by a non-uniform distribution, a different absorption (excitation) spectrum and very bright emission. Such KBr-Ni crystals possess all the listed type of centres after irradiation with X-rays. There are 7 figures and 9 references, 3 of which are Soviet, 1 English, 3 American and 2 German.

ASSOCIATION: Saratovskiy gosudarstvennyy universitet (Saratov State University)

SUBMITTED: July 8, 1957

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1. Alkali halides - Nickel activated 2. Alkali halides - Absorption spectra 3. Alkali halides - Emission spectra 4. Alkali halides - Excitation spectra

24(2), 24(7)

AUTHOR: Kats, M. L. SOV/48-22-11-15/33

TITLE: Absorption- and Emissionspectra of Alcali-Halide Crystals Containing Impurity Ions With Isoelectronic Clouds (Spektry pogloshcheniya i izlucheniya shchelochno-galoidnykh kristallov, soderzhashchikh primesnyye iony s izoelektronnymi obolochkami)

PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya fizicheskaya. 1958, Vol 22, Nr 11, pp 1347-1350 (USSR)

ABSTRACT: The most interesting but least investigated physical problem of the luminescence of crystal phosphors (luminous substance) is still that of luminous centers and the mechanism of selective light absorption by the activating impurity. It is supposed that the impurity absorption and emission bands depend on the transition of electrons between the energy levels of the activating impurities. It follows that if the electron cloud shows no major distortion, the absorption- and emission spectra as well as other properties of crystals with impurity ions of various heavy metals must be highly similar to each other, provided that these ions have isoelectronic clouds. The author closely examined the absorption- and emission spectra of alkali-halide

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SOV/48-22-11-15/33

Absorption- and Emissionspectra of Alcali-Halide Crystals Containing Impurity Ions With Isoelectronic Clouds

crystals activated by ions with isoelectronic clouds. The crystals were activated with In^+ and Sn^{2+} as well as with Tl^+ and Pb^{2+}. Experiments proved the statements mentioned above, i.e. in alkali-halide crystals activated by ions with isoelectronic clouds the absorption-, activation-, and emission spectra are very similar to each other. This proves that the absorption and emission processes in the above-mentioned crystals depend on the transition of electrons between the ion levels of the activator. They are, compared with the levels of free impurities, shifted under the influence of the inner crystalline field. There are 1 figure and 12 references, 6 of which are Soviet.

ASSOCIATION: Saratovskiy gos. universitet imeni N. G. Chernyshevskogo (Saratov State University imeni N. G. Chernyshevskiy)

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SOV/51-6-2-19/39

AUTHOR: Kats, M.L.

TITLE: Phosphorescence and Thermal De-Excitation of KBr-In Phosphors (Fosforestsentsiya i termovysvechivaniye fosforov KBr-Jn)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 2, pp 237 (USSR)

ABSTRACT: The author and V.K. Nikol'skiy reported earlier (Ref 1) results of an investigation of the absorption and fluorescence spectra of KBr-In phosphors. Under the experimental conditions of that work (thin crystals and weak source of excitation) no afterglow of long duration was observed. If KBr-In is excited with light from a mercury arc which is not separated out spectrally, then comparatively intense phosphorescence is observed whose decay [Fig 1 (see above)] suggests recombinational nature of emission. Thermal de-excitation of these phosphors (Fig 2) irradiated with X-rays, suggests the same mechanism. The thermal de-excitation curve consists of two peaks; optical measurements of changes in the absorption spectrum in the process of heating show that the high-temperature peak of Fig 2 is due to electrons localized at F-centres. Various arguments supporting the recombinational mechanism of emission of alkali-halide phosphors activated with indium

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Phosphorescence and Thermal De-Excitation of KBr-In Phosphors SOV/51-6-2-19/39

are also given in papers by N. Ye. Lushchik, Shamovskiy, Zhvanko, Ch.B. Lushchik and Volin (Ref 2). The fluorescence and thermoluminescence spectra of KBr-In phosphors measured by means of a high-speed spectrograph ISP-66 are essentially identical. Consequently in both cases emission is due to similar electron transitions at similar centres. This is a complete translation. There are 2 figures and 2 Soviet references.

SUBMITTED: July 13, 1958

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PHASE I BOOK EXPLOITATION SOV/5178

Kats, Mark L'vovich

Lyuminestsentsiya i elektronno-dyrochnyye protsessy v fotokhimicheski okrashennykh kristallakh shchelochno-galoidnykh soyedineniy (Luminescence and Electron-Hole Processes in Photochemically Colored Crystals of Alkali Halides) [Saratov] Izd-vo Saratovskogo universiteta, 1960. 270 p. Errata slip inserted. 3,000 copies printed.

Tech. Ed.: Alekseyev, P. Z.; Ed.: Korobova, E. I.

PURPOSE: This book is intended for physicists, chemists, and physical chemists interested in crystals of alkali halide compounds.

COVERAGE: This monograph is a summary of the author's studies on the luminescence mechanism of activated and nonactivated alkali halide crystal phosphors and related problems concerning the nature and structure of luminescence centers and electron and hole capture centers. The mechanism of light absorption in such crystals and

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the role of electron-hole processes in these phenomena are also covered. The material in the book can be divided into two sections. The first section deals with investigations of photochemically colored alkali halide crystals not containing activating impurity centers. The second section deals with the investigation of alkali halide phosphors activated by heavy metal ions. No personalities are mentioned. There are 361 references: 188 Soviet, 106 English, 63 German, 2 Czech, 1 Hungarian, and 1 Swedish.

TABLE OF CONTENTS:

S/058/62/000/008/044/134
A061/A101

AUTHORS: Kats, M. L., Nikol'skiy, V. K.

TITLE: On the nature of atomic centers in silver-activated alkali halide phosphors

PERIODICAL: Referativnyy zhurnal, Fizika, no. 8, 1962, 42, abstract 8V295 ("Nauchn. yezhegodnik. Saratovsk. un-t. Fiz. fak. i n.-i. in-t mekhan. i fiz.", 1955, Saratov, 1960, 71 - 76)

TEXT: Various assumptions regarding the nature of centers being responsible for the atomic A band (288 mμ) that appears in KCl-Ag phosphors as a result of X-irradiation are confronted. According to one viewpoint (Kats, Ettsel', and Shul'man), the A center consists of an F center with an Ag^+ ion as one of the cations in its environment, the electron coupling being stronger with Ag^+ than with K^+. According to another concept (Shamovskiy and co-workers), thin metallic silver films forming on the surface of the substructure blocks are responsible for the A band. A number of facts is presented in support of the former hypothesis, such as the absence of color in KCl-Ag crystals X-rayed

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On the nature of atomic centers in...

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A061/A101

at low temperature, and the absence of the 288-mμ band in the absorption spectrum of hyperfine silver layers applied to the surface of nonactivated alkali halide crystals.

V. Kosikhin

[Abstracter's note: Complete translation]

ANDRIANOV, A.S.; KATS, M.L.

X-ray electroluminescence in potassium bromide crystals.
Opt. i spektr. 11 no.3:422-423 S '61. (MIRA 14:9)
(Luminescence) (Potassium bromide crystals)

89241

S/048/61/025/001/007/031
B029/B067

9,6150 (also 1137, 1395)

AUTHORS: Kats, M. L., Gyünsburg, K. Ye., and Goulubentseva, L. I.

TITLE: Excitation of luminescence in activated alkali iodides at low temperature by means of excitons

PERIODICAL: Izvestiya Akademii nauk SSSR .. Seriya fizicheskaya, v. 25, no. 1, 1961, 43-44

TEXT: The authors investigated the spectra of the excitation of luminescence by excitons since new experimental data are required for establishing a theory on energy migration in a crystal phosphor. Alkali-halide iodides were activated with divalent tin and lead ions. The investigation was made with phosphors with a KI and NaI base, whose exciton absorption bands lie in the range about 219 and 229 mμ,respectively. The excitation spectra were taken at +20°C and -150°C by means of a special cryostat mounted in an СФ-4(SF-4) spectrophotometer which served as a monochromator. Studies of the excitation spectra of KI-Sn crystals showed an excitation band in the range of exciton absorption with a maximum at 219 mμ,and also a strong rise

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S/048/61/025/001/007/031
B029/B067

Excitation of luminescence...

in its intensity with decreasing temperature (Fig. 1). The rest of the bands are due to activating impurities. Similar bands within the range of exciton absorption were observed in the excitation spectra of KI-Pb and NaI-Sn crystals (Fig. 2). The activity of the bands about 219 mμ for KI and about 229 mμ for NaI increases with the content in activating impurities of the phosphors. In the absorption spectra of tin-activated alkali-halide crystals, the absorption bands of the activator decrease after exposure to X-rays and the intensity of luminescence of these crystal phosphors is reduced. This is due to the formation of non-luminescing atomic centers in tin. The activator bands in the excitation spectra of the potassium of the KI-Sn crystal, additively colored in the vapors, vanished on transition of the ion centers of tin to atomic centers. Simultaneously, the exciton bands of excitation vanished completely. The color of luminescence is the same in the case of both excitation in the activator bands and exciton bands. Changes in the absorption spectra of the crystal phosphor allow to draw conclusions as to the interaction of excitons with activators and thermal microdefects in the crystal lattice. The authors determined the absorption of the specimen before and after irradiation in the exciton band in order to ascertain the change in the absorption spectra of the

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S/048/61/025/001/007/031
B029/B067

Excitation of luminescence...

KI-Sn crystal phosphors under the action of light from the range of self-absorption. Such an irradiation reduces absorption in the range of the activator bands. In crystal phosphors with divalent activators, interaction processes take place between excitons and activator centers, which excite the luminescing centers and give rise to singly-ionized or atomic centers. This is the reproduction of a lecture read at the Ninth Conference on Luminescence (crystal phosphors), Kiyev, June 20-25, 1960. There are 3 figures and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc.

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Excitation of luminescence...

S/048/61/025/001/007/031
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Legend to Fig. 1:
$KI-SnI_2$ (0.075 mole% excitation spectrum;
a) 20°C,
b) -150°C.

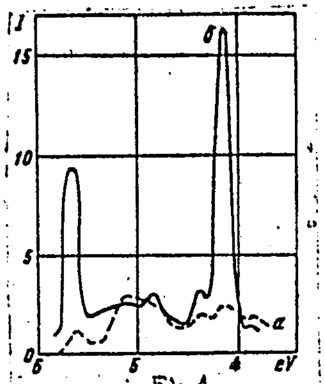

Fig 1

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89241

Excitation of luminescence...

S/048/61/025/001/007/031
B029/B067

Legend to Fig. 2:
a) NaI-Sn excitation spectrum;
b) KI-Pb excitation spectrum at -150°C.

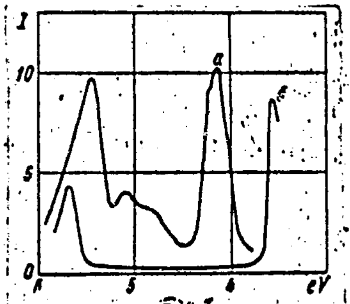

Fig 2

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20844

S/048/61/025/003/033/047
B104/B202

9.4160 (also 1137, 1395)

AUTHORS: Andrianov, A. S. and Kats, M. L.

TITLE: Luminescence of alkali halide phosphors which had been activated by means of antimony trichloride

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, v. 25, no. 3, 1961, 390-392

TEXT: This paper was presented at the 9th conference on luminescence (crystal phosphors) Kiyev, June 20 to 25, 1960. The authors studied alkali halide phosphors activated with ions having the same outer electron shells (In^+, Sn^{2+}, Sb^{3+}). They investigated the optical properties of surface-activated single crystal phosphors; Fig. 1 shows the absorption curves of $KCl-SbCl_3$ (Curve 1) $KBr-SbCl_3$ (Curve 2) phosphors and of an $SbCl_3$ layer which had been applied to a quartz base (Curve 3). Furthermore, curves 3 and 4 of this figure show the excitation spectrum and the fluorescence spectrum of $KCl-SbCl_3$ phosphor. A comparison of curve 1 and

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Luminescence of alkali halide...

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B104/B202

2 of this figure with the representations of the absorption spectra of alkali halide phosphors which had been activated with tin and indium indicates that the absorption spectra of these phosphors are caused by equal electron transitions. However, considerable differences are observed in the optical properties. While the activator absorption spectra of the phosphors activated with indium and tin are in full agreement with the fluorescence spectra, this agreement is not found in phosphors activated with antimony (Curves 1 and 4). This indicates that absorption and fluorescence take place in different centers. The formation of fluorescence centers due to the interaction between $SbCl_3$ molecule and the fundamental substance is inferred from the fact that fluorescence of $SbCl_3$ phosphor cannot be excited by ultraviolet light. In the following discussion N. Ye. Lushchik describes his experiments with KCl-Sb single crystals which, in principle, are in agreement with the results obtained here. There are 1 figure and 8 references: 6 Soviet-bloc.

ASSOCIATION: Saratovskiy gos. universitet im. N. G. Chernyshevskogo
(Saratov State University imeni N. G. Chernyshevskiy)

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Luminescence of alkali halide...

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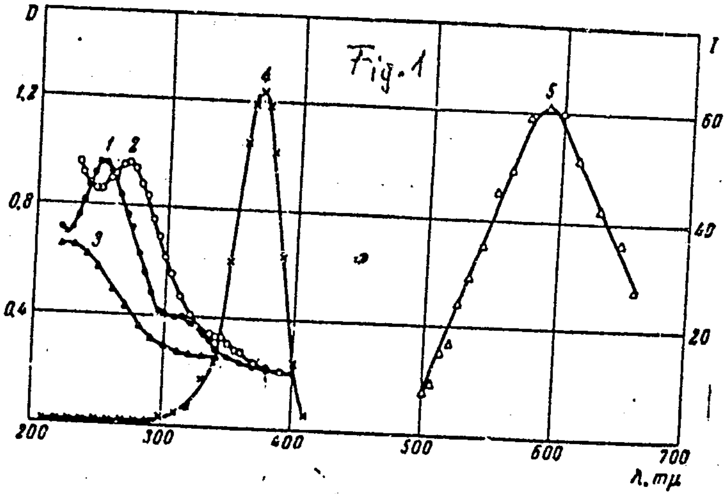
B104/B202



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L 19680-63 EWT(l)/EWP(q)/EWT(m)/BDS AFFTC/ASD/ESD-3/IJP(C)/SSD
Pad JD/HW/JG
ACCESSION NR: AR3006972 S/0058/63/000/008/D054/D054

SOURCE: RZh. Fizika, Abs. 8D395

AUTHORS: Kats, M. L.; Semenov, B. Z.

TITLE: Absorption and glow of activator centers in alkali halide crystal phosphors activated with nickel

CITED SOURCE: Sb. Fiz. shchelochno-galoidn. kristallov. Riga, 1962, 191-193

TOPIC TAGS: Absorption spectrum, excitation spectrum, NaCl-Ni crystal phosphor, KCl crystal phosphor, KBr-Ni crystal phosphor

TRANSLATION: Absorption and excitation spectra of NaCl-Ni, KCl-Ni, and KBr-Ni crystal phosphors, their aqueous solutions, and aqueous solutions of the activators were investigated. The absorption bands at 246, 254, and 250 nm in the spectra of these phosphors are

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ACCESSION NR: AR3006972

ascribed to the Ni^{2+} ions. It is found that the absorption band of crystal phosphors in the region 270--280 nm is observed also in aqueous solutions of phosphors. The centers responsible for the absorption in this band are apparently non-luminescent complexes, the component part of which is the activator. It is concluded that the induced luminescence in the NaCl-Ni is due to centers that absorb light in the long wave ultraviolet region (essentially in the 365-nm band). V. Kosikhin.

DATE ACQ: 06Sep63 SUB CODE: PH ENCL: 00

Card 2/2

36905
S/048/62/026/004/010/014
B104/B102

24.7000

AUTHOR: Kats, M. L.

TITLE: Absorption and luminescence of activator trapping centers in alkali-halide crystal phosphors

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 4, 1962, 506 - 513

TEXT: In a continuation of earlier investigations (Dokl. AN SSSR, 105, 415 (1956); Optika i spektroskopiya, 4, 637 (1958)) the author, jointly with B. Z. Semonov, studied the primary and secondary absorption spectra of NaCl-Ni, KCl-Ni, and KBr-Ni phosphors, and also of their aqueous solutions. The principal aim of the study was to interpret the additional absorption bands. When not exposed to X-rays, the two last-mentioned phosphors show absorption maxima at 213, 254, and 272 $m\mu$, and at 214, 250, 271, and 302 $m\mu$, respectively. It is assumed that the absorption bands at 246 $m\mu$ (NaCl-Ni), 254 $m\mu$ (KCl-Ni), and 250 $m\mu$ (KBr-Ni) be caused by activator centers, i. e., by the Ni^{2+} ion. The 235-, 295-, and 335-$m\mu$ bands (NaCl-Cu), and the 242-,

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Absorption and luminescence of ...

S/048/62/026/004/010/014
B104/B102

305-, and 365-mμ bands (KCl-Cu) are caused, by electron trapping centers of activators. In an investigation performed in cooperation with V. K. Nikol'skiy, absorption bands (345 and 375 mμ) were discovered in the absorption spectra of additionally colored KCl-Ag and KBr-Ag phosphors. These bands are attributed to those centers which were created by the electronic coloring of the phosphors. In a discussion, V. M. Belous of Odesskiy gos. universitet (Odessa State University) reported on a redistribution of electrons in AgCl among localization levels in the dark. Hardening of AgCl produces lattice defects, resulting in a new system of trap levels. An activator producing deep adhesion levels may also be regarded as a luminescent center. The recombination of a hole with an electron on an activator level leads to the emission of a red photon. There are 12 figures.

ASSOCIATION: Saratovskiy gos. universitet im. N. G. Chernyshevskogo (Saratov State University imeni N. G. Chernyshevskiy)

Card 2/2

PARFIANOVICH, I.A.; SHURALEVA, Ye.I.; KATS, M.L.

Discussion of the reports of I.A.Parfianofich and E.I.Shuraleva and M.L.Kats. Izv. AN SSSR. Ser. fiz. 26 no.4:513 Ap '62. (MIRA 15:4)

1. Odesskiy gosudarstvennyy universitet.
(Alkali metal halides--Spectra)

ACCESSION NR: AT4016305 S/0000/62/000/000/0191/0193

AUTHOR: Kats, M. L.; Semenov, B. Z.

TITLE: Absorption and luminescence of activator centers in Ni-activated alkali halide crystallophosphors

SOURCE: Vses. soveshch. po fiz. shchelochnogaloidn. kristallov. 2d, Riga, 1961. Trudy*. Fiz. shchelochnogaloidn. kristallov (Physics of alkali halide crystals). Riga, 1962, 191-193

TOPIC TAGS: nickel, absorption band, absorption spectrum, excitation spectrum, nickel activated crystal, crystallophosphor, nickel activated halide, alkali halide crystal, crystallography, crystal optical property, phosphor

ABSTRACT: In a further study of additional absorption bands the primary and secondary absorption spectra and the excitation spectra of NaCl-Ni, KCl-Ni and KBr-Ni have been examined. The results of the examinations were as follows: 1) NaCl-Ni. In addition to the basic band with a maximum at 246 mμ, non-irradiated samples showed a weak band with a maximum at about 276 mμ. X-raying intensified the 276 mμ band and produced further bands with maximums at about 306, 365, 400-410 and 216-226 mμ. Heating at 250-300C reestablished the preirradiated spectrum. 2) KCl-Ni and Kbr-Ni. Non-irradiated samples showed bands with maximums

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ACCESSION NR: AT4016305

at about 213, 254, 272 mμ and 214, 250, 271, 302 mμ, respectively. 3) Aqueous solutions of NaCl-$NiCl_2$, KCl-$NiCl_2$ and Kbr-$NiBr_2$. All spectra showed an absorption band at 274-276 mμ and less intensive maximum at about 400 mμ. 4) NaCl-Ni excitation spectra. Non-irradiated samples activated by electrothermodiffusion appeared to be excited predominantly at 365 mμ and showed, after x-raying, induced absorption bands at 276 and 306 mμ. Orig. art. has: 4 figures.

ASSOCIATION: Saratovskiy gosudarstvenny*y universitet im. N. G. Cherny*shevskogo (Saratov State University)

SUBMITTED: 00	DATE ACQ: 06Mar64	ENCL: 00
SUB CODE: SS	NO REF SOV: 004	OTHER: 000

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ACCESSION NR: AT4016325 S/0000/62/000/000/0416/0420

AUTHOR: Andrianov, A. S.; Kats, M. L.

TITLE: Electro- and x-ray-induced luminescence in KBr crystals

SOURCE: Vses. soveshch. po fiz. shchelochnogaloidn. kristallov. 2d, Riga, 1961. Trudy*. Fiz. shchelochnogaloidn. kristallov (Physics of alkali halide crystals). Riga, 1962, 416-420

TOPIC TAGS: luminescence, phosphor, alkali halide, alkali halide crystal, potassium bromide, electroluminescence, radioluminescence

ABSTRACT: Pure powdered KBr, mixed with a resin dielectric, was spread on a glass plate and, upon drying and polymerizing, coated with aluminum spray which served as one electrode, while a transparent SnO_2 coating on the reverse side of the plate served as the other. The capacitor thus created was placed in the path of an x-ray beam, with the aluminum coating facing the beam. The luminescence could be observed through the transparent SnO_2 layer and was found to occur under the influence of either an electric field or x-ray, with the combined action of both increasing its brightness. The nature of the intensifying action of an electric field on the x-ray-induced luminescence of KBr

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ACCESSION NR: AT4016325

was examined by adding $SnBr_2$ and AgBr activators. These activators produced no stimulating effect, suggesting that the increased brightness does not originate from activating admixtures present in the lattice but is linked with the excitation of the crystal base properties. Orig. art. has: 3 figures.

ASSOCIATION: Saratovskiy gosudarstvenny*y universitet im. N.G. Cherny*shevskogo (Saratov State University)

SUBMITTED: 00 DATE ACQ: 06Mar64 ENCL: 00

SUB CODE: OP, IC NO REF SOV: 002 OTHER: 001

Card 2/2

[illegible]

TITLE: Optical absorption and electron paramagnetic resonance in alkali halide crystals activated with nickel

SOURCE: [illegible] 1964 [illegible]

netic resonance, [illegible]

ASSOC[illegible]

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L 15219-65
ACCESSION NR: AP4048745

SUBMITTED: [illegible]

SUB CODE: OP, IC NR REF SOV: 004

Card 3/3

[illegible]

[illegible]

TITLE: Combined electric and x-ray luminescence of alkal [illegible] compounds

SOURCE: Optika i spektroskopiya, v. 17, no. 5, 1964, [illegible]

TOPIC TAGS: electroluminescence, x ray luminescence, [illegible] luminescence brightness, luminescence quenching

ABSTRACT: Continuing their earlier investigations of lumines[illegible] [illegible]

field (Opt. i spektr., v. 11, [illegible], 1961), the authors studied split capacitors (0.1—0.2 mm thick) with NaCl, KCl, KBr, KI, CsCl, CsBr, and CsI powders used as a dielectric. When an electric field is

Cord 1/3

[illegible]

ACCESSION NR [illegible]

[illegible]

photomultiplier and an oscilloscope or microammeter. The ratio of the intensity with and without electric [illegible]

[illegible]

Card 2/3

[illegible]

ACCESSION NR [illegible]

[illegible] [illegible]

[illegible] OTHER [illegible]

Card 3/3

[illegible]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. [illegible]

TOPIC TAGS: luminescence, luminescent crystal, sodium chloride, copper, lead, centers become the principal luminescence centers in [illegible] after prolonged

ACCESSION NR: AP5009615

ASSOCIATION: None

SUBMITTED: 00
ENCL: 00
SUB CODE: [illegible]

NR REF SOV: 008
OTHER: 001