

KAPLUNOVSKIY, P.S.

Reproduction in the fern-type beech forest. Izv.AN Arm.SSR.
Biol.nauki 15 no.11:27-30 N '62. (MIRA 15:12)

1. Karpatskaya lesnaya opytnaya stantiya Ukrainskogo nauchno-
issledovatel'skogo instituta lesnogo khozyaystva i agrolesomelio-
ratsii.

(ARMENIA—BEECH) (ARMENIA—FOREST REPRODUCTION)

KAPLUNOVSKIY, P. S.

Incense cedar in Askaniya-Nova. Biol. Glav. bot. sada no.47:
92-94 '62. (MIRA 16:1)

1. Karpatskaya lesnaya opytnaya stantsiya, g. Mukachevo.

(Askaniya-Nova—Incense cedar)

KAPLUNOVSKIY, P.S.

Finds of the wintergreen *Chimaphila umbellata* (L.) Nutt.
in the Crimea, Bot. zhur. 49 no.2:251-253 F '64.

(MIRA 17:6)

1. Karpatskaya lesnaya opytная stantsiya, g. Mukachevo.

KAPLUNOVSKIY, S.P.

Legumes

Summer sowing of perennial legume and grasses mixtures in southern Ukraine.
Korm. baza 3 no. 6, 1952.

Monthly List of Russian Accessions, Library of Congress, September 1952. UNCLASSIFIED.

KAPLUNOVSKIY, S. [P.]

Rye

"Perennial rye - a valuable feed crop." Kolkh. proiz 12 no. 6, 1952.

Monthly List of Russian Accessions, Library of Congress, October, 1952. UNCLASSIFIED.

USSR / Cultivated Plants. Fodders.

M-4

Abs Jour: Ref Zhur-Biol., No 6, 1958, 25096

Author : ~~Kaplunovskiy~~, S. P., Blinova, N. P.

Inst : "Askaniya-Nova" Institute of Hybridization and
Acclimatization of Livestock

Title : Experimental Sowing of Corn at the "Askaniya-Nova"
Institute

Orig Pub: V sb.: Kukuza v 1955 g. vyp. 6, M., Sel'khogiz,
1956, 110-114

Abstract: The "Askaniya-Nova" Institute of Hybridization and
Acclimatization of Livestock conducted in 1955 a
series of experiments to study the agrotechny of
corn raising for green feed and grain. The highest
green stuff yield with two harvests came from square-
pocket planting (50 x 50) with 4 plants per bunch.
Good results were also shown by mixed sowings of

Card 1/2

89

COUNTRY : USSR
CATEGORY : Cultivated Plants - Forage Crops. M
ABS. JOUR. : RZhBiol., No.14, 1958, No.63444
AUTHOR : ~~Kaplunovskiy, S. P.~~
INST. : Ukrainian Scientific Research Institute of Animal Husbandry
TITLE : Leguminous Forage Crops in the South of Ukrainian SSR.
ORIG. PUB. : Zemledeliya, 1957, No. 12, 42-47
ABSTRACT : According to the trials at Ukrainian Scientific Research Institute of Animal Husbandry "Askaniya-Nova", legumes (peas, vetchling, soybean, chick-pea, lentils, winter vetch, alfalfa, esparsette) alone and in mixture with cereal crops (winter rye and wheat) produce a large yield of digestible protein from a unit of area in comparison with the cereal forage crops. — O. A. Gorbunova

* "Askaniya-Nova"

Card: 1/1

KAPLUNOVSKIY, S.P., kand.sel'khoz.nauk

Growing sorgo for green forage and ensilage. Trudy "Ask.-Nov."
8:244-250 '60. (MIRA 14:4)
(Sorghum)

KONOVALOV, Ivan Antonovich; PUTS, Mikhail Ivanovich; ~~KAPLUNOVSKIY,~~
~~Yevgeniy Petrovich~~ [Kaplunovs'kiy, IE.P.]; TOCHENIY, P.A.
[Tochenyi, P.A.], red.; LIMANOVA, M.I. [Lymanova, M.I.],
tekhn. red.

[Give constant attention to the collective farm economy]
Povsiakdenno vnykaty v ekonomiku. Kharkiv, Kharkivs'ke
knizhkovye vyd-vo. 1962. 41 p. (MIRA 16:6)

(Collective farms)

KAPLYA, A. V.

Cand Bio Sci, Diss -- "Directivity of physiological and biochemical processes in the root system of wild species of fruit crops with varying frost resistance". Kiev, 1961. 25 pp, 22 cm (Acad Sci UkrSSR. Inst of Botany), 100 copies, Not for sale (KL, No 9, 1961, p 179, No 24308).
/61-55880/

KAPLYA, A.V.

Water balance and frost resistance of the root system of wild
fruit crops. Visnyk Kyiv.un. no.3. Ser.biol. no.1:78-88 '60.
(MIRA 16:4)

(FRUIT TREES—WATER REQUIREMENTS)
(PLANTS—FROST RESISTANCE) (ROOTS (BOTANY))

KAPLYA, A.V.

Frost resistance of different parts of the root system of
fruit trees. Visnyk. Kyiv. un. no.4. Ser. biol. no.2146-55
'61. (MIRA 16:6)
(ROOTS (BOTANY)) (PLANTS — FROST RESISTANCE)
(FRUIT TREES)

KAPLYA, A.V.

Colloidal changes in the cell protoplasm of the root system of
the rootstock of fruit crops of various winter hardiness. Visnyk.
Kyiv.un. no.2. Ser. biol. no.2:13-23'60. (MIRA 16:8)
(ROOTS (BOTANY)) (PLANTS—FROST RESISTANCE)
(PROTOPLASM)

KAPLYA, A.V.

Effect of different enviromental conditions on the frost resistance
and nitrogen metabolism of the root system of fruit crops during
the old part of the year. Visnyk Kyiv.un. no.5. Ser.biol. no.2:
56-64 '62. (MIRA 16:5)

(PLANTS--FROST RESISTANCE) (NITROGEN METABOLISM)
(ROOTS (BOTANY)) (FRUIT TREES)

KAPLYANSKAYA, F.A.; TARNOGRADSKIY, V.D.; VANGENGEYM, E.A.

Possibility of the separation of Taz layers in a cross
section of the periglacial sediments in the Tobol'sk portion
of the cis-Ural region. Biul. Kom. zhetv. per. no. 29:189-195
'64. (MIRA 17:8)

KAPLYANSKAYA, F.A.

Climatic conditions of the Tobol'sk interglacial. Inform.sbor.VSEGEI
no.53:31-47 '62. (MIRA 17:1)

KAPLYANSKAYA, F.A.; TARNOGRADSKIY, V.D.

Quaternary paleogeography of the extraglacial area in the West
Siberian Plain. Trudy VSEGEI 64:97-101 '61. (MIRA 15:6)
(West Siberian Plain--Paleogeography)
(West Siberian Plain--Glacial epoch)

ZARRINA, Ye.P.; KAPLYANSKAYA, F.A.; KRASNOV, I.I.; MIKHANKOV, Yu.M.;
TARNOGRADSKIY, V.D.

Periglacial formation in the West Siberian Plain. Mat. VSEGEI
Chet. geol. i geomorf. no.4:54-104 '61.

(MIRA 17:5)

USSR/Physics - Spectrum

FD-3141

Card 1/1 Pub. 153 - 16/19

Author : Gross, Ye. F.; Kaplyanskiy, A. A.

Title : Spectrum of absorption edge, internal photoeffect, and structure of crystals

Periodical : Zhur. tekhn. fiz., 25, No 9 (September), 1955, 1661-1663

Abstract : The writers discuss the difficult factors that determine the possibility of the existence of exciton levels and their properties; namely, the number of levels, their energy, rules of disposition, width, intensity, and polarization of corresponding absorption lines. In particular they discuss the problem of what influence is exerted by the structure of the crystalline lattice upon the line spectrum of absorption edge. They conclude that the exciton mechanism governing the excitation of the internal photoeffect has received new confirmation. Nine references: e.g. Ye. F. Gross and N. Karryyev, DAN SSSR, 81, 47, 1952; Ye. F. Gross and B. P. Zakharcheniya, DAN SSSR, 90, 745, 1953.

Institution : ---

Submitted : May 20, 1955

KAPLYANSKIY, A.A.

K-5

Category : USSR/Optics - Physical optics

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2315

Author : Gross, Ye.F., Kaplyanskiy, A.A.
Title : On the Absorption Spectra of Crystals of Certain Iodides

Orig Pub : Zh. tekhn. fiziki, 1955, 25, No 12, 2061-2068

Abstract : Absorption spectra of single crystals of red HgI_2 (I), PbI_2 (II), and CdI_2 (III) were investigated. Crystals I were in the form of plates having a thickness \underline{d} from several tens to several hundreds of microns and an optical axis \underline{c} in the plane of the plate. I displays strong dichroism at 77.3°K and at 20°K . If the plane of the crystal is perpendicular to the ray of light, one observes only the sharp edges of the absorption of the ordinary and extraordinary rays, the former being shifted by 250-300 A toward the longer wavelength relative to the latter. At 77.3°K the 5330 A is fully polarized with its electric vector E perpendicular to \underline{c} . At 4.2°K , the portion of the absorption spectrum of the ordinary ray between the two absorption edges differs from the 77.3°K spectrum in the following respects: the 5330 A line becomes considerable narrower and shifts towards 5296 A, and a weaker narrow 5321 A line appears; the edges of the continuous absorption shifts toward the shorter waves and forms a small step of continuous absorption at 5260 A, with a weak 5238 line visible against its background; all the lines and the step are similarly polarized with E perpendicular to \underline{c} . Crystals II are in the form of plates (\underline{d} ranges from 0.1 to

Card : 1/2

Category : USSR/Optics - Physical optics

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Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2315

several microns) the plane of which is perpendicular to the c axis and are grown from aqueous solutions. At 77.3°K , the crystals with $d \approx 1 \mu$ display only a sharp absorption edge at $4970\text{-}5000 \text{ \AA}$, and in the crystals with $d \sim 0.1 \mu$ one can see on this edge bands at 4948 (a strong one, $\Delta\lambda = 10 \text{ \AA}$), 4060 ($\Delta\lambda = 200 \text{ \AA}$) and 3750 \AA ($\Delta\lambda = 30 \text{ \AA}$). Near 3460 \AA , the continuous absorption grows sharply, forming the edge of a step that forms the background for bands at 3130 \AA ($\Delta\lambda = 10 \text{ \AA}$), 2780 \AA (strong, $\Delta\lambda = 40 \text{ \AA}$), 2690 \AA , and 2610 \AA (both weak). At 4.2°K , the spectrum is almost unchanged, at 20°C the bands broaden strongly and shift toward the long waves. The high absorption coefficient in the lines and in the bands ($10^4\text{-}10^5 \text{ cm}^{-1}$), the fact that the stoichiometry of the crystals is maintained as the result of the manner in which they are grown, and the constancy of the structure of the characteristic absorption upon prolonged illumination indicate, in the authors' opinion, that this structure can be attributed to the fundamental lattice of crystals I and II. In the case of I this is ascribed to exciton excitation. Crystals III were grown from aqueous solution or from a molten mass and made in the form of hexagonal plates with a plane perpendicular to c and with $d = 50\text{-}500 \mu$. A narrow 3835 band, the intensity of which is strongly dependent on the growth conditions, is located near the absorption edge in the vicinity of 3500 \AA . This band splits up into narrow 3832 and 3845 \AA lines at 4.2°K .

Card : 2/2

KAPLYANSKIY, A.A.

GROSS, Ye.F.; KAPLYANSKIY, A.A.

Absorption and emission spectra of cuprous chloride inclusions in rock
salt crystals. Opt. i spektr. 2 no.2:204-209 F '56. (MIRA 10:3)
(Copper chlorides--Spectra) (Sodium chloride--Spectra)

KAPLYANSKIY, A. A.

Category : USSR/Optics - Physical optics

K-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2316

Author : Gross, Ye.F., Kaplyanskiy, A.A., Novikov, B.B.Title : Photoconductivity, Radiation, and Absorption of Light in HgI₂ Crystals

Orig Pub : Zh. tekh. fiziki, 1956, 26, No 3, 697-700

Abstract : An investigation was made of the distribution of photoconductivity σ_{ph} of single crystals of red HgI₂ monocrystals (I) at 77.3°K in polarized light. The optical axis c is parallel to the surface of plate I. If the light is incident exactly perpendicular to the surface, the σ_{ph} curve for a ray with E perpendicular to c has a rapid rise near the sharp absorption edge of this ray ($\lambda = 5350--5390$), and then diminishes slowly toward the short-wave side. This decrease contains a narrow gap, the position of which coincides with the polarized 5330 A exciton absorption line (E is perpendicular to c). The σ_{ph} curve for a ray with E parallel to c has a broad maximum, corresponding to the absorption edge of the extraordinary ray ($\lambda = 4950--5150$ A). If plate I is turned slightly about an axis perpendicular to the surface, a narrow peak appears at 5330 A. The fact that the 5330 A exciton line appears both in the form of a peak and in the form of a gap in σ_{ph} is ascribed to the variation in the absorption of light of varying polarization as a function of the crystal orientation relative to the incident ray. The peak of σ_{ph} is observed when

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Leningrad Phys-Tech Inst.

Category : USSR/Optics - Physical optics

K-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 2316

excitons are formed over the active thickness of the crystal, while the gap in σ_{ph} appears when they are created and annihilated in the surface layers. It is deduced that the photoeffect is partly due to exciton excitation. An assumption is made that the photoeffect occurring upon absorption in the continuous spectrum is also due to exciton formation by recombination of electrons and holes.

Card : 2/2

Category : USSR/Electricity - Semiconductors

G-3

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4212

Author : Gross, Ye.F., Kaplyanskiy, A.A., Novikov, B.V.

Title : Structure of Spectral Curve For Internal Photoeffect in Crystals of Cadmium Sulfide

Orig Pub : Zh. tekhn. fiziki, 1956, 26, No 4, 913-916

Abstract : A connection is established between the line spectrum of the absorption edge and the spectral distribution of photoconductivity of a CdS crystal. According to the concepts concerning the exciton mechanism of photoconductivity, each line in the absorption spectrum corresponds to a maximum of photoconductivity. When CdS ($T = 77.3^{\circ}\text{K}$) is exposed to light so polarized that the E-vector, the optical axis c of the crystal, and the direction of the incidence of the ray lie in the same plane (the E vector and the axis c form thereby a small sharp angle), in the spectral distribution of the photoconductivity displays narrow maxima at 4869, 4840, 4820, and 4710 A. The first three maxima are in good agreement with the lines in the absorption spectrum. In the case when E is perpendicular to c , the wavelengths 4869, 4840, and 4820A correspond to dips in the curves of the spectral distribution of photocon-

Card : 1/2

Category : USSR/Electricity - Semiconductors

G-3

Abs Jour : Ref Zhur - Fizika, No 2, 1957, No 4212

ductivity. Such a phenomenon was observed earlier by the authors in the case of HgI_2 (Referat Zh. Fizika, 1956, 2316) and is connected, in their opinion, with an increase in the absorption coefficient when E is perpendicular to c. If the coefficient is very large, all the light is absorbed near the surface, which may cause a reduction in photoconductivity owing to the increased exciton annihilation.

Card : 2/2

KAPLYANSKIY, A. A.

Category: USSR / Physical Chemistry - Crystals

B-5

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29747

Author : Gross Ye. Fe., *Kaplyanskiy A. A., Novikov B. V.*

Inst : Academy of Sciences USSR *(Leningrad PhysTech Inst)*

Title : Exciton Structure of Spectral Curves of Photoelectric Effect in Crystals

Orig Pub: Dokl. AN SSSR, 1956, 110, No 5, 761-764

Abstract: Investigation of spectral distribution of internal photoeffect (PE) of HgI₂ and CdS crystals in the proximity of absorption edge where, according to other publications, narrow exciton absorption lines are present. Measurements were conducted at 77.3°K in polarized light, with monocrystal plates containing the c axis or perpendicular to c, at different mutual orientations of light vector E, direction of light incidence l and axis c. In the case of singular beam, when C and E form an acute angle, HgI has a PE peak at 5330 A, and CdS has peaks at 4869, 4840 and 4820 A. Position of all peaks coincides with the position of the lines of exciton absorption of these crystals.

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Category: USSR / Physical Chemistry - Crystals

B-5

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29747

The conclusion is reached that optical excitation of excitons causes internal PE. Wide structureless PE maxima in the region of absorption edges of ordinary and singular beams are probably connected with continuous absorption. This shows that PE arises also on light absorption in continuous spectra. However in such a case the PE can be caused by excitons formed by recombination of electrons and holes. Occurrence of recombination is confirmed by exciton radiation of these crystals on excitation in principal lattice. With another orientation of c, E and l, in lieu of PE peaks at the location of absorption lines are found PE dips, which are attributed to surface absorption of light. The effects of infrared and red brightening on PE curves have been investigated.

Card : 2/2

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KAPLYANSKIY, A.A.

PRIKHAT'KO, A.F.

24(7) p.3 PHASE I BOOK EXPLOITATION 804/1365

L'viv. Universitet

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

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

Card 1/30

Shpol'skiy, E.V., E.A. Girdshiyauskayte, and L.A. Klimova. Emission Spectra of Aromatic Hydrocarbons at Low Temperatures

24

Gross, Ye. F., and A.A. Kaplyanskiy. Exciton Pattern of the Spectral Curves for the Intrinsic Photoeffect and the Exciton Luminescence Spectra in Crystals

37

Gross, Ye. F., B.P. Zakharchenya, and N.M. Reynov. Zeeman Effect in the Exciton Spectrum of the Cuprous-oxide Crystal

38

Peofilov, P.P. Absorption and Luminescence of Bivalent Rare-earth Ions in Synthetic and Natural Fluorite Crystals

39

Faydysh, A.N., and I. Ya. Kucherov. Migration and Transfer of Electron-excitation Energy in Anthracene and Naphthalene Crystals

40

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KAPLYANSKIY A. A.

Dissertations. Branch of Physico-Mathematical Sci. Jul-Dec 1957.
Vest. Akad. Nauk SSSR, 1958, No. 4, pp. 115-116.

At the Inst. for Problems of Physics in S. I. Vavilov, the following dissertations for the degree of Cand. Physico-Mathematical Sci. were defended:

DZYALOSHINSKIY, I. Ye. - The Thermodynamic Theory of Weak Ferromagnetism in Antiferromagnetics.
ITSKEVICH, Ye. S. - The Thermal Capacity of Layer Lattices at Low Temperatures.

At the Institute of Physics and Technics (Leningrad Phys-Tech Inst, AS USSR) the following dissertations for degree Cand. Physico-Math Sci. were defended:
KAPLYANSKIY, A. A. - Spectroscopic Investigations in the Range of the Long Wave Edge of the Main Absorption of Crystals.

KRIVKO, N. I. - INVESTIGATION OF THE FERROMAGNETIC RESONANCE IN Some Ferrites at Low Temperatures.

ROMANOV, V. A. - The Determination of the Coefficient Relations of the Inner Conversion of γ Radiation on L and M Shells.

KAPLYANSKIY, A.A.

2) 5)
The conductivity, emission, and absorption of light by
crystal of mercury iodide. F. Grom, A. A. Kaplyanskiy,
A. A. Kabanov, and B. V. Novikov. *Dokl. Akad. Nauk SSSR*,
1974, 237 (English translation).—See *Chem. Abstr.* 74: 11747c.
B. M. R.

КАПЕЛЯНОВСКИЙ, А.А.

... introduced into a crystal of ...

... at 372 Å. The center of the ...

the activator in NaClO₄ ...
... produced an intense emission band
at 341 mμ. In the visible region NaClO₄ ...
emitted yellow-greenish light which gradually changed to
violet with an increase in the temp. This was accompanied
by an increase in the intensity of the ...

gradually concentrate back

KAPLYANSKIY, A.A.

AUTHORS: Gross, Ye. F. and Kaplyanskiy, A.A.

TITLE: Absorption of Light in Crystals of Mercury Halides
(Pogloshcheniye sveta v kristallakh galogenidov rtuti)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Vol. XXI, #2, pp 220-
224, 1957, USSR, Seriya fizicheskaya

ABSTRACT: Excited states of solids are manifested in absorption spectra of crystals by discrete structure at the long wavelength border of internal absorption. The role of the lattice in the existence and properties of exciton levels can be experimentally detected by two methods:

1. Studying and comparing absorption spectra of crystals of different chemical compounds possessing similar lattices;
2. Studying absorption spectra of crystals of different modifications of the same substance possessing polymorphism property; this method allows to detect the effect of crystal lattice on exciton levels "in the pure form."

Card 1/4

TITLE:

Absorption of Light in Crystals of Mercury Halides
(Pogloshcheniye sveta v kristallakh galogenidov rtuti)

The article describes results of studying absorption spectra in mercury halides HgJ_2 , HgJ and $HgBr_2$.

The absorption spectrum of tetragonal modification of HgJ_2 has a complicated and diverse structure (lines, bands, continuous absorption steps extending in a wide spectrum region from 5,330 to 3,725 Å (at $T = 77.3^{\circ}K$). Basing on the Dykman and Pekar theory, the narrow lines in the absorption spectrum can be ascribed to the excitation of non-polarizing excitons in the HgJ_2 crystallic lattice. The broad bands can be ascribed to the formation of polarizing excitons connected with the higher excitation levels in the HgJ_2 crystal.

In the absorption spectra of the rhombic modification of HgJ_2 , no discrete structure was observed. The rhombic lattice of $HgBr_2$ is wholly isomorphic with the rhombic HgJ_2 lattice and their absorption spectra are identical. These results indicate the strong effect of lattice structure on crystal exciton levels.

Card 2/4

TITLE:

Adsorption of Light in Crystals of Mercury Halides
(Pogloshcheniye sveta v kristallakh galogenidov rtuti)

The difference between tetragonal and rhombic HgJ_2 modifications stems mainly from a difference in the geometry of lattices.

Adsorption spectra of HgJ were also studied. Structure was not detected in its monocrystals; in the thin polycrystal layers a broad band preceding continuous adsorption spectrum was discovered. The band center is situated at a wavelength of $4,240 \text{ \AA}$ (at $T = 77.3^\circ\text{K}$). It can be ascribed to the excitation of polarizing excitons in the HgJ lattice. This fact indicates the possibility of different effects of lattice structure on the polarizing and non-polarizing exciton levels.

Comparing these results with the results of photo-sensitivity of the two HgJ_2 modifications, the following correlation can be established: crystals of tetragonal HgJ_2 possessing linear exciton structure at the border of adsorption spectrum are highly photo-sensitive;

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TITLE: Adsorption of Light in Crystals of Mercury Halides
(Pogloshcheniye sveta v kristallakh galogenidov rtuti)
crystals of rhombic HgJ_2 deprived of any structure at
the border of adsorption spectrum are non-photo-sensitive.
This correlation indicates the great role of excitons
in the phenomenon of internal photo-effect.
3 spectra are given. There are 18 references, of which
10 are Slavic (Russian).

INSTITUTION: Physico-Technical Institute of the USSR Academy of
Sciences

PRESENTED BY:

SUBMITTED: No date

AVAILABLE: At the Library of Congress

Card 4/4

SUBJECT: USSR/Luminescence 48-4-19/48

AUTHOR: Kaplyanskiy A.A.

TITLE: Linear Luminescence near the Edge of Main Absorption of Crystals (Lineychataya lyuminestsentsiya okolo kraya osnovnogo pogloshcheniya kristallov)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Seriya Fizicheskaya, 1957, Vol 21, #4, pp 531-533 (USSR)

ABSTRACT: The Optical Laboratory of the Physico-Technical Institute studied exciton states of crystals by the spectroscopic method. In order to study the process of exciton annihilation with a quantum of light emission, the Laboratory investigated the luminescence of crystals possessing a discrete exciton structure at the edge of internal absorption. Luminescence spectra were studied at temperatures of 4.2 and 77.3°K. In the emission spectrum of HgJ₂-single crystals two narrow luminescence lines were discovered. Luminescence emission of CuHgJ₄ crystals showed linear radiation consisting of at least 11 lines.

Card 1/2

TITLE:

Linear Luminescence near the Edge of Main Absorption of
Crystals (Lineychataya lyuminestsentsiya okolo kraya osnov-
nogo pogloshcheniya kristallov) 48-4-19/48

The luminescent spectrum of PbJ_2 crystals consists of several groups of lines and 4 equidistant bands, which resemble a so-called "edge emission" observed with other crystals (CdS, ZnS, ZnO).

There is a great similarity in luminescence spectra of PbJ_2 , CdS and CdSe: besides the resonance lines, their spectra show a group of emission lines and an equidistant band group with long wavelengths ("edge emission"). Resonance emission lines are to be considered as the luminescence of exciton annihilation. The nature of the "edge emission" is not as yet clear. The bibliography lists 9 references 8 of which are Slavic (Russian).

INSTITUTION: Not indicated

PRESENTED BY:

SUBMITTED: No date indicated.

AVAILABLE: At the Library of Congress.

Card 2/2

S/058/62/000/004/105/160
A061/A101

AUTHORS: Gross, Ye. F., Kaplyanskiy, A. A., Novikov, B. V.

TITLE: Structure of photoconductivity spectral curves in crystals at low temperatures (Theses)

PERIODICAL: Referativnyy zhurnal, Fizika, no. 4, 1962, 39, abstract 4E342 (V sb. "Fotoelektr. i optich. yavleniya v poluprovodnikakh", Kiyev, AN USSR, 1959, 66-73)

TEXT: The shape of photoconductivity spectral curves in crystals with discrete absorption edge structure at 77.3°K was studied on CdS, HgI₂, and PbI₂ single crystals. For these crystals, the maxima of photoconductivity were found to correspond to the discrete absorption lines ascribed to excitons. The shape of the absorption spectra and of the photoconductivity curves in CdS and HgI₂ chiefly depends on the mutual orientation of the crystal axis c and the electrical vector E of the exciting light. In HgI₂ crystals, when the absorption coefficient in the lines is large, a self-reversal of the maxima of photoconductivity is observed, which is related to the increased annihilation of excitons near the surface. The constant infrared illumination reduces photoconductivity; however,

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Structure of photoconductivity ...

S/058/62/000/004/105/160
A061/A101

its action upon the background and the peaks of photoconductivity is different in each crystal. These results are evidence of the important part played by excitons in photoconductivity phenomena. ✓

[Abstracter's note: Complete translation]

Card 2/2

SOV/51-6-3-26/28

AUTHOR: Kaplyanskiy, A.A.

TITLE: Luminescence Lines in X-Ray Irradiated Crystals of Lithium Fluoride (Lineychataya lyuminesstentsiya rentgenizovannykh kristallov ftoristogo litiya)

PERIODICAL: Optika i Spektroskopiya, 1959, Vol 6, Nr 3, pp 424-426, (USSR)

ABSTRACT: The author reports a discovery, at 77°K, of a luminescence line spectrum in LiF prepared from monocrystals subjected to X-ray radiation for tens of hours (only visible coloration is produced). The luminescence was excited by ultraviolet light from a SVDSH-1000 mercury lamp and recorded by means of a glass spectrograph with $\sim 40 \text{ \AA/mm}$ dispersion in the yellow region of the spectrum. Two typical spectra are shown in Fig. a and ζ ; Fig. η is the iron spectrum used for calibration. At 77°K, apart from the well-known wide red and green bands, the following narrow "atomic" lines were found: a group of four equidistant ($\Delta\nu \sim 247 \text{ cm}^{-1}$) lines at 569.8, 578.0, 586.2 and 595.0 $m\mu$ (of electron-vibrational origin); several lines between the latter, e.g. 581.0 and

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SOV/51-6-3-26/28

Luminescence Lines in X-Ray Irradiated Crystals of Lithium Fluoride

583.0 m μ ; lines at 562.7, 553.5 and 546.0 m μ ; a line at 531.6 m μ which appears only after further irradiation with ultraviolet light; lines at 534.0, 444.0 m μ etc. which are present only in some samples. These lines disappear on heating to room temperature. Their intensities vary from sample to sample (the samples were X-ray irradiated for various lengths of time) and certain lines were present in some samples but not in the others. The author suggests that these lines may be closely related (resonance) to the absorption lines which were observed in strongly colored LiF at low temperatures by Pringsheim and others (Refs. 2,3) but no explanation of their origin is offered. Acknowledgments are made to I.N. Zimkin and N.Ya. Karasik for X-ray irradiation of the crystals, and to the Corresponding Member of the Ac.Sc.USSR Ye.F. Gross for his

Card 2/3 advice.

SOV/51-6-3-26/28

Luminescence Lines in X-Ray Irradiated Crystals of Lithium Fluoride

There are 1 figure and 6 references, of which 1 is Soviet,
4 English and 1 German.

SUBMITTED: September 19, 1958

Card 3/3

14.3500

66585

SOV/51-7-5-15/21

AUTHOR: Kaplyanskiy, A.A.

TITLE: The Effect of Elastic Deformation Produced by Uniaxial Compression or Tension on the Spectra of Local Anisotropic Centres in a Cubic Lattice. I. Method.

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 5, pp 677-682 (USSR)

ABSTRACT: Elastic uniaxial compression or extension of a cubic crystal removes "orientational degeneracy" of energy levels of anisotropic centres, oriented along G_n axes. This is true both for the ground and excited states of these centres. Such compression or extension should produce splitting of individual absorption or luminescence bands which are due to transitions between levels of the anisotropic centres. It is shown that splitting of such bands can give information from which the orientation of the anisotropic centres in the lattice and the nature of the oscillators, used to describe absorption and luminescence of these centres, can be found. For this purpose the centres should possess narrow spectral bands and a system of levels sensitive to small elastic deformations of the crystal lattice. It is also required that the magnitude of the displacement of such levels should depend on the orientation of the centres with respect to the direction (P) of the applied stress and that this displacement should be different for

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66585

SOV/51-7-5-15/21

The Effect of Elastic Deformation Produced by Uniaxial Compression or Tension on the Spectra of Local Anisotropic Centres in a Cubic Lattice. I. Method.

the ground and excited levels. The paper is entirely theoretical and an experimental verification of the conclusions given here is reported in Part II (see the following abstract). There are 2 figures, 1 table and 16 references, 13 of which are Soviet, 2 English and 1 Japanese.

SUBMITTED: March 10, 1959

Card 2/2

24.3500

66586

SOV/51-7-5-16/21

AUTHOR: Kaplyanskiy, A.A.

TITLE: The Effect of Elastic Deformation Produced by Uniaxial Compression or Tension on the Spectra of Local Anisotropic Centres in a Cubic Lattice. II. Experimental Part.

PERIODICAL: Optika i spektroskopiya, 1959, Vol 7, Nr 5, pp 683-690 (USSR)

ABSTRACT: The paper is a continuation of earlier work (Part I, see preceding abstract). It reports an experimental verification of the predicted effect of elastic uniaxial deformation on the spectra of local centres in cubic crystals of fluorite, activated with rare earths (CaF₂.RE) and coloured crystals of LiF. Both absorption and luminescence spectra were recorded in polarized light; observations were made at right angles to the axis of elastic deformation. Crystals were cooled to the temperature of liquid nitrogen (77°K). The apparatus used to obtain the luminescence spectra is shown in Fig 1, where L is a mercury lamp SVDSH-1000, O₁ is a quartz objective, F is a UFS-1 filter, M is a sample, P is a press producing the elastic deformation, D is a quartz Dewar vessel filled with liquid nitrogen, O₂ is a glass objective, N is a birefringent crystal of Iceland spar, K is a quarter-wave plate and S is a slit of an ISP-51 spectrograph. The apparatus used to obtain the absorption spectra differed only in replacement of the mercury lamp L

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66586

SOV/51-7-5-16/21

The Effect of Elastic Deformation Produced by Uniaxial Compression or Tension on the Spectra of Local Anisotropic Centres in a Cubic Lattice. II. Experimental Part.

and the filter F by an incandescent lamp. Samples were cut from monocrystals. They were in the form of rectangular prisms whose two bases to which the external force was applied were parallel to the (100) plane in studies of compression along the G_4 axis or parallel to the (110) plane in studies of compression along the G_2 axis. The splitting effect predicted theoretically in Part I was observed clearly only in the linear luminescence spectra of $\text{CaF}_2 \cdot \text{Eu}^{+++}$ (Fig 2), $\text{CaF}_2 \cdot \text{Sm}^{+++}$ (Fig 3) and coloured LiF (Figs 4, 5). Comparison of the experimentally observed splitting with theoretical predictions yielded orientation of the anisotropic centres of linear luminescence in these crystals and the multipolarity of elementary radiators, which are responsible for some of the lines. Acknowledgments are made to Ye.F. Gross for his advice and to P.P. Feofilov for supply of fluorite crystals. There are 6 figures, 1 table and 16 references, 13 of which are Soviet, 1 English, 1 German and 1 mixed (English and German).

SUBMITTED: March 10, 1959

Card 2/2

4

GROSS, Ye.F.; KAPLYANSKIY, A.A.

Quadrupole optical excitation of the ground state of excitons
in copper oxide crystals. Fiz. tver. tela 2 no.2:379-380 F '60.
(MIRA 14:8)

1. Leningradskiy fiziko-tekhnicheskii institut AN SSSR.
(Excitons) Copper oxide crystals)

S/181/60/002/007/047/047/XX
B006/B067

AUTHORS: Gross, Ye. F., Kaplyanskiy, A. A.

TITLE: Splitting of the Fundamental Absorption Edge of Cu_2O Due to the Removal of the Energy Band Degeneracy in Orientated Deformation of Crystals

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1676-1677

TEXT: The authors studied the effect of deformation on the crystal spectra, which are related to 1) optical transitions between energy bands and 2) excitation of exciton states. The effect of uniaxial compression of Cu_2O crystals at 77°K on their spectra of the long-wave main absorption edge, the lines $\lambda = 6164, 6085, \text{ and } 6125 \text{ \AA}$ inclusive, was studied. The Cu_2O single crystals were compressed in the direction of the C_4, C_3, C_2 symmetry axes (the direction of compression is indicated by P), and the absorption spectra were taken perpendicular to P (in the direction L). The results are briefly discussed and shown in a figure. Pictures were also taken in polarized light. The main characteristics of the splitting

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Splitting of the Fundamental Absorption
Edge of Cu_2O Due to the Removal of the
Energy Band Degeneracy in Orientated
Deformation of Crystals

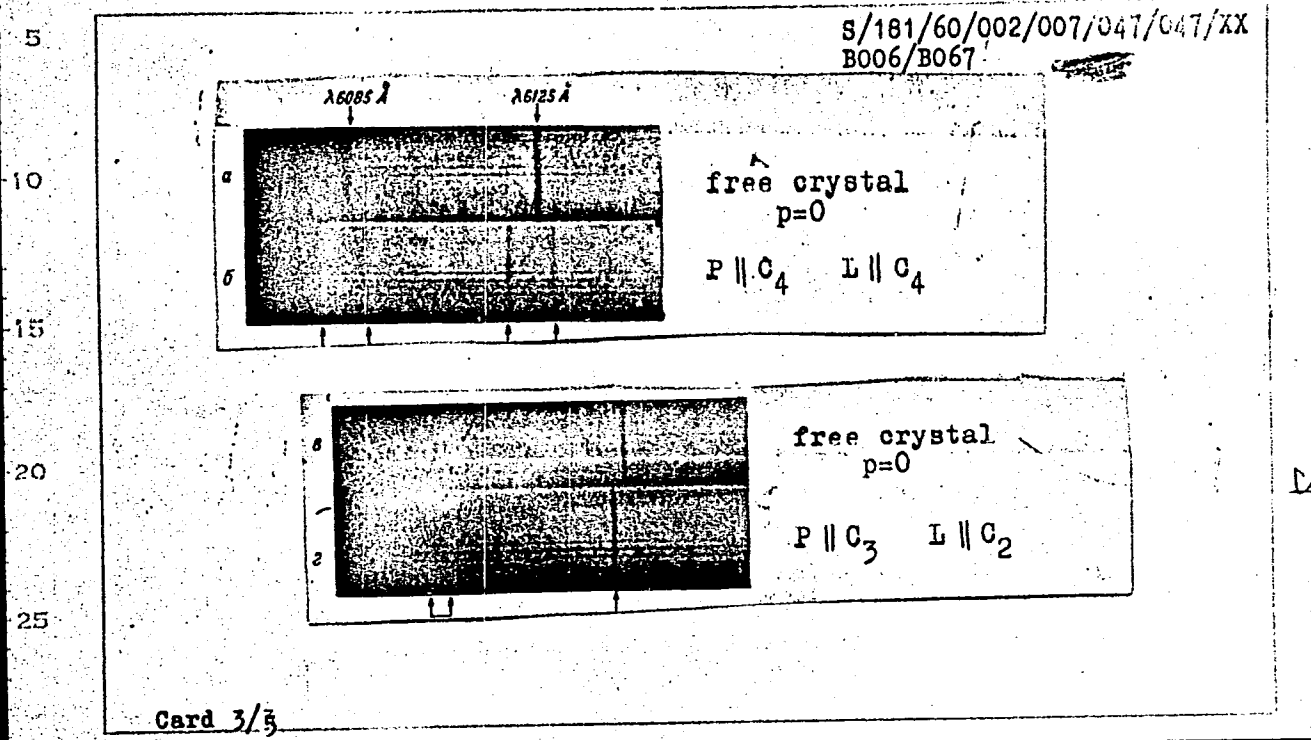
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B006/B067

effect - the multiplicity and the relative amounts of splitting ν indicate that one of the energy bands is single, and the other is triply-degenerate (in the extreme case at $\vec{k} = 0$). This experimental result is in agreement with theoretical investigations (Ref. 11) in which it was shown, on the basis of group-theoretical considerations, that the valency band (in connection with the 2p levels of O^{2-}) is triply-degenerate, and that the free band (4s levels of Cu) is single. There are 1 figure and 11 references: 7 Soviet and 4 US. ↓

ASSOCIATION: Leningradskiy fiziko-tehnicheskii institut AN SSSR
(Leningrad Institute of Physics and Technology of the
AS USSR)

SUBMITTED: May 17, 1960

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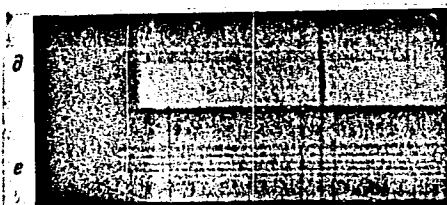
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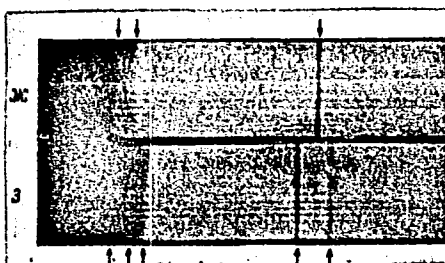
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B006/B067



free crystal
p=0

P || C₂ L || C₃



polarized light

E || P

P || C₂ L || C₃

polarized light

E ⊥ P

P || C₂ L || C₃

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5
0
5
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5

S/181/60/002/007/047/047/XX
B006/B067

Расщепление края основного поглощения Cu_2O при сжатии кристалла вдоль осей симметрии 4-го, 3-го и 2-го порядков и наблюдения по направлению L, перпендикулярному оси сжатия P.
 $\alpha, \sigma, \mu - \rho = 0$ (свободный кристалл);
 $\sigma - P \parallel C_4, L \parallel C_4; \mu - P \parallel C_3, L \parallel C_2; \sigma, \mu.$
 $\sigma - P \parallel C_2, L \parallel C_3; (\alpha - \sigma - \text{неполяризованный свет, } \mu - E \parallel P, \sigma - E \perp P).$

Splitting of the fundamental absorption edge of Cu_2O

(L \perp P)



Card 5/5

86451

9.4160 (3201, 1003, 1137)

S/181/60/002/011/041/042
B006/B060

26.2420

AUTHORS: Gross, Ye. F. and Kaplyanskiy, A. A.

TITLE: Study of the Effect of Oriented Deformations on the Spectrum of the Fundamental Absorption Edge of Cu_2O Single Crystals

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 11, pp. 2968-2981

TEXT: This is a very detailed report on studies made on monoaxially compressed Cu_2O single crystals. As a consequence of this deformation, an anisotropic polarized splitting of the longwave edge was observed to take place along with an exciton structure of the Cu_2O absorption spectrum.

Multiplicity, amount of splitting, and polarization in the spectra were examined with different directions of compression. The method used for the investigation was similar to the one described in Refs. 13, 14. The specimens were about $1 \times 2 \times 4$ mm large platelets placed in a special press inside a Dewar vessel (77°K). The spectra were taken in polarized (E \parallel P, E \perp P) and unpolarized light by an MCH-51 (ISP-51) spectroscope, dispersion $\sim 5\text{\AA}/\text{mm}$, and a $\gamma\phi$ -85 (UF-85) camera. The spectra were all taken

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86451

Study of the Effect of Oriented Deformations on the Spectrum of the Fundamental Absorption Edge of Cu_2O Single Crystals S/181/60/002/011/041/042 B006/B060

in the direction L which was perpendicular to the direction of compression P ($L \perp P$), with P being oriented along the axes C_4 , C_3 , and C_2 ; Figs. 1-3 show pictures of the polarized splitting of the absorption edge of Cu_2O .

The spectra in the figures are described in the text and certain characteristics are pointed out. The magnitude of the splitting is in all cases ($L \perp P$; $P \parallel C_4$, $P \parallel C_3$, $P \parallel C_2$) directly proportional to the compression pressure. The polarized splitting was calculated, and the theoretical and experimental splitting amounts Δ were intercompared ($\Delta = \nu - \nu_0$, ν_0 being the position of the line in the free crystal). The agreement is satisfactory. From results obtained it was possible to infer the character of the energy levels. The results can be explained by assuming that the triple degeneracy of the valency band in deformation is removed at $\vec{K} = 0$. The final part of the paper under consideration deals with the effect of the crystal deformation upon the yellow exciton series of Cu_2O (V. T. Agekyan, a student of LGU (Leningrad State University) participated in

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86451

Study of the Effect of Oriented Deformations on the Spectrum of the Fundamental Absorption Edge of Cu_2O Single Crystals S/181/60/002/011/041/042
B006/B060

this investigation). It was found that at $P \parallel C_4$ the set is sharply shifted in the direction of longer waves; the same, but less markedly, applies to $P \parallel C_3$, and at $P \parallel C_2$ a polarization effect appears in addition to this shift. The uniform shift of the lines allows the conclusion that deformation has an effect upon the position of the band, but not upon the individual exciton levels; a relationship was found, furthermore, to exist between the hydrogen-like exciton levels with $n \geq 2$ and the degenerate band. A. G. Zhilich is finally thanked for discussions on theoretical problems. There are 7 figures, 2 tables, and 29 references: 17 Soviet, 10 US, 1 French, 1 Japanese, and 1 Italian. X

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR Leningrad (Institute of Physics and Technology of the AS USSR, Leningrad)

SUBMITTED: August 4, 1960

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86451

S/181/60/002/011/041/042
B006/B060

Legends to

Fig. 1: polarized splitting of the absorption edge spectrum of Cu_2O on a crystal compression in the direction of the symmetry axis of 4th order;
Fig. 2: the same on a compression in the direction of the symmetry axis of 3rd order; Fig. 3: the same for a compression in the direction of the symmetry axis of 2nd order.
Legend to Fig. 7: spectrogram of the yellow exciton series of Cu_2O in monoaxially compressed crystals.

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| | | | | | |
|--|--------------------------------------|--------------------------|--------------------------|-------------------|-------------------|
| | | $\lambda 6125\text{\AA}$ | $\lambda 6085\text{\AA}$ | | |
| LHC ₄ НЕПОЛЯРИЗОВ. СВЕТ | P=0 | | | | |
| | $P=10 \frac{\text{кг}}{\text{мм}^2}$ | | | | |
| | | $\lambda_1^{(4)}$ | $\lambda_2^{(4)}$ | $\Lambda_1^{(4)}$ | $\Lambda_2^{(4)}$ |
| LHC ₄ | EHP | | | | |
| | EIP | | | | |
| LHC ₂ | EHP | | | | |
| | EIP | | | | |

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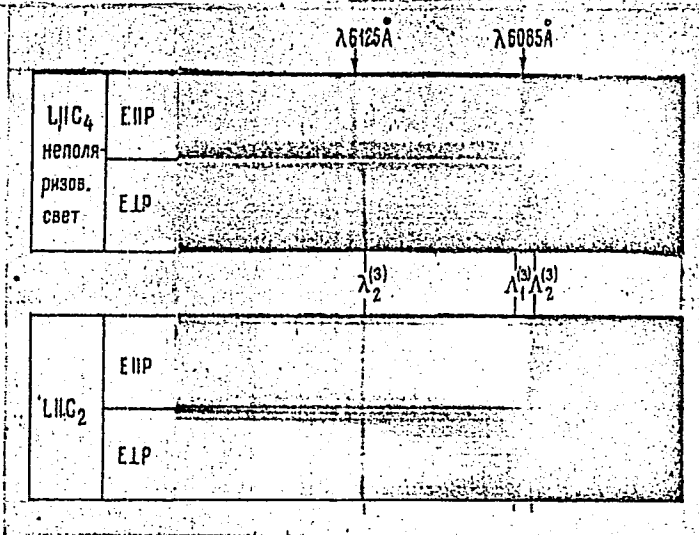
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86451

Рис. 1. Поляризованное расщепление спектра края поглощения Cu_2O при сжатии кристаллов вдоль оси симметрии 4-го порядка.

S/181/60/002/011/041/042
B006/B060



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Рис. 2. Поляризованное расщепление спектра края поглощения Cu_2O при сжатии кристаллов вдоль оси симметрии 3-го порядка.

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B006/B060

| | n=4 | n=3 | n=2 |
|-------------------|------------|-----|-----|
| PIIC ₄ | [REDACTED] | | |
| PIIC ₃ | [REDACTED] | | |

Card 7/8

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S/181/60/002/011/041/042
B006/B060

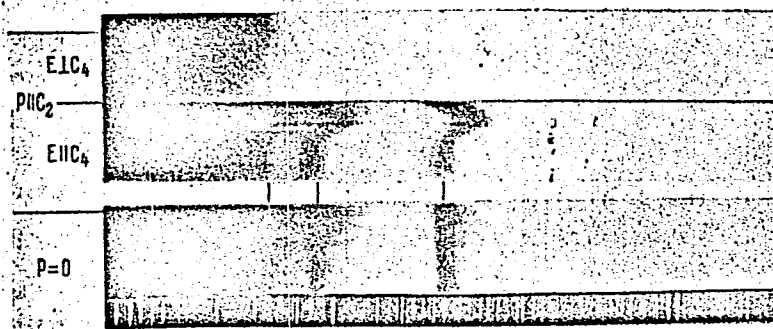


Рис. 7. Спектрограммы желтой серии экситона Cu_2O в одноосно-напряженных кристаллах.

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8005#3

S/020/60/132/01/25/064
B014/B014

24.7100

AUTHORS: Gross, Ye. F., Corresponding Member of the AS USSR, Kaplyanskiy, A.A.TITLE: The Optical Anisotropy of Cubic Crystals Which Causes the Effect of Spatial Dispersion. Quadrupole Exciton Absorption of Light in Cuprous Oxide γ

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 1, pp. 98-101

TEXT: When examining the absorption spectrum of monocrystalline samples of Cu_2O ($T = 77^\circ \text{K}$) the authors of the present paper detected the effect of anisotropic light absorption ($\lambda = 6125 \text{ \AA}$), which is unusual in the case of cubic crystals. It was found that in the spectrum of light passing through a Cu_2O lamina the intensity of these absorption lines is not equal in two arbitrarily chosen states of polarization which are perpendicular to each other. The degree of polarization and the integral intensity vary from specimen to specimen and also when the direction of the beam changes. A sufficiently large Cu_2O crystal was bred and used to determine the dependence of intensity and polarization of these lines upon the direction of the beam in the crystal

Card 1/3

K

80053

The Optical Anisotropy of Cubic Crystals Which Causes the Effect of Spatial Dispersion. Quadrupole Exciton Absorption of Light in Cuprous Oxide S/020/60/132/01/25/064 B014/B014

lattice. Thin sheets, which were differently oriented relative to the crystallographic axes, were cut out of this crystal. It was found that the intensity and the degree of polarization of the lines under consideration are fully determined by the orientation of the beam relative to the crystallographic axes. The results obtained are described by means of the spectrogram shown in Fig. 1 and the scheme shown in Fig. 2. Herefrom it may be seen that the spatial distribution of intensity and of the state of polarization has some elements of cubic symmetry. When taking account of polarization only (neglecting absorption intensity) it is possible to determine seven "optical" axes along which absorption is isotropic. The anisotropy of the absorption lines is ascribed by the authors to electric quadrupole transitions since the observable dependence of intensity and polarization upon the direction of light inside the crystal corresponds to the spatial field distribution of an electric quadrupole system. In discussing the results obtained here the authors refer to papers by S.I. Pekar et al. (Refs. 12 and 13) in which it was pointed out that optical anisotropy of cubic crystals associated with the occurrence of excitons is theoretically possible. Furthermore, a paper by V.L. Ginzburg (Ref. 14) is referred to, in which spatial light dispersion was taken into consideration.

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The Optical Anisotropy of Cubic Crystals Which Causes
the Effect of Spatial Dispersion. Quadrupole Exciton
Absorption of Light in Cuprous Oxide

80053

S/O20/60/132/01/25/064
B014/B014

The detection of quadrupole transition makes complementary demands on the theory of the exciton state of the crystal, in which dipole transitions are forbidden and quadrupole transitions allowed. In conclusion, reference is made to a model devised by A.G. Zhilich (Ref. 2) for these transitions. The authors thank M.A. Rumsh and V.N. Shchemelev for their assistance in experiments. There are 2 figures and 14 references, 10 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk SSSR (Institute of Physics and Technology of the Academy of Sciences of the USSR)

SUBMITTED: February 2, 1960

Card 3/3

KAPLYANSKIY, A.A.

Band splitting in the spectra of cubic crystals subjected to
oriented deformation. Opt. 1 spektr. 10 no.2:165-172 F '61.
(MIRA 14:2)

(Crystals—Spectra)

KAPLYANSKIY, A.A.; MOSKVIN, N.A.; PRZHEVUSKIY, A.K.

Band splitting in the luminescence spectra of anisotropic centers
in LiF and CaF₂-Eu crystals subjected to oriented deformation.
Opt. i spektr. 10 no.3:368-373 Mr '61. (MIRA 14:8)
(Calcium fluoride—Spectra) (Lithium fluoride—Spectra)
(Dislocations in crystals)

GROSS, Ye.F.; KAPLYANSKIY, A.A.

Quadrupole absorption and the optical lifetime of the ground state of excitons in a Cu_2O crystal. Dokl. AN SSSR 139 no.1: 75-78 J1 '61. (MIRA 14:7)

1. Fiziko-tekhnicheskiy institut AN SSSR. 2. Chlen-korrespondent AN SSSR (for Gross).
(Excitons--Spectra) (Copper oxide crystals)

4.2180
24.6200
26.2420

36882
S/181/62/004/004/026/042
B102/B104

AUTHORS: Gross, Ye. F., Kaplyanskiy, A. A., and Agekyan, V. T.

TITLE: Effect of oriented deformation on the spectra of direct and indirect excitation of the exciton ground state in Cu_2O crystals

PERIODICAL: Fizika tverdogo tela, v. 4, no. 4, 1962, 1009-1015

TEXT: Gross and Kaplyanskiy had already shown (FTT, 2, 1676, 2968, 1960) that uniaxial compression of Cu_2O crystals leads to splitting of the first component ($n=1$, 6125 Å) of the yellow exciton series and of the two edges (6165 and 6085 Å) of continuous absorption. For $P \parallel C_4$ and $P \parallel C_3$ a doublet arises, with $P \parallel C_2$ - a triplet; P is the compression direction.

These studies were continued. While the previous measurements were made in "transverse" geometry ($L \perp P$), now they were made in "longitudinal" one ($L \parallel P$); L is the direction of light propagation. The measurements were made again at 77°K and with ИСП-51 (ISP-51) spectrograph and an УГ-85

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S/181/62/004/004/026/042
B102/B104

Effect of oriented deformation...

(UF-85) camera. The compression load was 10-20 kg/mm². Results: With P || C₄, line and edges were only red-shifted and not polarized. With P || C₃, the line was shifted toward shorter waves, the edges were split into doublets and red-shifted; no polarization. With P || C₂, the line was slightly red-shifted, the edge was split into a triplet and the spectrum was polarized. With E || C₄ (C₄ ⊥ P), only the first edge was seen which was red-shifted; with E ⊥ C₄, both edges were seen, the first was slightly red-shifted, the second was shifted considerably toward shorter waves. The results of both studies (L ⊥ P and L || P) were analyzed on the basis of Elliott's theory (Proc. Internat. Confer. Semicond., Prague, 408, 1960; Phys. Rev. 124, 340, 1961) of the connection between these edges and indirect exciton transitions in the band n=1 (combined exciton-phonon transitions). The good agreement between this theory and the experimental results speaks in favor of the theory. The symmetry type of the phonon involved is assumed to be Γ_{12}^- . It can also be assumed that exciton migration takes place in Cu₂O. There are 1 figure and 1 table.

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S/181/62/004/006/043/051
B108/B138

AUTHORS: Gross, Ye. F., Kaplyanskiy, A. A., Agekyan, V. T., and Bulyanitsa, D. S.

TITLE: Polarization of the yellow exciton series in the Cu_2O spectrum on deformation of the crystals

PERIODICAL: Fizika tverdogo tela, v. 4, no. 6, 1962, 1660-1666

TEXT: The effect of uniaxial compression of Cu_2O crystals along the $\langle 100 \rangle$, $\langle 110 \rangle$, and $\langle 111 \rangle$ axes on the yellow exciton series was studied. A long-wave displacement of the series was observed. Anisotropic absorption was found but there was no splitting of the yellow series. Polarization of the absorption of the yellow series on deformation is explained by "direct forbidden" transitions (R. J. Elliott. Phys. Rev., 108, 1384, 1957) into exciton states and by band-to-band transitions, which are due to nearby excited bands. There are 1 figure and 1 table. ✓

ASSOCIATION: Fiziko-tehnicheskii institut im. A. F. Ioffe AN SSSR, Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad)

Card 1/2

S/181/62/004/008/019/041
B102/B104

AUTHORS: Gross, Ye. F., Kaplyanskiy, A. A., and Agekyan, V. T.

TITLE: Deformation-induced splitting of the blue and the dark blue exciton series in the Cu_2O crystal spectrum

PERIODICAL: Fizika tverdogo tela, v. 4, no. 8, 1962, 2169 - 2178

TEXT: Single-crystal Cu_2O plates cut in parallel to (100), (110) or (111) planes were compressed at 77°K in the directions $\langle 100 \rangle$, $\langle 110 \rangle$ or $\langle 111 \rangle$ respectively. It was then examined how the compression influenced the reflection spectrum (normal reflection, observation perpendicular to pressure P direction). $P \parallel [001]$: Broad and almost symmetrical splitting, doublet components polarized. $P \parallel [111]$: no splitting, no polarization; $P \parallel [110]$: medium and almost symmetrical splitting, doublet components polarized. The position of the doublet line (ν) related to that of the original line (ν_0) depends not only on the direction but also on the magnitude of the pressure: $\Delta = \nu - \nu_0$ depends linearly on p. A calculation of the deformation-induced line splitting shows that at $\vec{k} = 0$ the

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S/181/62/004/008/019/041
B102/B104

Deformation-induced splitting of the...

highest conduction band is of the type Γ_{12}^- . As the splitting is similar in both series the exciton band splitting must be due to splitting of the upper conduction bands which are the same in both. An investigation of the optical transitions in the bands Γ_8^- (Γ_{12}^-) shows that in Γ_8^- (Γ_{12}^-) the relative intensity of polarized absorption is equal for transitions from Γ_7^+ (blue) and from Γ_8^+ (dark blue). Qualitatively the theoretical results agree well with the experiments: if σ_{ij} given in kg/mm^2 ,

$$\Delta \text{ cm}^{-1} = -2.7 (\sigma_{xx} - \sigma_{yy} + \sigma_{zz}) \pm \quad (12).$$

$$\pm 25 \sqrt{\frac{(\sigma_{xx} - \sigma_{yy})^2 + (\sigma_{yy} - \sigma_{zz})^2 + (\sigma_{zz} - \sigma_{xx})^2}{2}}$$

Thus the amount, multiplicity and polarization of the exciton series splitting correspond to the calculated characteristics for the splitting of the transition Γ_7^+ , Γ_8^+ (Γ_{25}^+) \rightarrow Γ_8^- (Γ_{12}^-). There are 4 figures and 1 table.

Card 2/3

FEOFILOV, P.P.; KAPLYANSKIY, A.A.

Spectra of bivalent rare earth ions in crystals of alkali metal
fluorides. Part 1. Samarium. Opt. i spektr. 7 no.4:493-500
Ap '62. (MIRA 15:5)
(Alkali metal fluorides--Spectra) (Samarium--Spectra)

T. P. A. C
S/051/62/012/004/004/015
E039/E485

AUTHORS: Feofilov, P.P., Kaplyanskiy, A.A.

TITLE: Spectra of divalent rare earth ions in crystals of
alkaline-earth fluorides. I. Samarium

PERIODICAL: Optika i spektroskopiya, v.12, no.4, 1962, 493-500

TEXT: The spectro-luminescent character of the system $\text{MeF}_2 - \text{TR}^{2+}$ (Me = Ca, Sr, Ba; TR = Sm, Eu, Yb) is studied at room temperature, 77 and 4.2°K. Data referring to the Sm^{2+} ion are given in this paper. The luminescent and absorption spectra of the divalent ions of samarium in single crystal fluorides of Ca, Sr and Ba are obtained. The absorption spectra show a general similarity possessing three well defined bands. The luminescent spectra of $\text{SrF}_2 - \text{Sm}^{2+}$ and $\text{BaF}_2 - \text{Sm}^{2+}$ are similar in character, with little relative displacement ($\approx 20 \text{ cm}^{-1}$) between them. The luminescent spectrum of $\text{CaF}_2 - \text{Sm}^{2+}$ is different from the others. A series of absorption and radiated lines from $\text{MeF}_2 - \text{Sm}^{2+}$ disappear when the crystals are cooled at 77 and 4.2°K. An energy level diagram is constructed for the $\text{MeF}_2 - \text{Sm}^{2+}$ system. Two types of excitation level are shown,
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Spectra of divalent rare earth ...

S/051/62/012/004/004/015
E039/E485

a strong and a weak, which are different for the various cation bases. The displacement of the strong levels is similar to that observed in the band structure of the absorption spectra. Other characteristics of the spectra are explained on the basis of this energy level diagram, including the "freezing out" of lines at the lower temperatures. It is shown that the absorption spectra of all the radiated crystals and the radiated spectrum of $\text{CaF}_2 - \text{Sm}^{2+}$ are produced by the transition of electrons from the 4f shell to the outer shells (5d, 6s, etc). There are 7 figures and 2 tables. ✓

SUBMITTED: September 27, 1961

Card 2/2

S/051/62/013/002/006/014
E202/E492AUTHORS: Kaplyanskiy, A.A., Feofilov, P.P.

TITLE: Spectra of bivalent ions of rare earths in crystals of alkaline earth fluorides. II. Europium and Ytterbium

PERIODICAL: Optika i spektroskopiya, v.13, no.2, 1962, 235-241

TEXT: Absorption and luminescence spectra of Eu^{2+} and Yb^{2+} introduced separately into single crystal fluorides of Ca, Sr and Ba were studied at 293, 77 and 4.2°K. The absorption spectra of the above $\text{MeF}_2\text{-Eu}^{2+}$ were almost wholly contained in the UV region, and all had two strong and broad bands: the longwave and asymmetric (I) which was displaced towards the shortwave region with the increasing Me cation radius, and shortwave (II) displaced in the opposite direction. The luminescence spectra of $\text{MeF}_2\text{-Eu}^{2+}$ crystals showed at 77°K bright blue luminescence with a number of well defined bands corresponding to region (I). The absorption spectra of $\text{MeF}_2\text{-Yb}^{2+}$ showed similar bands to (I) and (II) and, in addition, most of the samples had also two local peaks on the long wavelength slope of (II). $\text{CaF}_2\text{-Yb}^{2+}$ showed at low temperatures unusually strong and comparatively persistent yellow-
Card 1/2

S/051/62/013/002/006/014
E202/E492

Spectra of bivalent ions ...

green luminescence which was structureless even at 4.2°K. No luminescence was detected with the corresponding Sr and Ba fluorides. Comparing the present results with those obtained for trivalent rare earths ions the authors commented as follows:

1) there is a greater transition probability for the bivalent ions; 2) the persistence of the excited states in the bivalent ions is shorter approximately by the order of 3; 3) also the shift of the energy levels due to change of Me is higher by the order of 1.5 to 2 than that of trivalent ions; 4) bivalent ions are much more subjected to temperature quenching; 5) clearly discernible electron-oscillation series are present in the absorption spectra. It was concluded that there are strong interactions of the excited states of the bivalent traces with the lattice which implies that the explanation of the observed phenomena cannot be fully explained by the transitions within the $4f^k$ configurations but are very likely due to transitions between the fundamental state and the terms of the mixed configurations, particularly $4f^{k-1}5d$. There are 6 figures and 2 tables.

SUBMITTED: September 27, 1961

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42191

S/051/62/013/004/005/023
E202/E492

74 3100
24 2500
AUTHORS:

Kaplyanskiy, A.A., Moskvina, N.A.

TITLE:

Piezospectroscopic effect in crystals of lithium fluoride activated with hexavalent uranium

PERIODICAL: Optika i spektroskopiya, v.13, no.4, 1962, 542-549

TEXT: Ten single LiF crystals activated with different uranium salts of varying concentrations were subjected to uniaxial compression along various symmetry axes at 77°K. This was followed by taking their luminescence spectra along the direction L, transverse to the axis of compression P. Excitation of luminescence was along M, perpendicular to L and P (sometimes M was parallel to L). The resulting spectra were photographed in nonpolarized and polarized light (E was either parallel or perpendicular to P) using spectrometer with approximately 5Å/mm dispersion. All samples showed at 77°K an equidistant longwave series of lines in addition to other lines, e.g. 4867, 4828 and 4765 Å. The most characteristic were the lines on the shortwave side giving rise to two definite types, viz. I and II. The sample activated with uranyl acetate had an additional very intensive series with the Card 1/3

Piezospectroscopic effect ...

S/051/62/013/004/005/023
E202/E492

principal line at 5225 Å. Only types I, and those with the 5225 Å line, were studied in detail. It was found that the reversible effect of uniaxial compression depending on direction P produced different effects in different lines. Shift and varying amount of splitting was observed. The split components were very strongly polarized. Good agreement between the calculated (Opt. i spektr., no.7, 1959, 677, 683; no.10, 1961, 165. Izv. AN SSSR, ser, fiz., v.25, 1961, 20) and the observed values of the piezospectroscopic effect parameters in the luminescence spectrum lines of LiF-U was found. The luminescence centres responsible for the majority of spectral lines in type I crystals and also for the two principal electron vibrational series are anisotropic formations oriented within the LiF lattice along the three crystalline axes of symmetry of the 4th order. The elementary oscillators corresponding to the lines of luminescence centres are linear electric and magnetic dipoles (π_e, π_m) oriented along the axes of the centres. Thus the radiation of the LiF-U luminescence centres represents the superposition of the electric and magnetic radiation spectra. Of other possible structures giving rise to this type of

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Piezospectroscopic effect ...

S/051/62/013/004/005/023
E202/E492

anisotropy only the interpenetration of the linear O-U-O in the LiF lattice by occupation of the F-Li-F positions was discussed. The authors' postscript added after submission of the paper attributes some of the luminescence centres in type II crystals to various UO_2^{++} containing complexes. There are 5 figures and 2 tables.

This paper was presented at the Second Conference on alkali-halogen crystals (Riga, June 1961).

SUBMITTED: August 24, 1961

Card 3/3

24.3950

43505

S/051/62/013/006/027/027
E039/E120

AUTHORS: Kaplyanskiy, A.A., and Przhevuskiy, A.K.
TITLE: Deformation splitting of lines in the spectra of
alkali-earth fluoride crystals activated by Sm and
Eu divalent ions

PERIODICAL: Optika i spektroskopiya, v.13, no.6, 1962, 882-884

TEXT: The piezo-spectroscopic effect on the spectral lines
of Sm^{2+} and Eu^{2+} in MeF_2 is described. Spectra for uniaxial
compression along the axes of symmetry C_4 , C_3 , C_2 for single
crystals at $77^\circ K$ and $4.2^\circ K$ are investigated in directions normal
to the axis of compression P in polarised light, with vectors
 $E \parallel P$ and $E \perp P$ (compressive force is 10 kg/mm^2). In the case
of MeF_2-Sm^{2+} (using SrF_2-Sm^{2+}) the magnitude of the splitting is
markedly different for lines connected with $f-f$ and $f-d$
transitions. A symmetrical series of levels of Sm^{2+} is
determined in the field O_h permitting a comparison of the f^6
with levels of the free ions ($5D_0$, $7F_0$, $7F_1$). These results
compare well with the literature. In the case of MeF_2-Eu^{2+}
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Deformation splitting of lines in ...

S/051/62/013/C06/027/027
E039/E120

(using $\text{CaF}_2\text{-Eu}^{2+}$) at 77 °K splitting occurs based on the resonance line 4130 Å. From the polarisation of the doublet it follows that the transition has an electric-dipole character. At 4.2 °K only the longwave component of the doublet is observed in luminescence. This is explained on the basis of depopulation as a result of deformation. A further study of the nature of the deformation behaviour of Eu^{2+} and Sm^{2+} spectra is required. There are 2 figures.

SUBMITTED: July 11, 1962

Card 2/2

ACCESSION NR: AR4032172

S/0058/64/000/002/D035/D036

SOURCE: Ref. zh. Fiz., Abs. 2D267

AUTHORS: Feofilov, P. P.; Kaplyanskiy, A. A.

TITLE: Latent optical anisotropy of cubic crystals containing local centers, and methods of its investigation (topics of a paper)

CITED SOURCE: Sb. Fiz. shchelochnogaloidn. kristallov. Riga, 1962, 100-101

TOPIC TAGS: latent anisotropy, cubic crystal, local center, anisotropic center, optical property, photochemical process, anisotropic photochemical process, spectral band splitting

TRANSLATION: Topics of a paper. The following questions are considered: concept of latent anisotropy of cubic crystals with local centers; classification of anisotropic centers; optical properties

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ACCESSION NR: AR4032172

of individual centers; optical properties of individual center; general principle of investigation of centers -- study of the optical properties of the crystal under the influence of anisotropic external action; anisotropic photochemical processes in crystals with centers; polarized luminescence of cubic crystals; splitting of spectral bands under elastic oriented strains and in magnetic and electric fields; paramagnetic resonance of centers. The discussions following the paper are reported. A. K.

DATE ACQ: 31Mar64

SUB CODE: PH

ENCL: 00

Card 2/2

S/053/62/076/002/001/004
B117/B104

AUTHORS: Feofilov, P. P., and Kaplyanskiy, A. A.

TITLE: The latent optical anisotropy of cubic crystals with local centers and methods for their investigation

PERIODICAL: Uspekhi fizicheskikh nauk, v. 76, no. 2, 1962, 201 - 238

TEXT: This is a survey on latent optical anisotropy of cubic crystals, due to the presence of particularly shaped local defects in cubic lattice. The paper bases on a lecture held at Il Soveshchaniye po fiziki shchelochno-galodnykh kristallov (2nd Conference on Alkali Halide Crystals) in Riga, June, 1961. Other papers on characteristic optical phenomena due to the presence of these so-called anisotropic centers are discussed: photochemical processes in cubic crystals with anisotropic centers; polarized luminescence of cubic crystals; splitting of spectral lines of cubic crystals under the action of directed elastic deformations (piezo-spectroscopic phenomenon) and under the action of magnetic and electric fields (Zeeman effect, Stark effect). V. L. Vinetskiy, M. F. Deygen, P. A. Khellenurme, O. A. Shmit, L. K. Yanson, A. A. Shatalov, L. I. Tarasova,

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The latent optical anisotropy...

S/053/62/076/002/001/004
B117/B104

N. Ye. Lushchik, L. A. Alekseyeva, Yu. R. Zakis, S. I. Vavilov, V. A. Arkhangel'skiy are mentioned. There are 23 figures, 1 table, and 88 references: 39 Soviet and 49 non-Soviet. The four most recent references to English-language publications read as follows: E. Sonder, Bull. Amer. Phys. Soc. 6, 114 (1961); J. Corbett, G. Watkins, J. Chem. Phys. Sol. 20, 319 (1961); D. J. Faraday, H. Rabin, W. D. Compton, Phys. Rev. Lett. 7, 17 (1961); C. Delbecq, W. Hayes, P. Yuster, Phys. Rev. 121, 1043 (1961). ✓

Card 2/2

32833

S/O20/62/142/002/011/029
B104/B138

9,2576 (1055, 1158, 1163, 1532)

AUTHORS: Kaplyanskiy, A. A., and Przhhevuskiy, A. K.

TITLE: Piezospectroscopic effect in ruby crystals

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 142, no. 2, 1962, 313-316

TEXT: The luminescence and absorption centers of ruby were investigated by examining the effect of oriented elastic deformations on the spectra of synthetic ruby crystals containing 1.6% Cr and having the shape of stretched rectangular parallelepipeds. The crystals were longitudinally pressed at 77°K. Compression was either parallel to the optical axis ($P \parallel C_3$) or perpendicular to the basal plane of the crystal ($P \perp C_3$). In the latter case, both $P \parallel C_2$ and $P \perp C_2$ hold. L.P. holds, L being the direction of observation. Uniaxial compression displays strong reversible effects on all of the absorption and luminescence spectra of ruby. The nature of the effect on the various lines differs and greatly depends on the direction of P. At $P \parallel C_3$ the symmetry remains unchanged, and occurs only a shift of lines. At $P \perp C_3$ the symmetry is disturbed. The lines are shifted

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B104/B138

Piezospectroscopic effect ...

and split up. The shift and splitting of the R and B lines, as well as of the N_1 and N_2 lines are discussed in detail. The results discussed in the present paper were reported to the X Vsesoyuznoye soveshchaniye po luminesentsii, Moskva (10th All-Union Conference on Luminescence, Moscow) in June, 1961. Ye. F. Gross is thanked for interest, and Yu. Ye. Svetlov for discussions. There are 3 figures, 1 table, and 13 references: 8 Soviet and 5 non-Soviet. The three references to English-language publications read as follows: A. L. Shawlow, D. L. Wood, A. M. Clogston, Phys. Rev. Lett., 3, 271 (1959); S. Sugano, Y. Tanabe, J. Phys. Soc. Jap., 13, 880 (1958); J. B. Wachtman jr., W. Tefft et al., J. Res. Nat. Bur. Stand., 64A, 213 (1960).

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR)

PRESENTED: July 31, 1961, by B. P. Konstantinov, Academician

SUBMITTED: July 31, 1961

Card 2/2

01 6600

AUTHORS:

Agekyan, V. T., Gross, Ye. F., Zakharchenya, B. P., and
Kaplyanskiy, A. A.

TITLE:

Piezomagneto-optical investigation of the quadrupole exciton
transition in Cu_2O crystals

PERIODICAL: Fizika tverdogo tela, v. 5, no. 1, 1963, 315-319

TEXT: The effect of a magnetic field \vec{H} (30 koe) and a compression P perpendicular to \vec{H} upon the quadrupole exciton line $n = 1$ (transition $\Gamma_1^+ \rightarrow \Gamma_{25}^+$) in the Cu_2O spectrum, was studied on a Cu_2O single crystal compressed along the $[001]$ axis. The spectrum was taken on a DFC-3 spectrograph with linear dispersion 2 A/mm. Observations were made in polarized light ($\vec{E} \parallel \vec{P}$ and $\vec{E} \perp \vec{P}$) perpendicularly to both \vec{H} and P. Without pressure, the $n=1$ line ($\lambda = 6125 \text{ \AA}$) is split into a triplet with its central line (polarized $\vec{E} \parallel \vec{H}$) in the position of the old line. The other two (polarized $\vec{E} \parallel \vec{H}$) have equal intensities and are symmetric about the central line. With rising pressure the central line shifts to longer

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Piezomagneto-optical investigation ...

S/181/63/005/001/047/064
B108/B180

waves, and the short-wave line to shorter waves with intensity increased at the expense of the long-wave line. Above 2 kg/mm^2 the long-wave line vanishes, leaving the other two polarized with equal intensities. These results are in full agreement with results obtained by solving the secular equation for the splitting of the Γ_{25}^+ level in the presence of an elastic deformation and a magnetic field (A. G. Zhilich. FTT, 3, 2041, 1961). There are 3 figures and 1 table.

ASSOCIATION: Fiziko-tehnicheskii institut im. A. F. Ioffe AN SSSR, Leningrad (Physicotechnical Institute imeni A. F. Ioffe AS USSR, Leningrad); Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: August 14, 1962

Card 2/2

L 9848-63

BDS

ACCESSION NR: AP3000584

S/0051/63/014/005/0664/0675

AUTHOR: Kaplyanskiy, A. A.; Medvedev, V. N.; Feofilov, P. P. 54

TITLE: Spectra of trivalent cerium ions in alkaline earth fluoride crystals

SOURCE: Optika i spektroskopiya, v 14, no. 5, 1963, 664-675

TOPIC TAGS: luminescence, absorption, crystal phosphors, Ce

ABSTRACT: The absorption and luminescence spectra of cerium in Ca, Sr and Ba fluoride single crystals were obtained at 300, 77 and 4.2°K in the region corresponding to 4f-5d transitions in the trivalent Ce ion. Ce sup 3+ is of particular interest because its 4f shell contains only one electron so that the level diagram is very simple; for the free Ce sup 3+ it has only two levels, differing as regards orientation of the electron spin. At room temperature the absorption spectra were measured by means of SF-4 and UR-10 spectrophotometers; at low temperatures the spectra were recorded on a quartz optics KSA-1 spectrograph. The luminescence was excited by a PRK-2 mercury discharge tube, mostly without monochromatization. At room temperature the absorption spectra

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ACCESSION NR: AP3000584

consist of two wide bands, the separation between which decrease in going from Ca to Ba fluoride as the host. At low temperature fine structure appears. The luminescence spectrum at room temperature also consists of two wide bands, one of which overlaps w'ith one of the absorption bands; at low temperatures structure develops in both bands and the background fades. The principal lines in the single crystal absorption and luminescence spectra at 4.2°K are tabulated. There were identified in the low temperature spectra vibrational sequences of narrow bands and lines; there is evinced mirror symmetry between the structure of the long wavelength absorption band and the two luminescence bands, which are associated with transitions from the lowest d-state to the 4f levels: sup 2F sub 5/2 (ground state) and sup 2F sub 7/2. Forbidden transitions between these levels were detected in the infrared absorption spectra. Orig. art. has: 5 figures and 4 tables.

ASSOCIATION: none

SUBMITTED: 13Sep62

DATE ACQ: 12Jun63

ENCL: 00

SUB CODE: FH

NR REF SOV: 006

OTHER: 006

ja/nh
Cord 2/2

L 10394-63

EWT(1)/EDS/EEC(b)-2--AFFTC/ASD/ESD-3--PI-4--IJP(C)

ACCESSION NR: AP3000585

S/0051/63/014/005/0676/0686

63

AUTHOR: Kaplyanskiy, A. A.; Moskvin, N. A.

61

TITLE: Piezospectroscopic investigation of luminescence centers in alkali fluoride crystals activated by hexavalent uranium²⁾

SOURCE: Optika i spektroskopiya, v. 14, no. 5, 1963, 676-686

TOPIC TAGS: luminescence centers, alkali halides, U, activators

ABSTRACT: The present work is a continuation of earlier research aimed at investigation of different luminescence centers in alkali fluoride phosphors activated by hexavalent uranium. The piezospectroscopic procedure employed has been described elsewhere (Kaplyanskiy, A. A.: Opt. i Spektr. 7, 677 and 683, 1959; Izv. AN SSSR, Ser. fiz., 25, 20, 1961; Proc. Internat. Conf. on Semiconductor Physics, Prague, p. 356, 1960); it consists in observing the luminescence spectra of cooled crystals compressed parallel to one of the principal axes. The spectra are observed parallel and perpendicular to the compression axis. Deformation results in splitting of virtually all the lines.

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L 10394-63
ACCESSION NR: AP3000585

2

of NaF:U and LiF:U. Different types of splitting are illustrated. It is inferred that there are present in alkali fluorides several different kinds of centers with different types of symmetry (see Fig. 1 in Enclosure 1). The "core" of the centers is formed by a uranyl ion: O-U-O. The various centers give rise to the different types of splitting. "In conclusion the authors thank Ye. F. Gross and P. P. Feofilov for their interest in the work." Orig. art. has: 4 equations and 5 figures.

ASSOCIATION: none

SUBMITTED: 26Jul62 DATE ACQ: 12Jun63

ENCL: 01

SUB CODE: PH

NR REF SOV: 012

OTHER: 007

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S/020/63/148/003/015/037
B108/B180

AUTHORS: Kaplyanskiy, A. A., Moskvin, N. A.

TITLE: Combined magnetic and electric dipole transitions in the spectra of alkali fluoride crystals with sesquivalent uranium

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 148, no. 3, 1963, 558-561

TEXT: To investigate the F centers and the multipolarity of the transitions in MeF-U, the authors studied the effect of a uniaxial compressive strain on the low-temperature luminescence spectra of LiF-U and NaF-U single crystals (P. P. Feofilov. Optika i spektroskopiya, 7, 842 (1959); 8, 824 (1960); 11, no. 3 (1961)). The compressed crystals were studied at 77°K in polarized light. The observations were made in two directions perpendicular to each other. Strain caused reversible polarized splitting of most of the lines, when the direction was changed, only one of the polarized components of a line changed, from which it could be seen whether the line in question was of magnetic or electric origin. This dependence of the deformation splitting pattern on directions shows that these lines

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Combined magnetic and electric ...

S/O20/63/148/003/015/037
B108/B180

are due to a blend of electric and magnetic dipole radiation, while its nature indicates that the F centers are rhombic, belonging to the symmetry group C_{2v} . There is 1 figure.

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe Akademii nauk SSSR (Physicotechnical Institute imeni A. F. Ioffe of the Academy of Sciences USSR) ✓

PRESENTED: July 27, 1962, by B. P. Konstantinov, Academician

SUBMITTED: July 19, 1962.

Card 2/2

L 33311-66 EWT(1) GG/GW/GD
ACC NR: AT6006267

SOURCE CODE: UR/0000/64/000/000/0003/0013

AUTHOR: Ponomarenko, L. M.; Kaplyanskiy, A. A.

48
B+1

ORG: none

TITLE: The ^{2/}scattering of electromagnetic waves from a statistically broken lunar surface

SOURCE: Leningrad. Elektrotekhnicheskiy institut svyazi. Nauchno-tekhnicheskaya konferentsiya. Trudy, no. 1, 1964, 3-13

TOPIC TAGS: lunar surface, lunar reflectivity, electromagnetic wave, scattering amplitude

ABSTRACT: The authors propose an approximate method for calculating the intensity and mean power of a field scattered from a lunar surface considered to be statistically uneven. It is assumed that the elements contributing to the coarseness of the surface are larger than the wavelength; in all other respects, the character of this unevenness may be arbitrary. An attempt is made to achieve an accurate and complete theoretical investigation of the lunar scattering problem, with particular attention to the complex mechanism governing the interaction between the incident electromagnetic wave on the one hand and a statistically coarse

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ACC NR: AT6006267

lunar surface on the other. The solution of the problem is approached through the use of a Kirchhoff approximation, i. e., on the assumption that at every point on the surface the field can be represented as the sum of the incident wave and the wave reflected from a plane tangential to the surface at the point in question. It is further assumed that for the lunar surface $\rightarrow \infty$ and that there is no shading of some sections by others. This last-named condition imposes certain constraints on the angles of inclination of the surface; more specifically, the scattering will result from sloping planes oriented in the direction of the point of observation. The paper concludes with a brief analysis of results obtained. Orig. art. has: 2 figures and 18 formulas.

SUB CODE: 03 / SUBM DATE: 08Dec64 / ORIG REF: 005 / OTH REF: 006

Card 2/2 *dy*

S/0051/84/016/002/0284/0273

ACCESSION NR: AP4020928

AUTHOR: Kaplyanskiy, A.A.; Feofilov, P.P.

TITLE: Low-temperature spectra of divalent samarium in alkali halide single crystals

SOURCE: Optika i spektroskopiya, v.16, no.2, 1964, 264-273

TOPIC TAGS: alkali halide crystal, alkali halide phosphor, samarium activated crystal, samarium doped alkali halide, samarium ion absorption, samarium ion luminescence, samarium 2+, low-temperature absorption, low-temperature luminescence

ABSTRACT: There have been numerous studies of the luminescence and absorption spectra of divalent samarium ions in different crystal hosts with di- and trivalent cations. Recently (V.Ye.Karpetyan, B.I.Maksakov and P.P.Feofilov, Opt. i spektr., 14, 441, 1963) there was demonstrated the possibility of activating alkali halide (MeHal) single crystals with monovalent cations with Sm^{2+} ions; some preliminary data on the Sm spectra were reported in the above mentioned paper. The present paper describes the results of further spectroscopic measurements of the luminescence and absorption of similar crystals - $\text{MeHal}:\text{Sm}^{2+}$ (Me = Na or K; Hal = Cl, Br or I) mainly at 77 and

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ACCESSION NR: AF1020928

4.2°K. The spectra were photographed by means of KSA-1 and Q-12 prism spectrographs and also by means of a DAS-1 diffraction grating instrument (dispersion 8 Å/mm), using plates sensitive to 820 mμ. The sources were incandescent lamps and a GSVD-250 discharge tube for the absorption and a superhigh pressure SVDSH-1000 mercury discharge tube with an SZS-10 light filter for the luminescence. Photometric traces of some of the absorption and emission spectra with many of the peaks and transitions identified are reproduced. Some measurements were also made of the persistence; generally, the luminescence of KAl:Sm^{2+} crystals at 4.2°K consists of two groups of bands: narrow bands (forbidden $4f^6$ transitions) with $\tau \approx 10^{-2}$ sec and diffuse "background" bands with $\tau < 10^{-5}$ sec. The experimental results are discussed and some of the distinctive features of the spectra of the investigated crystals are noted. The presence of different band groups may be explained either by the existence of centers of two types or on the assumption that at 4.2°K equilibrium in the system of excited levels is not attained within 10^{-6} sec. It is noted that similar fine structure in the luminescence and absorption spectra was observed at 4.2°K for KCl:Eu^{2+} and similar crystals. The authors consider it their obligation to thank N.A. Moskvina for extensive photographing and scanning of the spectra and N.M. Tolstoy for measuring the luminescence persistences." Orig. art. has: 2 figures and 2 tables.

Card 2/3?