SOV/120-59-2-16/50

A Multi-Frequency Phase Fluorometer with Double Frequency-Changing

described previously (Ref 11) has been extended by adding units to perform phase measurements at 8, 12, 15 and 20 Mc/s.   Fig 1 shows the block diagram.   The mixer, 1, receives frequencies f_1 and f_2 from a quartz oscillator and from a GSS-6 signal generator. A resonant circuit selects the beat frequency $F_1 = f_1 - f_2$ and feeds it to an electron-beam modulator.   The mixer, 2, receives the frequency F_1 from the photomultiplier (which detects the fluorescence), and f_2 from the GSS-6. A resonant circuit selects the frequency $F_2 = F_1 + f_2 = f_1$. Thus the double frequency-changing enables one to make phase measurements at a fixed frequency of 20 Mc/s, whereas the beam is modulated at frequency F_1. Now F_1 differs greatly from f_1 and f_2, and so the various frequencies can be separated very thoroughly by the filters.   The frequency f_1 (20 Mc/s) is stable (quartz oscillator), so the main causes of phase drift are frequency instability in the GSS-6 and instabilities in the resonant circuits, in the electron beam, and in the

Card 3/6 photomultiplier (an FEU-25).   Under the most unfavourable conditions, with $F_1 < f_2$ (modulation frequency 8 Mc/s),

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A Multi-Frequency Phase Fluorometer with Double Frequency-Changing

when $\Delta f_2/F_1 > \Delta f_2/f_2$ the zero drift is about $0.5°/min$. An 8-position sample-holder is used to change the sample and check the zero reading quickly. Numerous measurements made with the instrument indicate that the root-mean-square error is about $1°$. Fig 2 gives some results for plastic phosphors, (Ref 12). The fluorescent additives were excited by the light produced in a separate polystyrene disc ($\lambda = 310\ m\mu$), which was excited by a modulated beam of 30 kV electrons. The plastic phosphors containing tetraphenylbutadiene and triphenylpyrazoline showed no dependence of τ_f on frequency, within the experimental error. Calculations show that τ_f should fall uniformly with frequency if the decay consists of two components, both exponential but with different values of τ. The anthracene content of 10^{-2} g/g (Fig 2, curve 3) gives $\tau_1 = 2.7 \times 10^{-9}$ sec and $\tau_2 = 16 \times 10^{-9}$ sec. Anthracene in benzene gives the same value of τ_1, (Ref 13); τ_2 relates to anthracene bound to polystyrene, (Ref 14). The phase difference between the modulated electron beam and the fluorescence has to be measured in this method; the two signals are of different physical

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A Multi-Frequency Phase Fluorometer with Double Frequency-Changing

types.   There are several ways of making the measurement (Refs 11, 15).   If we use several different frequencies to measure the phase difference between two different values of τ , we can draw up enough equations to determine τ_1, and τ_2 , and to eliminate the unknown initial phase of the electron beam.   Measurements made with several pairs of phosphors show that it is impossible to get agreement between the values of τ_1 and τ_2 for all combinations of the frequencies (any two frequencies suffice to give τ_1 and τ_2 , so the number of combinations is 6).   Hence the decay laws are not exponential.   The results for polystyrene (which is the basis of the most plastic phosphors) can be explained if we suppose that some of the excited molecules interact with one another, i.e. that bimolecular processes occur.   We would get the reverse dependence of τ_f on frequency if we were to assume primary photons present.   Some more detailed aspects of this topic will form the subject of a separate paper.
This is a complete translation apart from Fig 1.
Card 5/6 There are 2 figures and 15 references, of which

A Multi-Frequency Phase Fluorometer with Double Frequency-Changing   SOV/120-59-2-16/50

3 are German, 4 are English, 7 are Soviet and 1 is translated from English.

Fig 2 captions are: Relation of γ_f to modulation frequency for various phosphors. 1) tetraphenyl butadiene in polystyrene, 3×10^{-4} g/g; 2) triphenyl-pyrazoline in polystyrene, 2×10^{-2} g/g; 3) anthracene in polystyrene, 10^{-2} g/g.

Card 6/6

SUBMITTED: February 13, 1958

KILIN, S.F.; ROZMAN, I.M.

Law of the luminescence of polystyrene during electron excitation. Opt.
i spektr. 6 no.1:65-69 Ja '59.   (MIRA 12:3)
        (Styrene)   (Luminescence)

KILIN, S.F.; ROZMAN, I.M.

Effect of reabsorption on the duration of fluorescence of organic sub-
stances. Opt. i spektr. 6 no.1:70-77 Ja '59.   (MIRA 12:3)
              (Fluorencence)

24(7)

SOV/48-23-1-22/36

AUTHORS: Rozman, I. M., Andreyeshchev, Ye. A., Kilin, S. F.

TITLE: On the Mechanism of the Luminescence of Plastic
             Scintillators (O mekhanizme lyuminestsentsii plastmassovykh
             stsintillyatorov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959,
             Vol 23, Nr 1, pp 1o2 - 1o7 (USSR)

ABSTRACT: The energy yield of scintillation in organic luminescent
             scintillators is much lower than that of luminescence.
             This fact gave rise to various different hypotheses in
             publications as to the luminescence mechanism of these
             substances. One of the hypotheses mentioned (Refs 13,14,
             15,16), according to which a bimolecular extinction process
             is responsible for the low energy yield of the scintilla-
             tion of organic substances, is not in contradiction to
             the experimental results obtained in this paper. The
             luminescence energy yield for plastic scintillators was
             determined on the basis of polystyrene with an addition
             of 0.015 g/g 1,1,4,4, tetraphenyl-1,3-butadiene for the
Card 1/3   case of excitation of the Co^{60} with γ-rays. The device

On the Mechanism of the Luminescence of Plastic   SOV/48-23-1-22/36
Scintillators

used for measuring the luminescence intensity ϕ is
illustrated by a figure. The dependence of the luminescence
yield ϕ /D (D = γ-radiation dose) on the shape and size
of the scintillator (sphere and cylinder) is shown by a
table. With a reduction of dimensions the yield increases
slightly. For the zero mass of the sample a luminescence
yield of 0.038 was found (by means of extrapolation), and
the specific amount of scintillation was determined as
amounting to

$$s = \frac{B}{h\nu} = 14 \text{ photons/kev.}$$ For the purpose of investigating

the extinction of polystyrene luminescence, the "fluoro-
metric time" τ was determined (Table 2). For the modulation
frequency it holds that

$$\tau_{fl} = \frac{1}{\omega} \text{ tg} \, \varphi, \quad \tau \sim 10^{-9} \text{ sec.}$$ This is indicative of a

bimolecular process. From these deliberations it follows
Card 2/3   that an additional extinction occurs with a rate of

On the Mechanism of the Luminescence of Plastic
Scintillators   SOV/48-23-1-22/36

$> 10^{10} sec^{-1}$, but that the specific amount of scintilla-
tion is only 5 times smaller than if there were no
additional scintillation. There are two possibilities
for agreement between these facts: a) a certain part of
the primary activations is very rapidly extinguished at
the expense of "non-active" absorption or at expense of
the local increase of temperature (temperature extinction
of fluorescence and scintillation of polystyrene coincide),
or b) a bimolecular extinction of part of the primary
activations is assumed. (Calculation and table of results
are given). There are 2 figures, 3 tables, and 24 refer-
ences, 10 of which are Soviet.

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21(10), 7(5)   SOV/53-69-3-4/6

AUTHORS: Rozman, I. M., Kilin, S. F.
                                    of
TITLE: Luminescence/Plastics Scintillators

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 69, Nr 3, pp 459-482 (USSR)

ABSTRACT: The present article gives a systematic account of the data
               hitherto known concerning plastics scintillators; with respect
               to other surveys dealing with this field reference is made to
               monographs (Refs 1-3), to surveys (Refs 4-7) and to reference 5,
               which gives a survey of experimental methods of investigating
               scintillator properties. The scintillators are subdivided into
               3 classes: anorganic crystals, organic substances, and noble
               gases. Among the organic substances, plastics(as e.g. polystyrene,
               polyvinyltoluene) are characterized by their great light emis-
               sion. The average duration of scintillation is between
               10^{-9} and 10^{-8} sec; they are well suited as "fast" detectors of
               ionizing particles; they are mechanically solid, not hygroscop-
               ic, and may also be used in a vacuum and within large tempera-
               ture intervals. In chapter 2 the production methods are briefly
Card 1/4   discussed (catalytic polymerization and thermal polymerization).

Luminescence of/Plastics Scintillators   SOV/53-69-3-4/6

Chapter 3 discusses the luminescence characteristics. The most
important are time- and energy resolving power. The former de-
pends on the time-dependent distribution of luminescence
photons inciding upon the photoelectronic multiplier, the lat-
ter on the energy absorbed per photoelectron in the scintilla-
tor. The same importance must be attached to "proportionality"
(between absorbed energy and impulse in the multiplier). The
properties of a scintillation counter depend essentially on the
luminescence yield, the luminescence spectrum, and the duration
of scintillation. The luminescence characteristics, however,
depend, besides on the nature of the matter, also on dimensions
and the light collection conditions. The external (calculatory)
characteristics may differ essentially from the internal
(physical) ones of a scintillator. In the following the lumines-
cence spectra are briefly discussed on the basis of two diagrams
and one table, and in the next chapter the luminescence yield
(ratio between the entire luminescence energy and the absorbed
excitation energy) and the specific amount of the scintillation
(number of photons per absorbed excitation energy unit) are dealt
with. Several simple relations are given and the respective
Card 2/4   characteristics of various scintillators are discussed on the

basis of tables. In the next chapter the duration of lumines-
cence and the form of the scintillators are discussed (2 dia-
grams, 2 tables). In chapter 4 the scintillation mechanism is
dealt with. The phases are discussed on the basis of the
example of radioluminescence: 1) Stopping of the charged
particle, excitation of the molecule. 2) All processes up to
charge- and energy loss. Some problems connected herewith are
discussed as e.g. excitation and ionization. Several problems
of absolute luminescence yield are discussed in the next
chapter. In the optimum case a specific scintillation magnitude

$$s_{max} = \eta/\mathcal{E}_0 = \tfrac{1}{8}\eta \text{ photons/ev is obtained, a value which is}$$

practically not attained; for 1 Mev electrons in anthracene
$s/\eta = 0.03$. Galanin and Grishin (Ref 44) tried to derive this
ratio for fast electrons theoretically - they obtained
$s/\eta = 0.006$. In the following the interaction of activated
molecules among one another is discussed together with some
further theoretical and experimental investigations (Rozman,
Galanin, Prosin, Kilin). The next chapter deals with the degree
of efficiency of the excitation energy transfer in plastics
scintillators, and chapter 5 deals with some examples of the

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Luminescence/Plastics Scintillators   SOV/53-69-3-4/6

of

    application of plastics scintillators. (X-Ray and γ-dosimetry,
recording of radiation at high intensities, - "saturation" only
at 10^4r/sec; β-counting, recording of fast neutrons and recoil
nuclei as well as of fission fragments in the case of a high
α-background, etc.) There are 7 figures, 10 tables, and
117 references, 40 of which are Soviet.

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24.6810

82883
S/120/60/000/02/014/052
E140/E335

AUTHORS: Kilin, S.F. and Rozman, I.M.

TITLE: On the Time Spread of Certain Photomultipliers

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, Nr 2, pp 57 - 58 (USSR)

ABSTRACT: The time spread in the dynode portion of multipliers has previously (Refs 2-4) been determined. The present paper reports the time spread of certain Soviet photomultipliers and RCA 5819 in the cathode region. A phase-shift method was used.
There are 1 figure, 1 table and 6 references, 3 of which are Soviet and 3 English.

SUBMITTED: March 25, 1959

Card 1/1

86732

$2/. 5200 (2P/6, /033, //44)$ S/120/60/000/006/006/045
E032/E314

AUTHORS: Viktorov, D.V., Kilin, S.F. and Rozman, I.M.

TITLE: On the Linearity of a Counter with a Plastic
            Scintillator

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, No. 6,
             pp. 27 - 30

TEXT: A study is reported of the dependence of the amplitude
of the scintillations on the electron and α-particle
energies in polystyrene and polyvinyl toluene-based plastic
scintillators. These plastics are designated ПC-1 (PS-1) and
ПC-2 (PS-2). Preliminary results by Boreli and Grimeland
(Ref. 3) indicated that these scintillators give a linear
output for electron energies between 0.4 and 1 MeV. The
present authors have investigated the response of these
plastics to electrons with energies between 20 and 800 keV.
A Compton spectrometer (Fig. 1) was used to determine the
energies. γ-rays were allowed to fall on the plastic under
investigation. Coincidences were recorded between pulses
produced in the plastic and the pulses due to Compton scattered
γ-rays produced in a second scintillation counter, using
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S/120/60/000/006/006/045
E032/E314

On the Linearity of a Counter with a Plastic Scintillator

sodium-iodide crystals. The plastic scintillators were
28 mm in diameter and 25 mm long. They were in good optical
contact with an ФЭУ-20 (FEU-20) photomultiplier and were
provided with a MgO reflector. In order to reduce background
random coincidences the γ-ray source was carefully screened
with lead. The resolving time of the coincidence circuit was
5×10^{-7} sec and provision was made for discrimination
against pulses in the counting channel of the sodium-iodide
crystals. Fig. 2 shows spectra obtained with the PS-2
plastic. The curve on the left corresponds to γ-rays of
80 keV and a Compton angle of 155 deg. The curve on the
right corresponds to γ-rays of 662 keV at a Compton angle
of 117 deg. Fig. 3 shows that the mean amplitude of pulses
from the PS-2 plastic is strictly proportional to the energy
of the incident electrons in the range 10 - 1 000 keV.
Fig. 4 shows a similar plot for the PS-1 plastic and again
the amplitude-energy relation is linear. In the latter case
the range covered is 400 to $\sim$ 800 keV. A study was also

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On the Linearity of a Counter with a Plastic Scintillator

made of α-particles with energies between 0.6 and 4.8 MeV.
Using a single-channel pulse-height analyser, a plot
was made of the mean amplitude of the scintillations vs. the
energy of the α-particles. Here, the amplitude-energy
relation is no longer linear. The results obtained are
shown in Fig. 5, in which Curve 1 refers to the PS-2 plastic
and Curve 2 gives the residual range of α-particles as a
function of energy. It was found that the amplitude-energy
relation is the same for both PS-1 and PS-2. The average
amplitude of the scintillations was found to be a linear
function of the residual range for energies between ~ 1 and
3 MeV.

There are 5 figures, 1 table and 8 references: 4 English,
2 Italian and 2 Soviet; one of the Soviet references is
translated from English.

SUBMITTED: October 31, 1959

Card 3/3

68330

24,6810

SOV/51-8-1-37/40

AUTHORS: Kulakova, A.F. and Rozman, I.M.

TITLE: Temperature Quenching in Certain Organic Scintillators [19]

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 1, pp 140-142 (USSR)

ABSTRACT: M.D. Galanin (Ref 5) has put forward an explanation of the much lower
             radioluminescence yield η_α of α-particles, compared with the yield (η_β)
             obtained by β-ray bombardment ($\eta_\alpha/\eta_\beta \sim 0.1$). Galanin suggested that
             the radioluminescence yield of α-particles is low because of very strong
             quenching in the central portions of the α-particle tracks. He
             ascribed this very strong quenching to very high local temperatures
             produced by the passage of heavy α-particles. Galanin assumed that
             outside the central portions of the tracks temperature falls very
             rapidly and that practically all α-luminescence is produced in the
             outer portions of the tracks. To check the main premises of Galanin's
             theory the present authors investigated the temperature dependence of
             the luminescence yield of dibenzyl and stilbene excited with $Ce^{144}-Pr^{144}$
             β-particles and with Po^{210} α-particles. The instrument used is shown
             schematically in Fig 1. Its main parts were a photomultiplier FEU-29 (1),
             a source of α- or β-rays (8), a thermocouple (9) and a furnace (10).

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Temperature Quenching in Certain Organic Scintillators

A sample was placed in a container (6). On top of the sample there was an opaque aluminium foil which prevented the light produced by excitation of air above the sample from reaching the photomultiplier. The results obtained (Fig 2) showed that on melting of both crystals there was a sharp fall of both α- and β-luminescence yields. Similar behaviour was earlier reported by Herforth and Kallman (Ref 6) for naphthalene diphenyl and phenanthrene. In the case of stilbene excited with α-particles the luminescence yield fell by a factor of 1000 on melting. In the case of β-excitation the measured luminescence yield after melting was high because of the Cherenkov radiation accompanying β-rays. This shows that the temperature dependence of the luminescence yields of stilbene and dibenzyl agrees with Galanin's theory i.e. that a rise of ~100°C above room temperature may produce an almost complete quenching of luminescence. Moreover the second assumption made by Galanin in his theory, i.e. that the yield falls very sharply (in a very narrow range of temperatures), is also satisfied in the case of stilbene and dibenzyl. The authors point out, however, that Galanin's theory is not universally applicable: many organic substances with low melting point luminesce quite strongly when in

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Temperature Quenching in Certain Organic Scintillators

SOV/51-8-1-37/40

liquid state. This happens in the case of toluene, xylene, styrene,
benzene, etc. To illustrate these departures from Galanin's theory
the authors show in Fig 3 the results of their measurements on polyvinyl
toluene: on melting of this substance there is no sharp fall of the
luminescence yield. It follows that the temperature quenching due to
local heating in the path of an ionizing particle cannot be the only
or the most important cause of dependence of the radioluminescence
yield on the specific energy loss of the incident particles. There
are 3 figures and 7 references, 3 of which are Soviet, 2 English,
1 German and 1 translation from English into Russian.

SUBMITTED: June 3, 1959

Card 3/3

ROZMAN, I.M.

Mechanism of scintillation in organic substances. Part 1. Opt.
i spektr. 8 no.4:525-530 Ap '60. .
                    (Scintillation (Physics))   (MIRA 13:11)

80557

S/051/60/008/06/013/024
E201/E691

5.3100

AUTHORS: Andreyeshchev, Ye.A. and Rozman, I.M.

TITLE: The Quantum Yield of Fluorescence of Certain Substances in Polystyrene

PERIODICAL: Optika i spektroskopiya, 1960, Vol 8, Nr 6, pp 828-831 (USSR)

ABSTRACT: An experimental technique of measuring the quantum yields of fluorescence is described and the results are given for eight organic compounds in polystyrene. First the quantum yield of 2,5-diphenyl-1,3-oxazole (2PO) in polystyrene was measured. Next the yields of the other seven compounds were found relative to that of 2PO. All samples were prepared by V.M. Shoniya by thermal polymerization method (Refs 1, 2). Both the incident photon flux and the luminescence flux were measured using "quantum counters", i.e. either (1) a solution of 1,5-diphenyl-3(4-phenylbutadienyl($-\Delta^2$)pyrazoline in dioxane (5×10^{-3} g/ml), or (2) a plastic scintillator containing 1.8×10^{-2} g/ml of 1,5-diphenyl-3-styryl-$\Delta 2$-pyrazoline. The quantum yield spectra of these two counters are given in Fig 1 and the experimental set up is shown in Fig 2. A monochromator SF-4 was used to separate out the 313 mμ line from a mercury lamp spectrum. The exciting light from the lamp fell on the samples

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80552

S/051/60/008/06/013/024
E201/E691

The Quantum Yield of Fluorescence of Certain Substances in Polystyrene

at 14° to the normal.   Plastic scintillators were in the form
of cylinders (16 mm diameter and 1 mm height) with a polished front
surface. The rear surfaces of the samples were in optical contact
with smoked ebonite to prevent any reflection at that surface.
Fluorescence was passed through a SZS-17 filter to a quantum counter
in optical contact with a photomultiplier FEU-29. The quantum yield
of 2PO in polystyrene was found to be 0.80 ± 0.05 (Table 1). This
value was used to obtain (by comparison with 2PO) the quantum yields
of the other seven compounds in polystyrene. These yields were (Table 3):
0.66 ± 0.08 for 2,5-diphenyl-1,3,4-oxydiazole; 0.42 ± 0.06 for
acenaphthene; 0.75 ± 0.08 for n-terphenyl; 0.73 ± 0.07 for
for 1,1,4,4-tetraphenyl-1,3-butadiene; 0.74 ± 0.07 for
1,3,5-triphenyl-Λ^2-pyrazoline; 0.76 ± 0.10 for 1,3,4-triphenyl-Λ^2-pyrazoline;
0.84 ± 0.08 for 4-styrylstilbene. There are 2 figures, 3 tables
and 6 Soviet references.

SUBMITTED: October 12, 1959

Card 2/2

ROZMAN, I.M.

Possible role of temperature quenching in the scintillation
of organic substances.   Izv.AN SSSR.Ser.fiz. 24 no.5:567-571
My '60.   (MIRA 13:5)
                  (Radioactivity)

21,5200

AUTHORS: Baroni, Ye. Ye., Kovyrzina, K. A.,   S/076/60/034/03/027/038
             Rozman, I. M., Andreyeshchev, Ye. Ye.,   B005/B016
             Shoniya, V. M. (Sukhumi)

                                                        69139

TITLE: Plastic Scintillators on a Polystyrene Basis. III.

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol 34, Nr 3, pp 665-667 (USSR)

TEXT: The authors synthesized polystyrene scintillators with additions of various
derivatives of pyrazoline, oxazole, and stilbene according to a standard method
(cf Ref 2). The synthesis of some of these additions which have not yet been
described in publications, and the influence exercised by the cis-trans-configura-
tion of 1,3,4,5-tetraphenyl pyrazoline and p,p'-diphenyl stilbene upon the in-
tensity of luminescence of the scintillators will be dealt with in a separate
paper. The intensity of luminescence of standard samples of the scintillators
synthesized (16 mm diameter, 10 mm height) on excitation by β-radiation of a
$Ce^{144} - Pr^{144}$ preparation was measured photoelectrically on an FEU-29 photo-
multiplier. No corrections were considered for the spectrum of luminescence ra-
diation, for self-absorption etc. Thus, the results obtained characterize direct-
ly the efficiency of scintillators combined with a photomultiplier. Table 1
presents the results obtained for the following luminescent additions: 22 deriva-
tives of Δ^2-pyrazoline, 3 derivatives of 1,3-oxazole, 1 derivative of oxazolone,
and 2 derivatives of stilbene. The efficiency of stilbenes mixed with p-terphenyl

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Plastic Scintillators on a Polystyrene Basis. III

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B005/B016

was also studied. For each of the additions investigated the table gives the con-
centration the addition of which causes maximum luminescence of the scintillator,
furthermore, the relative efficiency on direct excitation of the addition by ul-
traviolet radiation, and finally the wavelength on which the maximum of the emis-
sion spectrum is found. All these values are given without corrections. The effi-
ciency of an addition is directly proportional to the quantum yield in fluores-
cence and depends on the agreement between the luminescence spectrum and the
spectral sensitivity of the photomultiplier. The efficiency of the scintillator
further depends on the extent of excitation energy transfer from the polystyrene
to the addition. Among the additions listed in table 1 there are some causing
a very high scintillator efficiency, which may therefore be recommended for the
manufacture of scintillators. The authors also investigated the applicability of
some of the above-mentioned additions to the shifting of the spectrum in poly-
styrene scintillators. Table 2 shows the relative efficiency of 4 derivatives of

Δ^2-pyrazoline and of 2 derivatives of stilbene with respect to the shifting of
the spectrum in polystyrene scintillators. The measurements were also carried
out by means of an FEU-29 photomultiplier. The concentration of the additions in
these experiments was 0.001 g/g. There are 2 tables and 3 Soviet references.

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Plastic Scintillators on a Polystyrene Basis. III

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S/076/60/034/03/027/038
B005/B016

SUBMITTED: May 28, 1959

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27700
S/120/61/000/003/010/041
E073/E335

24 3500

AUTHORS: Baroni, Ye.Ye., Kilin, S.F., Kovyrzina, K.A.,
Rozman, I.M. and Shoniya, V.M.

TITLE: On the Duration of the Light-emission of Plastic
Scintillators

PERIODICAL: Pribory i tekhnika eksperimenta, 1961, No. 3,
pp. 72 - 74

TEXT: The results are described of measurements of the
light-emission time of the relative yield of luminescence for
a number of plastic scintillators based on polystyrene and
polyvinyltoluol. The measurements were made by means of an
x-ray phase fluorimeter. The data permit estimating the
"suitability" of plastic scintillators in "high-speed circuits".
The measured "fluorimetric times" are tabulated for plastic
scintillators with a single luminescent addition. It was
found that the times were particularly low for scintillators
made of di- and triphenyloxazole, diphenyloxodiazole and
n-terphenyl. Of the investigated scintillators the largest H/τ
value was obtained for scintillators with n-terphenyl, the

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On the Duration of E073/E335

optimum concentration being 4 g per 100 g of monomer.   The
dependence of H/τ on the polymerisation conditions of
polyvinyltoluol showed an unexplained decrease in τ in the
case of polymerisation at 200 ^{o}C. The fluorimetric time
for polyvinyltoluol equals 13.5 nanosecs for a polymerisation
time of 120 hours at 170 ^{o}C and 11.5 nanosec for 30 hours
polymerisation at 200 ^{o}C. Spectrum mixing agents bring about
an increase in H owing to a decrease of the self-absorption
in the basic addition and lead to a better correspondence of
the emission spectra with the spectral sensitivity of the photo-
electron multipliers.   However, the value of τ also increases
simultaneously. The rôle of the spectrum-mixing agents 4P,
PPS and StS consists basically of the transformation of the
short-wave part of the illumination spectrum 3P into a proper
emission spectrum. Thereby, the influence of reabsorption in
the 3P itself on the external magnitude of the scintillation
and on the duration of the light emission is excluded. The
obtained data show that as regards the speed of the response
(H/τ) some plastics are superior to stilbene. Table 4 shows
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On the Duration of ....

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the comparative values;   all the plastic scintillators had a diameter of 28 mm,^{a}/height of 25 mm with a MgO reflector and H_γ was measured by means of a photomultiplier $\Phi\ni Y$-2η (FEU-29).   There are 4 tables and 8 references: 5 Soviet and 3 non-Soviet. The two English-language references quoted are: Ref. 1 - R.K. Swank, W.L. Buck - Rev. Scient. Instrum., 1955, 26, 15; Ref. 2 - R.C. Sangster, J.W. Irvine - J. Chem. Phys., 1956, 24, 670.

SUBMITTED: June 21, 1960

Card 3/4

S.4500   2209

29613
S/120/61/)00/004/024/034
E202/E592

AUTHORS: Andreyeshchev, Ye.A., Baroni, Ye.Ye., Kursanova, N.S.
             and Rozman, I.M.

TITLE: Press-moulded plastic phosphors with organo-metallic
             additives

PERIODICAL: Pribory i tekhnika eksperimenta, no.4, 1961, 151

TEXT: The authors observed the inherent loss of lumines-
cence in scintillating plastic phosphors prepared in the orthodox
way, by dissolving the organo-metallic compounds together with the
luminescent additives in a monomer and subsequently polymerising
the whole mixture. Instead, the authors introduced successfully
organo-metallic and organo-semimetallic compounds into plastic
phosphors at the stage of press moulding. The experiments were
based on a plastic phosphor derived from the polymerisation of
styrene with 3% p-terphenyl and 0.04% 1,3,5-triphenyl-2-pyrazoline.
Powder mixtures of the above were compounded with each of the
following: $Pb(C_6H_5)_4$, $Hg(C_6H_5)_2$, $Sn(C_6H_5)_4$ and $As(C_6H_5)_3$ and were
press-moulded for 3 hours at 125-130°C at a pressure of 2.5 kg/cm^2
in a split metallic mould in the absence of inert gas. Since the

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Press-moulded plastic phosphors.

29613
S/120/61/ 100/004/024/034
E202/E592

melting points of the first two additives were above the moulding
temperature. the resulting phosphors were turbid whereas the
remaining two additives gave rise to transparent phosphors. The
luminescence of the above phosphors was measured from the mean
current of a photomultiplier exposed to β-particles and it was
found that a very strong quenching of luminescence occurred in
phosphors with Hg and As compounds. This was attributed to the
relatively easy formation of phenyl radicals and their interaction
with the agents responsible for luminescence. On the other hand,
relatively low quenching of lead and tin compounds was explained
by the absence of phenyl radicals. The lowest loss of lumines-
cence was observed with the tin compound additive, viz 5% w/w of
Sn, in the phosphor reduced the relative luminescence output to
60%. All samples were 4 mm thick and 36 mm in diameter. There
are 1 table and 5 references: 2 Soviet and 3 non-Soviet. The
English-language references are as follows Re. : i . Basile,
J.Chem.Phys.. 1957 27 801; no .4: M. Hyman. J.J. Ryan, IRE
Trans. Nucl. Sci. 1958, NS-5 No.3, 87.

SUBMITTED: September 29 i960
[Abstractor s Note: The word "organoelemental" is a misnomer, it
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Press-moulded plastic phosphors

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is more than justified to forego the semi-metallic character of As. and treat the whole group as organo-metallic]

Card 3/3

ROZMAN, I.M.

Transfer of excitation energy in viscous solutions of organic
substances. Opt.i spektr. 10 no.3:354-361 Mr '61. (MIRA 14:8)
        (Molecular dynamics)   (Organic compounds)

KILIN, S.F.; KOVYRZINA, K.A.; ROZMAN, I.M.

Luminescence of n-terphenyl in a mixture of toluene and
carbon tetrachloride. Opt. i spektr. 11 no.3:390-396 S '61.
(MIRA 14:9)

(Terphenyl) (Luminescence)

S/120/62/000/001/010/061
E032/E514

AUTHORS: Murguliya, G.Ye., Plyutto, A.A. and Rozman, I.M.

TITLE: Recording of neutrons from pulsed sources

PERIODICAL: Pribory i tekhnika eksperimenta, no.1, 1962, 54-55

TEXT: The neutron yield of pulsed sources is usually
measured with scintillation counters. Both the photomultiplier
in the scintillation counter and the preamplifying circuits may
be affected by stray magnetic fields due to the neutron source.
In the present paper the authors describe a method of recording
neutron spectra which does not involve the use of a preamplifier.
The detector consists of a scintillation counter and the OK-17-M
oscillograph equipped with a photographic camera. The counter-
probe unit incorporates the ФЭУ-24 (FEU-24) photomultiplier with
a plastic scintillator (diameter of 70 mm, height 70 mm). The
probe is surrounded by a brass and lead screen. The current
pulse from the photomultiplier is fed directly into the input of
the oscillograph amplifier. The time distribution and the
integral neutron yield of pulsed sources can be deduced from the
appearance of the oscillographic records. With an effective
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Recording of neutrons from ...   S/120/62/000/001/010/061
                                     E032/E514

solid angle of 10^{-3} the lower limit of sensitivity is said to be
5000 neutrons/pulse.   The method has been used with the spark
chamber described by the first two of the present authors in
Ref.4 (PTE, 1961, No.5, 28).   There are 1 figure and 1 table.

SUBMITTED: June 20, 1961

Card 2/2

S/120/62/000/003/011/048
E032/E114

AUTHORS: Vartanov, N.A., Rozman, I.M., Ryukhin, Yu.A., and
            Chkuaseli, Z.D.

TITLE: Application of plastic scintillators to
            β-spectrometers

PERIODICAL: Pribory i tekhnika eksperimenta, no.3, 1962, 62-64

TEXT: It is pointed out that scintillation β-spectrometers
have inferior energy resolution as compared with magnetic
spectrometers. However, they may be useful in preliminary
experiments. The authors have therefore investigated the possible
use of polyvinyl-toluene plastic scintillators in measurements of
the end-points of β-spectra. The scintillator was mounted on a
high-sensitivity photomultiplier (cathode sensitivity 79 μA/lumen).
Good light collection was ensured by means of a perspex reflector.
Back scattering and edge effects were avoided by collimating the
β-particle beam with a copper diaphragm. The resolution for the
624 KeV line of Cs^{137} was found to be 12%. The end points of the
β-spectra of P^{32}, Co^{60}, Cs^{137} and Tl^{204} were determined. The
results were as follows: 1686 ± 13 KeV (P^{32});

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Application of plastic scintillators.. S/120/62/000/003/011/048
E032/E114

305 ± 8 KeV (Co^{60}); 507 ± 8 and 1165 ± 11 KeV (Cs^{137}); and 753 ± 10 KeV (Tℓ^{204}). The total conversion coefficient for the 662 KeV γ-line corresponding to the isomeric transition of Ba^{137m} was found to be 0.128 ± 0.014, which is in good agreement with published results. It is concluded that plastic scintillators may be successfully employed in β-spectrometers for studying both conversion electrons and continuous β-spectra. Further reduction of back scattering should facilitate studies of complex β-spectra and the determination of the intensity of isolated components. There are 6 figures.

SUBMITTED: September 29, 1961

Card 2/2

S/051/62/012/002/010/020
E202/E192

AUTHORS: Kovyrzina, K.A., and Rozman, I.M.

TITLE: Luminescence of certain solvents

PERIODICAL: Optika i spektroskopiya, v.12, no.2, 1962, 248-253

TEXT: The intensity of luminescence was measured during the exposure to soft ionising radiations which do not produce Cherenkov light, in a series of pure solvents and in solutions of up to 4% w/w, carefully purified 2,4,5-triphenyl-1,3-oxazol (3RO). The following solvents were used: n-terphenyl, toluene, n-xylene, benzene, acetone, tertiary amyl acetate, 1,4-dioxan, n-heptane, carbon tetrachloride, methylaldehyde, ethanol and water. Excitation was by a variety of sources, viz: α-Po^{210}, β-C^{14}, β-Pm^{147}, 25 kV X-ray, and 2652 Å UV. The intensity of luminescence obtained with each source and each solvent was compared. The apparatus was of the customary cell type with diaphanous windows for the irradiation and a photo-multiplier tube. The experimentation included the following measurements: absorption spectra of some of the pure solvents;

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S/051/62/012/005/009/021
E075/E136

AUTHORS: Maksimov, M.Z., and Rozman, I.M.

TITLE: On the transfer of energy in solid solutions

PERIODICAL: Optika i spektroskopiya, v.12, no.5, 1962, 606-609

TEXT: Expressions were obtained for the decay of light emission of donor molecules and for the quantum yield of the energy of transfer from donor to acceptor molecules. Decay function $N_D(t)$ was given by:

$$N_D(t) = N_D(0) \exp\left[-\frac{t}{\tau_o} - 2q\sqrt{\frac{t}{\tau_o}} \right] \qquad (1)$$

and the quantum yield of the transfer given as:

$$\eta t = 2qe^{q^2} \int_q e^{-x^2} dx \qquad (2)$$

where: τ_o = mean life of the excited molecules of donor in the absence of acceptor, and q = a value proportional to
Card 1/2

On the transfer of energy in solid .. S/051/62/012/005/009/021
E075/E136

concentration n_A of acceptor molecules, which depends on their optical characteristics and dielectric properties of the medium (factor B) and is given by:

$$q = \left(\frac{2\pi}{3}\right)^{2/3} B\tau_o^{1/2} n_A = 2/3 \pi^{3/2} B\tau_o^{1/2} n_A s . \qquad (3)$$

$N_D(t)$ and ηt were evaluated for stationary molecules with different degrees of correlation between directions of the dipole moments of donor and acceptor molecules. It was found that Eqs. (1), (2) and (3) apply to solid solutions, but in Eq.(3) the numerical value of parameter s is different from $\sqrt{\frac{2}{3}}$. The postulate of Foerster-Galanin, stating that the molecules are points in space, is considered acceptable if the average distance between donor and acceptor molecules R is greater than the sum of their "radii" R_{12}. The critical concentration of acceptor, above which Eqs. (1), (2) and (3) do not apply, is $6.3 \times 10^{-3} R_{12}^{-3}$.

Card 2/2   SUBMITTED: April 6, 1961

39872

S/051/62/013/002/012/014

E032/E514

24.3500

AUTHOR: Rozman, I.M.

TITLE: On the dependence of the radioluminescence yield on the particle energy

PERIODICAL: Optika i spektroskopiya, v.13, no.2, 1962, 287-288

TEXT: It is stated that there is no adequate theoretical explanation of the fact that the radioluminescence yield of organic substances in the condensed phase, which is excited by heavy particles (α-particles, protons etc.), is smaller than in the case of electron excitation. According to the hypothesis of M. Furst and H. Kallman (Phys. Rev., 85, 816, 1952), the luminescence quenching is due to the interaction between excited molecules whose local density in the track of a heavy particles is very large. Owing to the interaction the excitation energy of two molecules may turn out to be concentrated in one of them and, as a result, both "portions" of energy or only one of them may be lost. The present author estimates the fraction of "activations" which may be lost in this way, assuming that the quenching processes are instantaneous. The mean density of "activations" in the main

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On the dependence of the ...   S/051/62/013/002/012/014
                                    E032/E514

track of a slow particle is computed with the aid of the formula

$$\bar{n} = \frac{1 - f}{\pi R^2 W} \frac{dE}{dx}$$

where dE/dx is the specific energy loss in the given part of the
track, f is the fraction of this energy carried away by δ-electrons
beyond the limits of the interaction radius R, and W is the
average energy per "activation". The values of dE/dx, f and R
are taken from a previous paper (Izv.AN SSSR, ser.fiz., 24, 567,
1960) and W is assumed to be 8 eV (Izv.AN SSSR, ser.fiz., 23, 102,
1959). Next, it is assumed that the distribution of the molecular
"activations" follows the Poisson law and the number of lost
"activations" is estimated.   The resulting formulae are then used
to calculate these quantities for anthracene and it is pointed out
that it will be desirable to carry out experimental studies of the
radioluminescence yield as a function of molecular dimensions,
for example in the gaseous phase.   There is 1 table.

SUBMITTED: February 17, 1962

Card 2/2

L 18742-63   EWT(m)/BDS   ASD   S/2941/63/001/000/0128/0131
ACCESSION NR: AT3002206

AUTHORS: Andreyeshchev, Ye. A.; Baroni, Ye. Ye.; Viktorova, V. S.; Kovy*rzina, K. A.; Rozman, I. M.; Shoniya, V. M.

TITLE: Excitation energy transfer in solid solutions of organic substances. 2

SOURCE: Optika i spektroskopiya; sbornik statey. v. 1: Lyuminestsentsiya. Moscow, Izd-vo AN SSSR, 1963, 128-131

TOPIC TAGS: phosphorescence, donor, acceptor, induction resonance

ABSTRACT: Phosphorescent quenching of the donor energy and the excitation energy transfer from donor to acceptor were studied in several organic substances. The solvents and solutes are listed. The experimentally determined radiationless transfer parameter p_t (defining optical characteristic of the donor and acceptor molecules and the dielectric property of the media) was found to be consistently higher (about 1.8 times) than the value determined analytically by the induction resonance theory. Orig. art. has: 3 figures, 3 tables, and 3 formulas.

ASSOCIATION: none

Card 1/2/

L 18743-63   EPR/EWP(j)/EPF(c)/EWT(m)/EDS   ASD   Ps-4/Pc-4/Pr-4 RM/   73
ACCESSION NR: AT3002207   WW/MAY   S/2941/63/001/000/0131/0135

AUTHORS: Andreyeshchev, Ye. A.; Baroni, Ye, Ue.; Rozman, I. M.; Shoniya, V. M.

TITLE: Excitation energy transfer in solid solutions of organic substances. 3

SOURCE: Optika i spektroskopiya; sbornik statey. v. 1: Lyuminestsentsiya.
Moscow, Izd-vo AN SSSR, 1963, 131-135

TOPIC TAGS: phosphorescence, donor, induction resonance

ABSTRACT: The quantum phosphorescent yield of tetraphenylbutadiene in polystyrene
was measured as a function of diviphenyl ethylene concentration. The concentra-
tion of diviphenyl ethylene varied from 0.0089-2 gm/100gm of polystyrene. As in
previous solid solutions investigated by the same authors (Optica i spektroskopiya.
Sbornik 1, 1963, str. 128) and by I. M. Rozman (Opt. i. spectr., 10, 354, 1960),
the phosphorescent quenching energy of the donor agrees fairly closely with the
induction resonance theory but the energy transfer parameter deviates by a factor
of 1.8 from theoretical predictions. Orig. art. has: 5 formulas, 2 figures, and
2 tables.

Card   1/2/

ANDREYESHCHEV, Ye.A.; BARONI, Ye.Ye.; VIKTOROVA, V.S.; KOVYRZINA,
        K.A.; ROZMAN, I.M.; SHONIYA, V.M.

        Chemical transformation during polymerization investigated
        by means of absorption spectra. Vysokom. soed. 5 no.10:1482-
        1484 O '63.   (MIRA 17:1)

KILIN, S.F.; MURGULIYA, G.Ye.; ROZMAN, I.M.

Recording of pulsed X-radiation by condensing ionization chambers.
Prib. i tekh. eksp. 8 no.1:42-45 Ja-F '63.   (MIRA 16:5)

1. Fiziko-tekhnicheskiy institut AN Gruzinskoy SSR.
              (X rays) (Ionization chambers)

KILIN, S.F.; ROZMAN, I.M.

Radioluminescence of organic substances. Part 2: Duration of
radiation in nonluminescent solvents. Opt. i spektr. 15 no.4:
494-499 O '63.   (MIRA 16:11)

DEMIN, A.G.; KUSHAKEVICH, Yu.P.; MAKOVEYEV, Ye.A.; ROZMAN, I.M.;
    CHACHAKOV, A.F.

Millisecond thallium isomers. Zhur. eksp. i teor. fiz. 45
no.5:1344-1351 N '63.   (MIRA 17:1)

ACCESSION NR: AP4009134   S/0056/63/045/006/2067/2067

AUTHOR: Demin, A. G.; Rozman, I. M.

TITLE: New shortlived isomers of ruthenium and tellurium

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 45, no. 6, 1963, 2067

TOPIC TAGS: ruthenium, tellurium, ruthenium isomer, tellurium isomer, new isomers, shortlived isomers, Alpha bombardment of tin, Alpha bombardment of molybdenum, deuteron bombardment of tin, deuteron bombardment of molybdenum, radioactivity, radioactivity, gamma yield

ABSTRACT: Thick targets of chemically pure molybdenum and tin were bombarded with 22-MeV alpha particles and 11-MeV deuterons. The target gamma rays were detected with a scintillation counter and multiplier. Alpha particle bombardment of the molybdenum and tin yielded new activities with half-lives 1.85 ± 0.06 and 104 ± 5 msec and gamma-ray energies 227 and 284 (± 5) keV, respectively. The tin gamma spectrum also showed a weak 85 ± 5-keV line. A deuteron bombardment test showed that only Ru had an activity with 1.84 msec half life. It is therefore concluded that the 1.84 and 104-msec isomers

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ACCESSION NR: AP4009134

are 97, 117, Ru-97, and Te-117 or Te-115. The Te isomer yield is
$\sim 1 \times 10^{-7}$ and is close to the calculated value $\sim 6 \times 10^{-7}$.

ASSOCIATION: none

SUBMITTED: 24Aug63   DATE ACQ: 02Feb64   ENCL: 00

SUB CODE: PH   NO REF SOV: 004   OTHER: 002

Card 2/2

MURCULIYA, G.Ye.; PLYUTTO, A.A.; ROZMAN, I.M.

Recording neutrons of pulsed sources. Prib.i tekh.eksp. 7 no.1:
54-55 Ja-F '62.   (MIRA 15:3)

(Neutrons)(Nuclear counters)

S/120/63/000/001/008/072
E032/E314

AUTHORS: Kilin, S.F., Murguliya, G.Ye. and Rozman, I.M.

TITLE: Recording of pulsed X-rays by capacitor-type
             ionization chambers

PERIODICAL: Pribory i tekhnika eksperimenta, no. 1, 1963,
             42 - 45

TEXT: An important feature of these chambers is that they
are not connected to the measuring device during exposure to
radiation. This means that they can be used to record ionizing
radiation in the presence of a high level of electromagnetic
pick-up, e.g. in the case of high-current pulsed discharges. A
chamber of this type is described for determination of the
intensity of X-rays with energies in excess of a few keV. It is
illustrated in Fig. 1, in which 1 is the inner electrode, 2
the outer electrode, 3 the screen, 4 insulators, 5 guard
ring, 6 electrometer, 7 charging device and 8 auxiliary
battery. The total volume of the chamber is 35 1. and its
diameter and length are 30 and 50 cm, respectively. In the case
of soft X-rays a thin (2 mm) perspex window, having a transmissivity
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S/120/63/000/001/008/072
E032/E314

Recording of ....

of 0.7 at 10 keV, is employed. Ionization is then localized near the window in such cases and in order to produce a more uniform electric field in this region the inner electrode carries a thin (2 mm) perspex disc. The battery 3 is used to ensure complete collection of ions. The insulators are made of teflon and will ensure retention of the charge on the collector for a few hours. The capacitance of the chamber is 33.5 pF. The charge is measured with a vacuum-tube voltmeter with an input capacitance of about 1 pF and a grid current of less than 10^{-14} A. The chamber may be filled with air (aluminum walls) or with crypton or xenon (steel walls). Examination of the experimental results shows that the sensitivity of the device is greater than that of the sensitivity of the photographic method by several orders of magnitude, although it is much lower than that of the scintillation method. However, it has the great advantage of simplicity and independence of electromagnetic pick-up. There are 3 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN GruzSSR
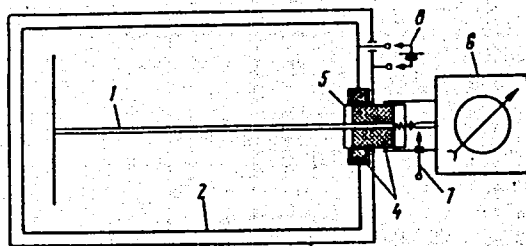   (Physicotechnical Institute of the AS, Georgian SSR)

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Recording of ....

S/120/63/000/001/008/072
E032/E314

SUBMITTED: February 14, 1962

Fig. 1:

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ANDRĔYESHCHEV, Ye.A.; KILIN, S.F.; ROZMAN, I.M.; SHIROKOV, V.I.

Transfer of electron excitation energy in viscous solutions of
organic substances. Izv.AN SSSR.Ser.fiz. 27 no.4:533-539 Ap '63.
(MIRA 16:4)

1. Fiziko-tekhnicheskiy institut AN Gruzinskoy SSR.
(Fluorescence)   (Organic compounds)   (Quantum theory)

VIKTOROV, D.V.; KILIN, S.F.; ROZMAN, I.M.

Dependence of the luminous efficiency of organic scintillators
on the proton energy. Prib. i tekh. eksp. 9 no.4:90-93
Jl-Ag '64.
(MIRA 17:12)

1. Fiziko-tekhnicheskiy institut AN GruzSSR.

ACCESSION NR: AP4032870   S/0051/64/016/004/0663/0673

AUTHOR: Kilin, S.F.; Mikhelashvili, M.S.; Rozman, I.M.

TITLE: Concerning radioluminescence of organic substances. 2. Specific lumines-
cence quenching under excitation by fast electrons

SOURCE: Optika i spektroskopiya, v.16, no.4, 1964, 663-673

TOPIC TAGS: cathodoluminescence, radioluminescence, luminescence quenching, scin-
tillator, triphenyl derivative, tetraphenyl derivative, triphenylpyrazoline

ABSTRACT: Parts 1 and 2 (S.F.Kilin, K.A.Kovy*rzina and I.M.Rozman, Opt.i spektro.
Sbornik 1.Lyuminestsentsiya, p.147, Pub.AN SSSR, 1963; S.F.Kilin and I.M.Rozman, Ibid.
15,494,1963) of the present series of papers were devoted to description of the re-
sults of investigation of the luminescence of alcohol and water solutions of a num-
ber of organic compounds. Appreciable reduction of the persistence of luminescence
under x-ray excitation as compared with luminescence under photoexcitation was tak-
en as evidence of specific quenching of radioluminescence in these solutions. The
present paper gives further experimental results and an interpretation thereof.
There were studied two-component liquid and plastic (solid) scintillators in which

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ACCESSION NR: AP4032370

the solute molecules are acceptors of the electronic excitation energy acquired by the solvent molecules. Data, in the form of curves of the luminescence yield and persistence as a function of the solute concentration, for 2,4,5-triphenyl-1,3-oxazole in toluene, 1,3,5-triphenyl-Δ^2-pyrazoline in toluene, 1,1,4,4-tetraphenyl-1,3-butadiene in polystyrene, and triphenylpyrazoline in polyvinyltoluene under excitation by ultraviolet (2652 Å) and fast electrons from C^{14} are presented in figures. It is shown that in the case of stimulation by electrons there is evinced an added dynamic quenching of the acceptor luminescence. A phenomenological theory of the effect is proposed; this leads to the correct relationships between values of the persistence and yield of radioluminescence (cathodoluminescence) and of photoluminescence. It is noted that such added dynamic quenching is exhibited not only by good sintillators, but also by organic substances in water and alcohol solutions (see second reference above). Orig.art.has: 33 formulas, 8 figures and 1 table.

ASSCCIATION: none

SUBMITTED: 01Jun63   DATE ACQ: 07May64   ENCL: 00

SUB CODE: OP   NR REF SOV: 010
                                                                    OTHER: 005

Card 2/2

L 20215-65   EWT(1)/EWT(m)/EPF(c)/EWP(j)/EEC(b)-2   Pc-4/Pr-4   IJP(c)/RPL/
AEDC(a)/AFWL/SSD/AS(mp)-2/ESD(gs)/ESD(t)   RM

ACCESSION NR: AP4030711   S/0051/64/016/006/1063/1065

AUTHOR: Kilin, S.F.; Mikhelashvili, M.S.; Rozman, I.M.

TITLE: Concerning electronic excitation energy transfer in liquid solutions

SOURCE: Optika i spektroskopiya, v.16, no.6, 1964, 1063-1065

TOPIC TAGS: energy transfer, energy migration, diffusion, scintillator, luminescence quenching, luminescence yield

ABSTRACT: The theory of resonance transfer of excitation energy in luminescent solutions, developed by Th.Förster (Zs.Naturforsch.,4a,321,1949) and M.D.Galinin (Zhur.eksp.i teor.fiz.,28,485,1955) yields results that are in good agreement with experiments for viscous solutions; in the case of solutions with low viscosity, however, experiment usually indicates a higher migration efficiency than predicted by the Förster-Galinin theory. It has been hypothesized that the reasons for the divergence are molecular diffusion and transfer incident to molecular encounters. Yu.A. Kurskiy and A.S.Selivanenko (Opt.i spektro.,8,643,1960) and A.M.Samson (Ibid.13,511, 1962) attempted to solve the problem of energy transfer, taking into account both these factors, but their treatments were not carried far enough to permit direct

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CCESSION NR: AP4039711

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comparison with experiment. Accordingly, in the present work the authors calculated
the excitation decay law and quantum fluorescence yield for donor molecules in a low
viscosity solution in which there occur both diffusion and resonance transfer, on
the basis of the method proposed by V.V.Antonov-Romanovsky(Phys.Rev.125,1,1962). The
calculation results for the relative quantum efficiency as a function of the accep-
tor concentration for different values of a parameter S (which is defined in terms
of the number of donor molecules, the excitation lifetime, and the resonance trans-
fer distance) are presented in the form of curves. The results of some numerical
calculations for triphenyl and triphenyl-Δ2-pyrazoline in toluene, anthracene in
benzene and diphenyloxazole in xylene are compared with the experimental (authors'
values and from the literature) data mainly to evaluate the significance of the dif-
fusion mechanism. "The authors thank M.M.Agrest and his co-workers for carrying
out the numerical computations on a Ural computer." Orig. art. has: 8 formulas, 2
figures and 1 table.

ASSOCIATION: none

SUBMITTED: 11Sep63

SUB CODE: NP, OP   NR REF SOV: 007

ENCL: 00

OTHER: 009

Card 2/2

L 14038-65   EWT(m)/EWP(j)/EWA(h)   Pc-4   AFWL/SSD   RM
ACCESSION NR: AP4044857   S/0051/64/017/003/0431/0437

AUTHOR: Kilin, S. F.; Rozman, I. M.

TITLE: Radioluminescence of organic substances. IV. Alpha, beta ratio of plastic scintillators

SOURCE: Optika i spektroskopiya, v. 17, no. 3, 1964, 431-437

TOPIC TAGS: scintillator, polystyrene, organic phosphorescence, luminescence quenching, luminescence yield, alpha particle reaction, beta particle reaction

ABSTRACT: The first three parts of this paper were published in Opt. i Spektr. Suppl. 1 "Luminescence, p. 147, 1963, and Opt. i spektr. v. 15, 266, 1963. It is shown that the variation of the α,β-ratio $(D_{\alpha\beta})$ of plastic scintillators based on polystyrene with organic compounds cannot be attributed to the increase in the energy-transfer rate from the excited molecules of the solvent to the mole-

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L 14038-65
ACCESSION NR: AP4044857

cules of the dissolved matter, as in the case of liquid scintilla-
tors, but it is also necessary to take into account the possibility
of additional quenching of the acceptor molecules. The authors
therefore measured $D_{\alpha\beta}$ of plastic scintillators based on polystyrene
with different luminescent impurities. The ratio is found to depend
on the individual properties of the impurity, and decreases with in-
creasing concentration for most investigated compounds. The mea-
surements of $D_{\alpha\beta}$ were therefore supplemented with measurements of
the ratio of the luminescence yields under photoexcitation and ex-
citation with α and β particles. The scintillator production pro-
cedure was the same as used by Andreyeshchev et al. (PTE no. 6, 27,
1960). The results show that the numerical values of $D_{\alpha\beta}$ depend
strongly on the luminescent compound. In the case of 1, 3, 5
terphenyl-Δ^2-pyrazoline and in the case of 2,5 diphenyl-1,3 oxazole
the value of $D_{\alpha\beta}$ decreases with increasing concentration. In addi-
tion, the dependence of the light yield on the energy of the α par-
ticles was practically the same for all substances. The results are

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ACCESSION NR: AP4044857   *3*

interpreted by assuming the presence of specific quenching of the
radioluminescence. "The authors are grateful to Ye. A. Andresh-
cheyev, V. S. Viktorova, and A. F. Kulakova for help with the mea-
surements." Orig. art. has: 4 figures, 2 formulas, and 2 tables.

ASSOCIATION: None

SUBMITTED: 17Oct63   ENCL: 01

SUB CODE: OP, OC   NR REF SOV: 006   OTHER: 005

Card 3/4

L 14038-65
ACCESSION NR: 4044857   ENCLOSURE: 01

Fig. 1. αβ-ratio of plastic scintillators
based on styrene polystyrene

1 = Luminescent additive
2 = C_A, mole/liter
3 = $D_{\alpha\beta}$ at E_α, Mev

Люминесцирующая добавка (1)	C_A моль/л (2)	$D_{\alpha\beta}$ при E_α, мгэв (3)		
		5.0	4.1	3.0
1,3,5-Трифенил-Δ²-пиразолин (ЗФП)	0.068	0.070	0.060	0.049
	0.17	0.052	0.046	0.035
	0.26	0.045	0.036	—
	0.32	0.040	0.030	—
2,5-Дифенил-1,3-оксазол (2ФО)	0.046	0.092	0.074	—
	0.14	0.082	0.006	0.052
	0.27	0.074	0.061	—
2,5-Дифенил-1,3,4-оксдиазол (2ФОД)	0.046	0.107	0.088	0.072
Флуорантен	0.050	0.137	0.116	0.102
4-Стирилстильбен (СтС)	0.055	0.079	0.067	—
Тетрафенилпиррол	0.028	0.114	0.093	0.077
Трифенилпиррол	0.035	0.096	0.081	0.065
1,5-Дифенил-3 (п-метоксифенил)-Δ²-пиразолин (2ФОФП)	0.035	0.091	0.078	0.060
1,1,4,4-Тетрафенил-1,3-бутадиен (4ФБ)	0.029	0.090	0.075	0.059
1,4-Дифенил-1,3-бутадиен (2ФБ)	0.10	0.105	0.089	0.065
п-Терфенил (ЗФ)	0.13	0.107	0.090	0.072
Аценафтен	0.20	0.123	0.105	0.081

Luminescent additives:
1,3,5-Terphenyl- Δ² - pyrazoline
2,5-Diphenyl-1,3-oxazole
2,5-Diphenyl-1,3,4-oxydiazole
Fluoranthene
4-Styrilstilbene
Tetraphenylpyrrole
Triphenylpyrrole
1,5-Diphenyl (n-metoxyphenyl)-Δ²-pyrazoline
1,1,4,4-Tetraphenyl-1,3-butadiene
1,4-Diphenyl-1,3-butadiene
n-Terphenyl
Acenaphthene

Card 4/4

L-4980-65   EWT(1)/EWT(m)/EPF(c)/EWP(j)/EEC(b)-2   Pc-4/Pr-4   IJP(c)/Pa-4   RM
ACCESSION NR: AP4048740   S/0051/64/017/005/0705/0711

AUTHORS: Kilin, S. F.; Rozman, I. M.   B

TITLE: Radioluminescence of organic substances. V. Kinetics of
luminescence of solutions of some compounds in heptane, nonane,
cyclohexane, and dioxane

SOURCE: Optika i spektroskopiya, v. 17, no. 5, 1964, 705-711

TOPIC TAGS: radioluminescence, light excitation, organic solvent,
heptane, nonane, cyclohexane, dioxane, organic luminor

ABSTRACT: To obtain information on the mechanism whereby excitation
is transferred from the solvent to the solute, the authors measured
the luminescence yield and time as functions of the concentration of
the luminescent substance. The measurement procedure was described
in the earlier papers of this series (Opt. i spektr. v. 12, 248,
1952 and v. 15, 494, 1963). The solutes were anthranilic acid, 1,

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L-14980-65
ACCESSION NR: AP4048740

3. 5-triphenyl-Δ^2 pyrazoline, and anthracene. Luminescence was ex-
cited by ionizing radiation and by light in the absorption band of
the solutes. The radioluminescence yield in paraffins is approximate-
ly one-half the yield in toluol. The radioluminescence duration in
paraffins is equal to the fluorescence duration of the solute (to
within $\pm 2 \times 10^{-2}$ sec). The high efficiency of transfer of the elec-
tron excitation energy from the paraffins to the dissolved substance
is attributed either to rapid displacement of the excitation over
the solvent molecules, or to the possibility that the excitation is
produced by large colonies of molecules as a whole. The results are
not accurate enough to be fully conclusive. Orig. art. has: 3
figures, 9 formulas, and 3 tables.

ASSOCIATION: None

SUBMITTED: 12Dec63   ENCL: 00

SUB CODE: OP,OC   NR REF SOV: 007   OTHER: 017

Card 2/2

L 20047-65   EPF(c)/EWG(j)/EWA(h)/EWP(j)/EWT(m)/EWA(l)   Pc-4/Pr-4/Peb
SSD/AFWL/ASD(m)-3/AFMD(c)   RM/DM
ACCESSION NR: AP5001272   S/0089/64/017/006/0497/0500

AUTHOR: Baroni, Ye. Ye.;Kilin, S. F.;Lebsadze, T. N.; Rozman, I. M.;
Shoniya, V. M.

TITLE: Introduction of organoelemental compounds in polystyrene

SOURCE: Atomnaya energiya, v. 17, no. 6, 1964, 497-500

TOPIC TAGS: polystyrene, organoelemental compound, copolymerization,
shielding material, luminescent additive, scintillation counter

ABSTRACT: Materials for γ-radiation and for neutron shielding and
scintillation counters have been synthesized by high-temperature
copolymerization of styrene with tetraphenyl lead, diphenylmercury,
tetraphenyltin, triphenylarsen, triphenylbismuth, or diphenylselenium.
Scintillators were prepared by introduction into styrene of such
luminescent additives as terphenyl. The copolymerization conditions
of materials containing 12% Pb, 19% Bi, 33% Hg, 12% As, 11% Sn, or
10% Se are described in detail, and the results of measurements of the
quantum efficiency of scintillators containing Pb, Hg, or Sn are
given. Orig. art. has: 4 tables.

Card 1/2

L 20050-65
ACCESSION NR: AP4049535

2

stably at all power levels including the maximum (90 MW). The total
icebreaker power of 44,000 hp was provided by three reactors operat-
ing simultaneously at 65 MW each. Each reactor produced 360 tons
steam per hour at 28 kg/cm^2 and 300--310C. The operational and neu-
tron-physics characteristics of the reactors, the procedures used
to reload the reactors, and the training of personnel are described
in some detail. It is concluded that the atomic equipment of the
icebreaker operated satisfactorily in all respects. "The experi-
mental neutron-physics characteristics of the active zones of the
reactors were obtained by the co-workers N. A. Lazukova and A. K.
Sledzyuka." Orig. art. has: 10 figures.

ASSOCIATION: None

SUBMITTED: 00

SUB CODE: NP   NR REF SOV: 003

ENCL: 00

OTHER: 000

Card 2/2.

L   11086-66   EWT(1)/EWT(m)/EWP(j)/EWA(h)/EWA(l)   IJP(c)   GS/RM

ACC NR: AT5023439   SOURCE CODE: UR/0000/65/000/000/0122/0126

AUTHOR: Kilin, S. F.; Rozman, I. M.

ORG: none

TITLE: Specific quenching of luminescence of organic compounds during excitation by fast electrons

SOURCE: Simpozium po elementarnym protsessam khimii vysokikh energiy. Moscow, 1963. Elementarnyye protsessy khimii vysokikh energiy (Elementary processes of the chemistry of high energies); trudy simpoziuma. Moscow, 1965, 122-126

TOPIC TAGS: luminescence quenching, excited electron state, electron energy, luminescence, electron bombardment, photoluminescence, fluorescence

ABSTRACT: The yield and duration of luminescence in several organic compounds was studied during their excitation by fast electrons to assess the dynamic quenching effect. Luminescence duration was measured on a phase fluorometer with a modulation frequency $\omega = 1.25 \cdot 10^8$ sec. Dependence of luminescence duration of plastic scintillators upon concentration of luminescence additive is shown in fig. I. Dependence of luminescence yield of liquid and plastic scintillators upon additive concentration is shown in fig. 2. For dependence of luminescence duration of anthranilic acid in
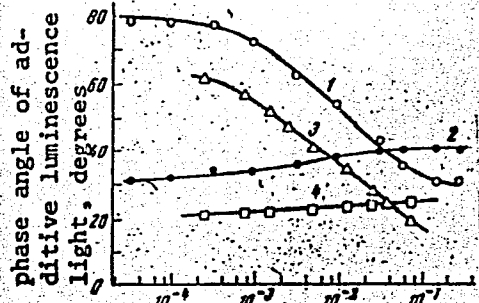
Card 1/ 3

L 11086-66

ACC NR: AT5023439

Fig. 1. 1 and 2--1,3,5-triphenyl-Δ^2-pira-
zole in polyvinyltoluene; 3 and 4--1,1,4,4-
tetraphenyl-1,3-butadien in polystyrene;
curves 1 and 3--excitation by x-rays and
curves 2 and 4--excitation by UV light
(λ = 3200-3800 Å).

additive concentration, moles/l
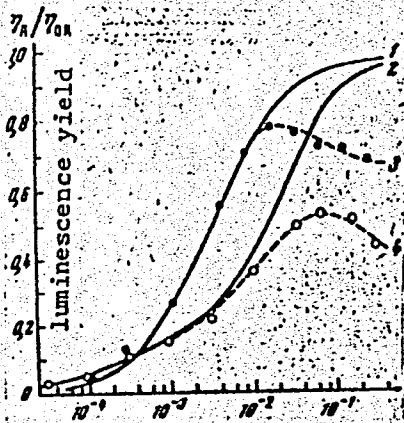
Fig. 2. 1 and 2--ratios of quantum yields
of additive fluorescence during excitation
of solvent (λ = 2652 Å) and indirect exci-
tation of additive (λ = 3650 Å), 3 and 4--
ratios of luminescence intensity during ex-
citation of C^{14}-compound by β-particles and
photons (λ = 3650 Å), curves 1 and 3--li-
quid phase; curves 2 and 3--plastic state.

ACC NR: AT5023439

alcohol upon concentration see fig. 3. For anthranilic acid CCl$_4$ system, the rate
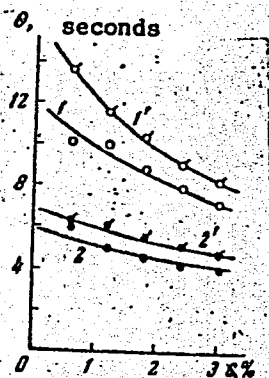
θ, seconds

Fig. 3. 1 and 1'--optical excitation; 2 and 2'--excitation with x-rays, 1 and 2-- oxygen saturated solutions; 1' and 2'-- O$_2$-free solutions.

constant of luminescence quenching is 4.7·10^9 1/mol·sec and the rate constant of photoluminescence quenching is 2.4·10^9 1/mol·sec. Orig. art. has: 3 figures, 1 table, 3 formulas.

SUB CODE: 20/   SUBM DATE: 23Feb65/   ORIG REF: 007/   OTH REF: 003

Card 3/3

RUZMAN, I.M.; RYUKHIN, Yu.A.; CHACHAKOV, A.F.

Isolation of carrier-free Sn^{117m} and In^{111} from cyclotron target.
Radiokhimiia 6 no.4:500-502 '64.   (MIRA 18:4)

BARONI, Ye.Ye.; KILIN, S.F.; LEBSADZE, T.N.; ROZMAN, I.M.; SHONIYA, V.M.

Introduction of metallo-organic compounds into polystyrene.
Atom. energ. 17 no.6:497 D '64   (MIRA 18:1)

PRIMOZ, Gspan, dipl. inz. (Ljubljana); ROZMAN, Jancz, dipl. inz. (Ljubljana); JERIC, Smiljan, dipl. inz. (Ljubljana)

Measuring the transmission and reflection coefficients in the manufacture of Ag-O-CS photocathodes. Elektr vest 31 no.3/5:89-91 Mr-My '64

1. Institute of Electronics and Automation, Ljubljana, Teslova 30.

ROZMANOVA, N.V.

Action of biomycin on the physiology of the yeast cell. Izv.vys.
ucheb.zav.;pishch.tekh. no.4:70-74 '60.   (MIRA 13:11)

1. Leningradskiy tekhnologicheskiy institut pishchevoy promyshlennosti.
Kafedra tekhnologii brodil'nykh proizvodstv.
        (Yeast)   (Biomycin)

15-1957-10-13545

Translation from: Referativnyy zhurnal, Geologiya, 1957, Nr 10,
                    pp 12-13 (USSR)

AUTHORS: Vodorezov, G. I., Rozman, Kh. S.

TITLE: The Devonian Rocks of the Kempirsayskiy Region as Re-
              lated to the Problem of the Age of the Ultrabasic Rocks
              of the Southern Urals (O devonskikh otlozheniyakh Kem-
              pirsayskogo rayona v svyazi s voprosom o vozraste ul'-
              trabazitov Yuzhnogo Urala)

PERIODICAL: V sb: Materialy po geol. i poleznym iskopayemym
              Yuzhnogo Urala, Nr 1, Moscow, Gosgeoltekhizdat, 1956,
              pp 16-27

ABSTRACT: Cambrian, Ordovician, Silurian, Devonian, and Carboni-
              ferous rocks are involved in the geological structure of
              the region. Numerous intrusions of ultrabasic rocks of
              various sizes penetrate the pre-Upper Devonian beds.
              The largest of these is the Kempirsayskiy ultrabasic
              pluton. A brief description of the Devonian rocks of
Card 1/4   the Kempirsayskiy region is given; they are most fully

15-1957-10-13545

The Devonian Rocks of the Kempirsayskiy Region as Related to the
Problem of the Age of the Ultrabasic Rocks of the Southern Urals

developed in the western part of the region. Lying unconformably
on the Silurian there occur the following series, (from the base
upward): 1) Shandinskaya series (Eifelian, 150 m)--conglomerates,
sandstones, tuffs, and lenses of limestones with Carinatina ari-
maspus Eichw., Karpinskia conjugula Tschern., and Spirifer superbus
Eichw.; 2) Chancharskaya series (Eifelian, 500 m)--porphyrites
and albitophyres and their tuffs; 3) Aytpayskaya series (Givetian,
100 m)--conglomerates and conglomerate-breccias, with lenses of
limestone, resting unconformably on lower beds and containing
corals (Fascyphyllum, Grypophyllum, and Stenophyllum) and brachi-
opods (Atrypa desquamata var. totaensis Khod., Gypidula acutolo-
bata Sandb., G. biplicata Schnur., and Uncinulus angularis (Phil-
lips); 4) Yegindinskaya series (upper Givetian-lower Frasnian,
300 m)--siltstones. siliceous shales, and local laminated bitu-
minous shales; 5) Zilairskaya series (Frasnian and Famennian,
400 m)--sandstones and shales, and subordinate conflomerate mem-
bers; and 6) Kiinskaya series (Famennian, 380 m)--siliceous bitu-

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15-1957-10-13545
The Devonian Rocks of the Kempirsayskiy Region as Related to the
Problem of the Age of the Ultrabasic Rocks of the Southern Urals

minous rocks, with limestone in the upper part with Clymenia
(Bilaclymenia, Cyrtoclymenia, and others) and trilobites (Pha-
cops, Proetus, and others). The sedimentary and tuffaceous
rocks of the Coblentzian and Eifelian are everywhere cut by small
intrusions of ultrabasic rocks. Such intrusions are not found
in the sedimentary and effusive rocks of the upper Givetian,
Frasnian, and Famennian; these relationships support the Givet-
ian age (probably comprising the whole upper part) of the ultra-
basic intrusions of the Kempirsayskiy region. It is noted that
the Khabarninskiy and Kempirsayskiy masses and the interforma-
tional intrusions in the western part of the region are of the
same age and are very closely related. The rocks adjoining the
masses mentioned above are Cambrian, Ordovician, and Silurian.
The interformational intrusions, which are distributed to the
west, are considered by the author to be peripheral apophyses of
these masses, occurring at higher stratigraphic levels. In the
eastern part of the region there occur individual ultrabasic

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15-1957-10-13545

The Devonian Rocks of the Kempirsayskiy Region as Related to the
Problem of the Age of the Ultrabasic Rocks of the Southern Urals

intrusions which are also associated with the Kempirsayskiy
mass. The author considers these to be later derivatives of an
already completely emplaced mass, squeezed out into the adjacent
country rocks during tectonic tensions in upper Givetian and,
partly, in lower Frasnian time. Objections are cited against
the practice of classifying intrusions by age "bands" and it is
proposed that these intrusions be differentiated by their rela-
tions to tectonic structures.

Card 4/4   I. N. Krasilova

ROZMAN, Kh.S.

Representatives of the subfamily Yunnanellinae from Kazakhstan and
the Mugodzhar Hills. Paleont. zhur. no.2:91-100   '59.
                                          (MIRA 13:1)

1.Institut geologicheskikh nauk Akademii nauk SSSR.
          (Kazakhstan--Brachiopoda, Fossil)

ROZMAN, Kh.S.

Enantiosphen Whidborne from Givetian deposits of the southern
Mugodzhar Hills. Paleont.zhur. no.3:47-54 '59.
                                          (MIRA 13:4)

1. Geologicheskiy institut Akademii nauk SSSR.
        (Berchogur region--Brachiopoda, Fossil)

ROZMAN, Kh.S.

Famen and lower Torunai stratigraphy of the Mugodzhar Mountains
and adjacent regions of the Urals. Izv. AN SSSR. Ser. geol. 25
no.12:42-51 D '60.   (MIRA 13:11)

1. Geologicheskiy institut AN SSSR, Moskva.
        (Ural Mountain region--Geology, Stratigraphic)

ROZMAN, Kh. S. Cand Geol-Min Sci -- "Stratigraphy and the Brachiopoda

(Rhynchonellacea) of the Mugodahar Famennian stage and adjacent reions."

Mos, 1961 (Acad Sci USSR. Geol Inst). (KL, 4-61, 190)

KELLER, B.M.; ROZMAN, Kh.S.

       Sediments of the Lower Ordovician in Aktyubinsk Province of
       Kazakhstan and adjacent regions of the western slope of the
       Southern Urals. Trudy GIN no.18:93-101 '61.   (MIRA 14:6)
           (Ural Mountain Region—Geology, Stratigraphic)

ROZMAN, Khana Solomonovna; KRESTOVNIKOV, V.N., otv.red.;
     BEZNOSOVA, G.A., otv.red.; ZHURAVLEV, V.S., red.izd-va;
     MAKOGONOVA, I.A., tekhn.red.

[Stratigraphy and brachiopods of the Famenian stage of
the Mugodzhar Hills and adjacent regions] Stratigrafiia
i brakhiopody famenskogo iarusa mugodzhar i smezhnykh
raionov. Moska. Izd-vo Akad.nauk SSSR, 1962. 195 p.
31 plates. (Akademiia nauk SSSR. Geologicheskii institut.
Trudy, no.50).   (MIRA 15:10)
     (Mugodzhar Hills region—Geology, Stratigraphic)
     (Mugodzhar Hills region—Rhynchonellacea, Fossil)

ROZMAN, Kh.S.

Valerian Nikolaevich Krestovnikov, 1888-1964; obituary.
Paleont. zhur. no.3:154-155 '65.   (MIRA 18:9)

CHUGAYEVA, M.N.; ROZMAN, Kh.S.; IVANOVA, V.A.; PEYVE, A.V., glavnyy red.;
        KELLER, B.M., otv. red.; KUZNETSOVA, K.I., red.; MENNER, V.V.,
        red.; TIMOFEYEV, P.P., red.

        [Comparative biostratigraphy of Ordovician sediments in the
        northeastern U.S.S.R.] Stravnitel'naia biostratigrafiia
        ordovskikh otlozhenii Severo-Vostoka SSSR. Moskva, Nauka,
        1964. 235p. illus. (Akademiia nauk SSSR. Geologicheskii
        institut. Trudy, no.106).   (MIRA 17:12)

        1. Chlen-korrespondent AN SSSR (for Peyve).

SARTENER, P.; ROZMAN, Kh.S.

Famennian rhynchonellid complex common to North America and the
Urals. Paleont. zhur. no.1:148-150 '65.

(MIRA 18:4)

1. Geologicheskiy institut AN SSSR.

ROZMAN, Ya. B. Cand Tech Sci -- (diss) "Study and development of ~~the~~ *a* *Continuously variable drive* ~~ungraded driving gear~~ of products of universal ~~cylinder-and-cone~~ *cylindrical* ~~grinding machines~~ *grinders* on the basis of an electromagnetic ~~slipping~~ *slip* clutch." *(Machine Tool)*

Mos, 1957. 15 pp 20 cm. (Min of Higher Education USSR. Mos ~~Bench~~ *Machine Tool* and

Instrument# Inst im I. V. Stalin.) 100 copies. (KL, 22-57, 106).

-2o-

ROZMAN, Marijan

Aluminum bronze with hard inclusions. Ljevarstvo 10 no.1/2:
40-47 '63.

1. Upravitelj ljevaonice, Varazdin.

BONCH-BRUYEVICH, V.L.; ROZMAN, R.

    Theory of light a sorption in heavily doped semiconductors.
    Fiz. tver. tela 6 no.8:2535-2537 Ag '64.
                                 (MIRA 17:11)

    1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

ACCESSION NR: AP4043390

S/0181/64/006/008/2535/2537

AUTHORS: Bonch-Bruyevich, V. L.; Rozman, R.

TITLE: On the theory of light absorption in strongly doped semi-conductors

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2535-2537

TOPIC TAGS: light absorption, doping, forbidden band, band width, germanium, electron concentration

ABSTRACT: Inasmuch as earlier interpretations of experimental data on light absorption in strongly doped semiconductors are based on the concept of the width of the forbidden band, which is not amena-ble to an unambiguous definition, the authors introduce a "renor-malized" expression for the bandwidth, whereby the "narrowing down of the forbidden band" becomes simply due to the exchange interac-tion between the carriers, and has no direct bearing on the influ-

Card   1/2

ACCESSION NR: AP4043390

ence of the impurity on the band structure of the semiconductor,
which is practically negligible. The correctness of this inter-
pretation is checked for n-type germanium. It is indicated that it
is also possible to check this interpretation experimentally by
producing a high electron concentration not by doping but with the
aid of injection. However, the required level of injection is too
large for the present experimental capabilities. Orig. art. has:
5 formulas.

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet im. M. V.
Lomonosova (Moscow State University)

SUBMITTED: 16Mar64   ENCL: 00

SUB CODE: SS   NR REF SOV: 006   OTHER: 005

Card   2/2

NOVAKU, V.[Novacu, Valer], prof.; OSTIANU, N.M.[translator]; ROZMAN,R.,
red.; BURTSEV, A.K., red.; GRUSHIN, A.V., tekhn. red.

[Introduction to electrodynamics] Vvedenie v elektrodinamiku.
Moskva, Izd-vo inostr. lit-ry, 1963. 303 p. (MIRA 17:1)

1. Chlen-korrespondent AN Rumynskoy SSR (for Novaku).

BONCH-BRYYEVICH, V.L.; ROZMAN, R.

Theory of heavily alloyed semiconductors; band-to-band transitions. Fiz. tver. tela 5 no.10:2890-2901 O '63.   (MIRA 16:11)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova i Vsesoyuznyy institut nauchnoy i tekhincheskoy informatsii Gosudarstvennogo komiteta Soveta Ministrov SSSR po koordinatsii nauchno-issledovatel'skikh rabot i AN SSSR.

POPOVIC, Radivoje, Dr.; ROZMAN, Radivoj, dr.

Shoulder-hand syndrome. Med. glasn. 10 no.3:124-129
March 56.

1. Interna klinika Medicinskog fakulteta u Beogradu (v.d.
upravnika prof. dr. B. Bozovic).
    (SHOULDER,
          shoulder-hand synd. (Ser))

POPOVIC, Radivoje, Dr.; ROZMAN, Radivoj, dr.

Case of shoulder-hand syndrome after myocardial infarct.
Med. glasn. 10 no.3:129-131 March 56.

1. III Interna klinika Medicinskog fakulteta u Beogradu
(v. d. upravnika doc. dr. B. Bozovic.).
    (SHOULDER, dis.
         shoulder-hand synd. after myocardial infarct. (Ser))
    (MYOCARDIAL INFARCT, compl.
         shoulder-hand synd. (Ser))

ROZMAN, Silvo, inz. (Rudnik Mezica, Mezica)

Dressing of lean lead-zinc ores in the Mezica Ore Dressing Plant. Tehnika Jug 18 no.6:Suppl.:Rudarstvo metalurg 14 no.6: 1049-1053 Je '63.

1. Glavni tehnolog za separiranje rudnika Mezica, Mezica.