differs in that the plates should be sufficiently thick and should be located at a large distance from the detector, so that no regenerated K_1^0 mesons reach the detector.

In conclusion we note that if there exist two CP-even K mesons, namely K_1 and K_3, then two CP-odd K mesons, K_2 and K_4, should exist. It is therefore of interest to search for the two components in ordinary K_2^0-meson decays ($K_{\pi 3}$, K_{U3}, K_{e3}).

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[1] Christenson, Cronin, Fitch, and Turlay, Phys. Rev. Lett. 13, 138 (1964).

[2] De Douard, Dekkers, Jordan, Mernod, Willits, Winter, Scharff, Valentini, Vivargent, and Bott-Bodenhasen, Phys. Lett. 15, 58 (1965).

[3] Galbraith, Manning, Taylor, Jones, Malos, Astbury, Lipman, and Walker, Phys. Rev. Lett. 14, 383, 1965.

[4] K. Nishijima and M. H. Saffouri, Phys. Rev. Lett. 14, 205, 1965.

[5] G. Bernardini, Transactions, Conference on High Energy Physics, Dubna, 1964.

[6] H. J. Lipkin and A. Abashian, Phys. Lett. 14, 151 (1965).

[7] J. Uretsky, Phys. Lett. 14, 154 (1965).

[8] M. Levy and M. Nauenberg, Phys. Lett. 12, 155 (1964).

[9] R. Sachs, Phys. Rev. Lett. 13, 348 (1964).

[10] Bernstein, Cabibbo, and Lee, Phys. Lett. 12, 146 (1964).

[11] Lyuboshitz, Okonov, Podgoretskii, and Wu, JINR Preprint D-1926, 1964.

[12] V. V. Vladimirskii and M. V. Terent'ev, The Regeneration Phenomenon and the Complete Experiment in a K^0 Meson Beam. ITEF Preprint No. 323, 1965.

NEW EFFECT OF INCREASING THE PHOTOCONDUCTIVITY OF ORGANIC SEMICONDUCTORS IN A WEAK MAGNETIC FIELD

E. L. Frankevich and E. I. Balabanov
Institute of Chemical Physics, USSR Academy of Sciences
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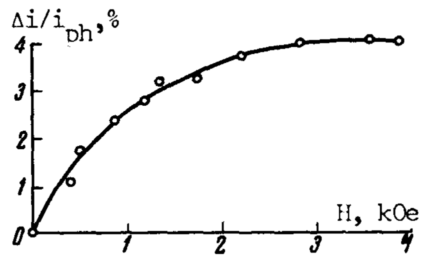
In an investigation of the photoconductivity of condensed aromatic hydrocarbons (anthracene and tetracene), we have noted a new effect, wherein the photocurrent through the sample increased when a constant magnetic field was applied to it.

The photoconductivity was measured in vacuum-sputtered films with an electrometric dc amplifier. The photoconductivity of the films, 3-20 μ thick, was investigated in surface cells and in "sandwich" type cells. In the cells of the latter type, the sputtered-aluminum electrodes were semi-transparent. The illumination was with visible light from a 20 watt incandescent lamp, focused by means of an optical system and transmitted through a water filter. To study the photoconductivity of anthracene, which is not sensitive to the visible light, a DKSSh-1000 lamp was used. The investigated substances were purified by multiple recrystallization from freshly distilled solutions, followed by vacuum distillation. The measurements were made both in a vacuum of 10^{-6} mm Hg, on samples prepared in the same vacuum, and in air. The photocurrents in the samples ranged from 10^{-7} A (tetracene sandwich-type sample, 20 V on the electrodes) to 10^{-12} A (anthracene surface cell, 370 V on the electrodes).

The nature of the observed effect is that turning on the constant magnetic field (or bringing a permanent magnet close to the sample) causes the photocurrent i_{ph} to increase by an amount Δi, which grows with rising i_{ph} in such a way that when H is constant $\Delta i/i_{ph}$ remains constant at different light intensities. On the other hand, when H increases, $\Delta i/i_{ph}$ also increases. The maximum attained value of $\Delta i/i_{ph}$ is 4%. The ratio $\Delta i/i_{ph}$ does not depend on the orientation of the sample in the magnetic field (the light flux was incident perpendicular to the plane of the film in all cases). The manifestation of the effect itself does not depend on the material of the electrode (aluminum or silver), on the type of the sample, on the vacuum conditions, or on the voltage applied to the sample.



Relative increase of the photocurrent in tetracene vs. magnetic field intensity

The figure shows the experimental plot of $\Delta i/i_{ph}$ against the magnetic field intensity H for sample No. 4 (see the table). We see that $\Delta i/i_{ph}$ increases sharply in relatively weak fields and then approaches saturation. The table shows typical values of $\Delta i/i_{ph}$ for several samples, plotted in different magnetic fields H.

We investigated the temperature dependence of $\Delta i/i_{ph}$ of tetracene samples (No. 3) in vacuum. $\Delta i/i_{ph}$ remained constant within ± 30% in the temperature range from 220 to 300°K. The photocurrent i_{ph} increased with increasing temperature like $i_{ph} = i_0 \exp(-E/kT)$. The value of E turned out to be 0.3 eV.

Sample	Magnetic field intensity H, Oe	$\Delta i/i_{ph}$ %	Measurement conditions
1. Anthracene	3000	3.5	Surface cell, measurements in air
2. Tetracene	17	0.2	Ditto
	140	1.5	Ditto
	3900	3.1	Ditto
3. Tetracene	500	1.8	Surface cell, measurements in vacuum 10^{-6} mm Hg
4. Tetracene	500	1.8	The same sample but measured in air
5. Tetracene	3200	3.2	"Sandwich" type sample, measurements in air

The magnetic field had no effect on the dark current in the investigated samples. The fact that $\Delta i/i_{ph}$ is independent of the sample orientation relative to the magnetic field indicates that the increase in the photoconductivity is not connected with the direction of motion of the carriers through the sample, but is determined by the effect exerted by the magnetic field on the creation or (and) annihilation of the photocurrent carriers. It is known that light causes production of excitons in molecular crystals. Thermal ionization and recombination of the excitons produces the current carriers. A very probable cause of the increase in photocurrent in the magnetic field is the influence of this field on the lifetime of the excitons prior to their vanishing without formation of carriers ("annihilation").

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EFFECT OF A FOCUSED RUBY-LASER BEAM ON THE RUBY

T. P. Belikova and E. A. Sviridenkov
P. N. Lebedev Physics Institute, USSR Academy of Sciences
Submitted 13 May 1965

Investigations of the interaction between light from a powerful laser and a substance that exhibits resonant absorption at the lasing frequency is of interest because multi-stage and multi-quantum transitions are facilitated in such a system. We have investigated the effect of a focused ruby-laser beam on a ruby. The ruby crystal was polished in the form of a cube 0.8 cm on edge and placed in the focus of the beam of a pulsed-Q laser of $\sim 10^7$ W power (breakdown takes place in air). The beam inflicted damage on the crystal in the form of a chain of ring-like microscopic fractures with local formations in the center. The chain of fractures was aligned along the axis of the laser beam (Fig. 1; the laser beam direction is indicated by the arrow, and the beam was focused on the center of the crystal).

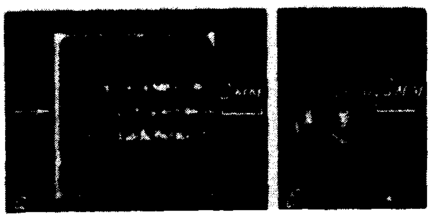

Fig. 1. a - Traces of microscopic fractures in ruby crystal after three laser pulses. Magnification 3x; b - two individual fractures from the track (magnification 30x).

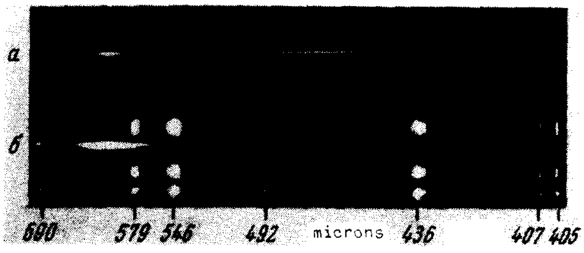

Fig. 2. Ruby glow spectra at different radiation power: a - $\sim 10^6$ W, b - 10^5 W (total energy larger than in a).

The damage was accompanied by an intense flash of light with a continuous spectrum.

At a lower power, $\sim 10^6$ W, no damage to the crystal occurred, but glow, consisting of two broad bands with maximum at ~ 630 and ~ 450 nm was observed from the ruby (Fig. 2a).

At $\sim 10^5$ W power (without pulsed Q), the blue band disappeared, leaving only the orange band (Fig. 2b). A similar orange glow was observed and partially investigated in ruby excited by a mercury lamp [1].