JEDIC Journal of Ethics and Diversity in International Communication

| e-ISSN: 2792-4017 | www.openaccessjournals.eu | Volume: 1 Issue: 7

The Properties of Diffusion of Iodine Solution in Cotton Fiber

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Abstract
Based on the alloying of cotton fiber with iodine solution, its electrophysical properties were studied and it was determined in the article experimentally that the temperature dependence of the electrical conductivity of cotton fiber is the same as that of semiconductor materials.

Keywords: Cotton fiber, diffusion, solution, electrical conductivity, volt-ampere characteristics, semiconductor, alloying, photoelectric properties, spectrum.

The properties of diffusion of iodine solution in cotton fiber

Diffusion is a kinetic thermoactivation process in which solids play a key role in determining the physical and chemical properties of semiconductors. Therefore, in the production of semiconductor materials with certain properties, first of all, the diffusion parameters of the incoming compounds are determined. [1,2].

The control is ripe as an object. Varieties of cotton fiber "Golib", "Diyor" were obtained. Before alloying the cotton fiber (PT) with the element iodine, it is combed with a small comb (sharp edge 0.5 mm) and then cut from the side of the seed.

Then cotton fiber (PT) is inserted into a glass tube with a diameter of 1-4 mm, impregnated by cutting with a solution of 10% iodine in alcohol.

The cotton fiber (PT) sample is held in a soaked state for 15-60 minutes and then dried in a sliding chamber for 1 hour. It is then placed in a 10 mm long glass or quartz container after drying to prevent exposure to moisture during the experiment.

We use HU lacquer and graphite-based conductive glue to create ohmic contact and seal from the external environment. This conductive glue (length 1 cm, thickness 20 μm and resistance 300 Om) is then applied to the sides of the glass or quartz container.

The methods of studying the electrophysical properties of cotton fibers

Photoelectric measurements were carried out using monochromators UM-2 and IKM-1. The dispersion is 10 μm = 0.18 / mm with a refractive index of 600. In the UM-2 monochromator, the spectral range is 3800-10000 A0, and the linear variance at wavelengths 7865-4046 A0 is 335-33 A0, respectively.

Graphic or tungsten quartz body lamps were used as the light source. Monochromatic calibration spectra For the entire spectrum of FU light, a symbolic high-pressure lamp DRSH-250 was used.

The constant voltage applied to the cotton fiber sample is 0-100 V. Spherical wavelength of special light emitted when checking photo transmittance

A UV lamp with a maximum luminosity of l = 0.254 μm was used.

ISSN 2792-4017 (online), Published under Volume: 1 Issue: 7 in December-2021

JEDIC Journal of Ethics and Diversity in International Communication

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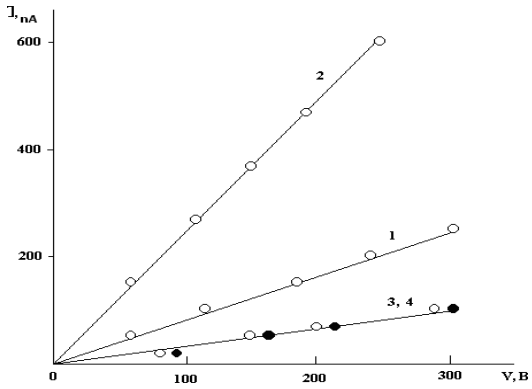
The study of the photoelectric properties of iodine-alloy cotton fiber

Recently, research has begun on the semiconductor properties of organic and inorganic materials. In this direction, it was found that cotton and silk fibers have semiconducting properties. [3]

The study of its photoelectric properties provides an opportunity based on the laws of physics, even in non-structural structures. Thus, the Council of the Circuit of Electroelectric Research opens up new possibilities for the creation of new tools and equipment based on the physical laws occurring in cotton fiber (PT).

Based on the above, the results of the study of the photoelectric properties of PT iodinated with iodine are given below. (Figure 1) shows the measurement of VAX (volt-ampere characteristic) of iodine-alloyed cotton fiber when exposed to UV light in the dark (2). As you can see in the picture, VAX is linear in both cases.



When the sample is illuminated with UV light, the currents JF / Jt = 3-5 ratio, where JF, Jt are dark and photocurrent values, respectively. This allows them to be used as recorders of elements in the UV and visible light spectrum regions. growth occurs on the basis of exponential law. (Picture 1)

Picture 1. VAX in iodine-alloyed cotton fiber. 1 - In the dark. 2 - hv = 5ev (l = 0.254mkm) when illuminated with UV light (DB - 30 - 1 lamp) T = 300 K. 3.4 cotton fiber unalloyed with iodine 3 - in the dark. 4 - When illuminated by UV light.

The cotton fiber (PT sample is soaked for 15-60 minutes and then dried in a sliding chamber for 1 hour. We use HU lacquer and graphite-based conductive glue to create ohmic contact and seal from the external environment. This conductive glue (length 1 cm, thickness 20 μm and resistance 300 Om) is then applied to the sides of the glass or quartz container.

Conclusion

Alloying of cotton fiber in 10% alcohol solution of iodine was studied. The color of the fibrils of the cotton fiber decreases from the point of proximity to the seed to their ends. PT of iodine permanently alloyed with UV was also found to increase the photoconductivity when exposed to UV light.

The photoelectric kinetics of iodine-alloyed PT associated with a specific optical transition was investigated, and its photoelectric properties were explained by a zonal diagram. The Valt-Ampere characteristic (VAX) of natural fibers alloyed with iodine was measured and studied. Based on the increase in electrical and photoconductivity of iodine-alloyed PT, it is possible to create in electronics resistors, moisture meters.

ISSN 2792-4017 (online), Published under Volume: 1 Issue: 7 in December-2021

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ISSN 2792-4017 (online), Published under Volume: 1 Issue: 7 in December-2021