OPTOELECTRONIC HELIOTRANSFORMER OF ENERGY

Akhunov K.Kh., Khomidov A.K.
Fergana Polytechnic Institute
"Electrical engineering, electrical mechanics and electrical technologies"

ABSTRACT

The article gives descriptions about a solar device for generating electric fields by means of a concentrated beam. The device is a multistage transformer with an optical input. A structural block diagram and the principle of operation of an optoelectronic solar energy transformer are given.

Keywords: light-emitting diode, photodetector, sunbeam, electric signal, optoelectronic solar transformer, photo voltage, APV films, energy, light guide, capacitance.

The theory and technology of semiconductor in homogeneities is the scientific basis for the creation of various generator-type photodetectors (FPGT). In recent years, the physics and technology of inhomogeneous semiconductor materials has been developing very intensively, which is due to the rapidly growing demand for inhomogeneous materials in the creation of various optoelectronic solar devices and devices. In this regard, the most relevant is the field of semiconductor solar technology, which allows organically linking optoelectronics and solar technology [1,2]. However, the development of optoelectronics (OEGT) is impossible without the study of problematic issues, FPHT, for this, the theory and technology (TT) of inhomogeneous semiconductor structures are needed, which have been solved so far only partially.

When studying the CTs of inhomogeneous semiconductors and in homogeneities, special attention should be paid to the influence of the physicochemical nature of in homogeneities, which are necessary for understanding the photoelectric properties of inhomogeneous semiconductor materials. It is known that, in the case of binary and more complex inhomogeneous semiconductors, the main attention should be paid to the phase and structural-composition properties, as well as to the nature of interatomic bonds in in homogeneities. The study of the basic properties of inhomogeneous semiconductors has two goals. First, these properties make it possible to gain a deeper understanding of the physicochemical nature of material in homogeneities, the type of chemical bond, violation of the stoichiometric composition, the effect of impurities, etc. Second, the areas of technical application of inhomogeneous semiconductors are mainly determined by photoelectric and optical properties, which is necessary for the correct orientation of their possible practical application [1, 2]. Among binary semiconductor compounds, the most important place is occupied by metal compounds with oxygen, sulfur, selenium and tellurium, and they are highly heterogeneous in structure and composition. At a certain temperature, they have electron and hole conductivity and therefore can be considered as inhomogeneous semiconductors. Some compounds of this type can have both p- and n- conductivity from the nature of the introduced impurities. Many inhomogeneous semiconductors have now found a variety of technical applications.

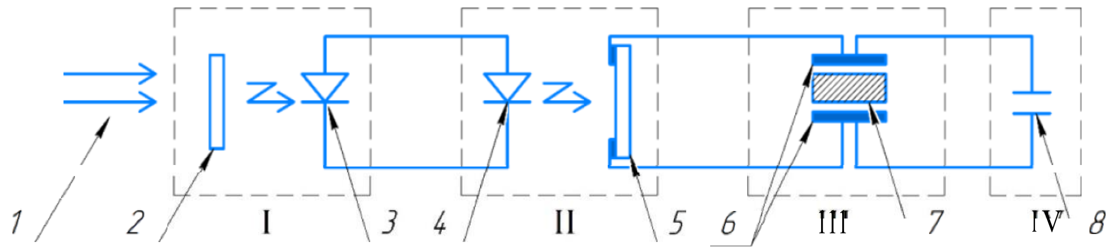
Chemical compounds of metals with sulfur (S) selenium (Se) and tellurium (Te) are called chalcogenides. These include a large group of inhomogeneous semiconductors with interesting electrical properties. When passing from one chalcogenide to another, its specific conductivity can vary from 10^{-10} to 10^{8} Ohm. In addition, chalcogenites, as a rule, exhibit high photosensitivity in a wide spectral range, depending on their nature. Chalcogenides have a high carrier mobility. Among the chalcogenides of group AIIBVI, most compounds have a covalent type of chemical bond. Therefore, they have significantly high mobility of the order of 3000-6000 cm^2/V.

In such materials, the photoelectric characteristics change with the violation of homogeneity and stoichiometry. Based on this, it can be assumed that with the help of inhomogeneous semiconductors of the chalcogenide type, it is possible to use them as an effective material for the development of various generator-type photodetectors in order to create optoelectronic solar devices and devices [7, 8].

It is known that when an inhomogeneous semiconductor is illuminated, a gate photo-EDS can appear, and these can be of various types of transitions and heterojunctions formed from a link of grain-interlayers. The electrical conductivity of the interlayers differs from the electrical conductivity of the grains, so there is a contact between different structures. Usually, it is believed that the interlayers are relatively high resistivity, and the grains are less high resistivity. This pattern is typical for semi-crystalline inhomogeneous structures. In such structures of chalcogenides, optical anisotropic phenomena are observed, which can be used to create power generating systems with optical power, in such systems as from the primary main generator is a semiconductor solar energy converter. The efficiency of solar energy conversion depends on the electro physical characteristics of inhomogeneous semiconductor structures from which solar cells are made [9,10,11]. However, the issues of theory, technology and practice of inhomogeneous semiconductor structures of the chalcogenide type are not sufficiently strictly covered in the literature.

Figure: 1. Block diagram of an optoelectronic solar energy transformer.

Significant results have now been achieved not only in the practical use of solar energy, but also in the development of a scientific basis for the theory and technology of the development of various optoelectronic solar devices and devices for ground and extraterrestrial use (space systems).



REFERENCES:

1. R. Naimanboev, K. Kh. Akhunov, AK Khomidov - Technological mode for obtaining APN films, "International conference on optical and photoelectric phenomena in semiconductor micro- and nanostructures", September 8-9, 2011. 174-176 p.
2. R. Naimanboev, K. Kh. Akhunov, A. K. Khoinidov - Optoelectronic method for determining microparameters of generator-type photodetectors, "Actual Science", International Scientific Journal, No. 11 (28) 2019, 16-18 p.
3. Zh. I. Alferov et al. - FTP, 2004, Vol. 38, no. 8.
4.NP Udalov, R. Pulatov - "Optoelectronic pulse transformers, New electronic devices and devices" collection of articles. MDNTP, 1974