CLASSIFICATION OF OPTICAL RADIATION RECEIVERS FOR THE DEVELOPMENT OF OPTOELECTRONIC INFORMATION-MEASURING SYSTEMS

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ABSTRACT

The topic "Classification of Optical Radiation Receivers for the Development of Optoelectronic Information-Measuring Systems" refers to the categorization of different types of optical radiation receivers, which are important components of optoelectronic information-measuring systems. The annotation for this topic may highlight the purpose and scope of the study, as well as the key objectives and findings of the research.

Keywords. *optoelectronics, optical radiation receivers, photodiodes, phototransistors, photomultiplier tubes, classification, information-measuring systems, telecommunications, sensing, imaging, components, characteristics, capabilities, optimization, applications.*

АННОТАЦИЯ

Тема «Классификация приемников оптического излучения для разработки оптико-электронных информационно-измерительных систем» касается категоризации различных типов приемников оптического излучения, являющихся важными компонентами оптико-электронных информационно-измерительных систем. Аннотация к этой теме может освещать цель и объем исследования, а также основные задачи и результаты исследования.

Ключевые слова. *оптоэлектроника, приемники оптического излучения, фотодиоды, фототранзисторы, фотоумножители, классификация, информационно-измерительные системы, телекоммуникации, зондирование, формирование изображений, компоненты, характеристики, возможности, оптимизация, приложения.*

INTRODUCTION

Optical radiation receivers (ORRs) are devices whose state changes under the influence of an optical radiation flow, serving for the detection of the radiation. ORRs convert the energy of optical radiation into electrical energy, which is more convenient for direct measurement [1].

Important parameters characterizing the properties and capabilities of various types of optical radiation receivers (ORRs) include: step electron-threshold sensitivity - the minimum radiation flow per unit of working frequency band (measured in W/Hz); conversion coefficient (integral sensitivity, relative sensitivity) - relates the incident radiation flow to the output signal magnitude of the ORR; time constant - the time required for the output signal of the ORR to reach a specified level; spectral characteristic - the dependence of ORR sensitivity on the wavelength of the incident radiation (those with low wavelength dependence over a wide range of wavelengths are called non-selective, as opposed to selective ORRs, which have distinct maxima and minima in their spectral characteristics) [2-5].

By the principle of operation and manufacturing, photodetectors can be divided into three major groups (see Fig. 1.1): semiconductor (photon) detectors, thermal (non-selective) detectors, and photoemissive and capacitance detectors.

DISCUSSION AND RESULTS

The diversity of optical radiation receivers is determined by a multitude of energy conversion methods and the impossibility of creating receivers that are equally sensitive across the entire optical spectrum. Absorption of optical radiation energy leads to changes in the state of the receiver substance. This change can result in an increase in temperature, which in turn causes changes in various substance parameters, such as gas pressure, conductivity of solid bodies, electric polarization of dielectrics, and others. Receivers of optical radiation based on this principle are called thermal receivers[6-7].

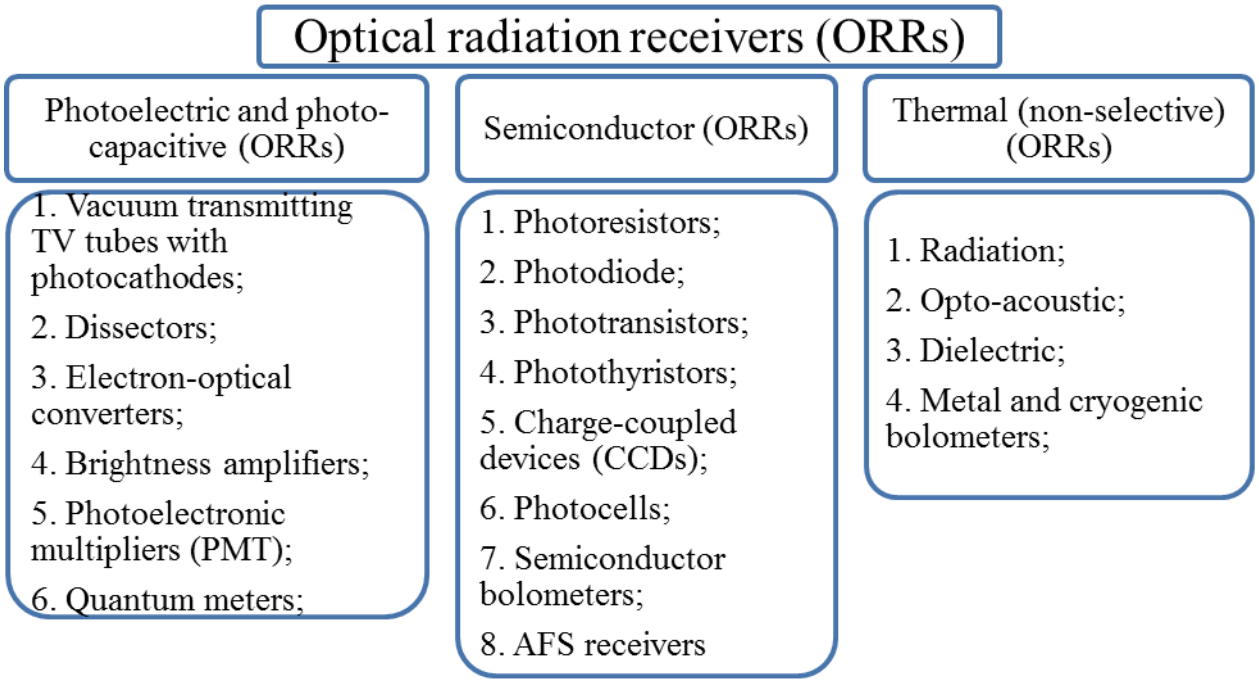

Figure 1.1 presents a classification of (ORRs).

The most prevalent types of optical radiation receivers include metallic and semiconductor bolometers and thermoelectric elements, as well as molecular radiometers, optoacoustic, pyroelectric receivers, among others. Bolometers operate on the basis of the variation of electrical resistance of metal or semiconductor with temperature change caused by the absorption of incident optical radiation flux. On the other hand, the temperature change of the absorbing surface of thermoelectric elements, proportional to the radiation falling on it, results in the appearance of a corresponding thermoelectric EMF within them.

REFERENCES

1. Starkirkiewics J., Sosnovski L., Simpson O. Photovoltaic effekt exhibited in Highjresletance Semiconducting Films // Nature: 1946. - Vol. 158, P. 28.
2. "Introduction to Optoelectronics" by J. Wilson and J. F. B. Hawkes, 2012.
3. Зокиров, А., & Гайназарова, К. (2022). ТЕХНОЛОГИЯ ПОЛУЧЕНИЯ АФН ПЛЕНОК ИЗ ХАЛЬКОГЕНИДОВ КАДМИЯ. Scientific Collection «InterConf», (103), 202-208.
4. Зокиров, А. И. У., & Ташланова, Д. М. (2022). О природе микрофотоэлементов. *Ta'lim fidoyilari*, *5*(9), 269-272.
5. Ахмедов, Б. Б., Хошимов, Х. А. У., & Зокиров, А. И. У. (2022). РЕШЕНИЕ УРАВНЕНИЯ ШРЕДИНГЕРА ДЛЯ ПОТЕНЦИАЛЬНОЙ ЯМЕ ПРЯМОУГОЛЬНОЙ ФОРМЫ. *Oriental renaissance: Innovative, educational, natural and social sciences*, *2*(Special Issue 4-2), 942-947.
6. Kamolova, M. M. (2022). PHOTOELECTRIC PROPERTIES in CdTe. IJODKOR O'QITUVCHI, 2(22), 430-432.
7. Muhabbatxon, K. (2022). POLIMER YARIM O'TKAZGICHLARDA YUTILISH SPEKTRI SEZGIRLIGNI UZUN TO'LQIN METODI BILAN ANIQLASH. PEDAGOG, 1(3), 248-256.