

SIMPLIFIED TWO-WAVE STRUCTURAL DIAGRAM

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Abstract:	Keywords:
The article presents a block diagram of a device for determining the content of one substance in another. The use of this device makes it possible to simplify the design by eliminating the photodiode. The device has a low sensitivity and can be used in moisture measurement and colorimetry of liquids.	Pulse generator, photosensitivity, photodiode, photoelectric signal, LED, design, photodetector mode, moisture measurement.

Introduction

A block diagram of a device for determining the content of one substance in another is shown in Fig.1. The device works as follows [1-7]. The alternating current GI pulse generator generates a periodic sequence of alternating current pulses. The generated current during the positive half-cycle of the pulse turns on the LED1 light-emitting diode, the current passes through the resistor R1, the light-emitting diode LED1 and the diode VD1. This current causes LED1 to glow, which emits at the reference wavelength. This radiation passes through the controlled object in the KO cell and hits the light-sensitive surface of the LED2 light-emitting diode, the cathode of which is positively energized and which operates as a photodiode during the positive half-cycle [8-24]. The passed luminous flux by the LED2 light-emitting diode (at a given time, the photodiode) is converted into a photoelectric signal, which is removed from the additional resistor R2. This signal is fed to the input of the BOFS block for processing the photoelectric signal. Under the action of the negative half-cycle, the current flows through the resistor R1, the diode VD1 and the LED 2, which emits at the measuring wavelength. The radiation from the LED 2 passes through the controlled object and hits the photosensitive surface of the LED 1, the anode of which has a negative voltage applied. When the negative half cycle is active, LED1 operates in photodiode mode [25-37]. The signal of negative polarity from the middle output of the additional resistor R2 is fed to the input of the BOFS block for processing the photoelectric signal, which ensures the division of signals from the fluxes of the reference and measuring light-emitting diodes, which is proportional to humidity.

The Main Part

The use of this device makes it possible to simplify the design of the device by eliminating the photodiode, the function of which is alternately performed by two light-emitting diodes.

You can greatly simplify the device, if you use the properties of the LED to work in the photodiode mode. In this case, with a two-wave structural scheme, the same LED alternately operates in the emitter mode and in the photodetector mode. A diagram of such a device is shown in Fig.1.

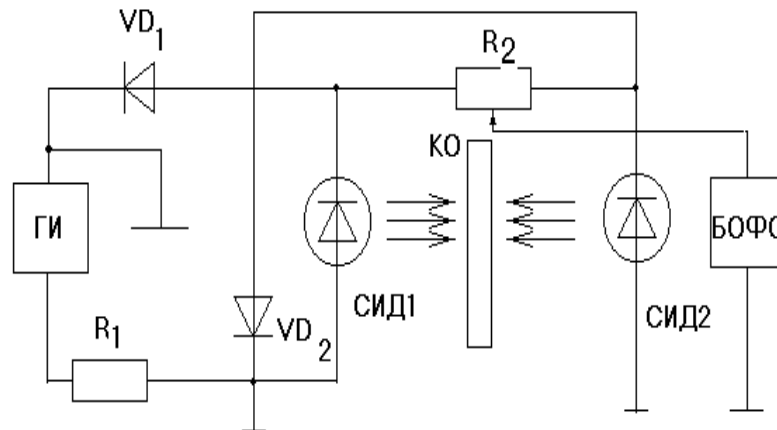


Fig.1. Device for determining the content of one substance in another:

ГИ - alternating current pulse generator; БОФС - photoelectric signal processing unit. The GI generator generates a periodic sequence of AC pulses. With a positive half cycle, LED1 turns on (current passes through resistor R1, diodes LED1 and VD1); LED1 emits at the reference wavelength [38-57]. This radiation passes through the controlled object КО and the diode LED2, which operates in the photodiode mode, is converted into an electrical signal taken from the resistor R2. This signal is fed to the input of the photoelectric signal processing unit.

Conclusion

Under the action of the negative half-cycle, the current flows through the resistor R1, the diode VD2 and the light emitting diode LED2, which emits at the measuring wavelength. The radiation from LED2 passes through the CO and LED1, which operates in this period of time in the photodiode mode, is converted into an electrical signal, and then from the resistor R2 is also fed to the input of the BOFS. The BOFS block implements the ratio of these signals, which is proportional to the controlled parameter.

Due to the low sensitivity of LEDs in the photoconversion mode, this device has a low sensitivity and can be used in moisture and colorimetry of liquids.

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