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ABSTRACTS

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Y-1

PHOTONICS AND APPLICATION OF DIPYRROMETHENE COMPLEXES WITH ZINC

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The demand for using a variety of optical devices in modern technology makes it necessary to explore the photonics of new organic luminophores such as coordination complexes of dipyrromethene with p- and d-elements depending on their structure, intermolecular interactions, temperature, etc. Systematic observation of photochemical and photophysical properties and establishment of their connection with structural features of the complexes are required for successful usage of dipyrromethene complexes and creation of various hi-tech optical devices which are based on them. Therefore, the purpose of the work is to study the spectral luminescent and sensory properties of different complexes of dipyrromethenes with zinc, the optimal combination of which will indicate the direction of the most effective use of these dyes.

For this compounds were investigated spectral-luminescent properties in different solvents. It was found that zinc dipyrromethene complexes don't have effective fluorescence but have long-lived emission due to increased nonradiative intersystem processes in the excited state. Introduction of heavy atoms into the dipyrromethene core enhances intersystem crossing, which leads to a long-lived emission. For solid samples based on zinc complexes was found dependency of the long-lived emission intensity of the oxygen concentration in gas flow. The presence of line segment indicates the possibility of the use of these complexes as optical sensors for oxygen determination. The results obtained in this work can be used as the basis for the design of optical devices.

Y-2

STUDY OF ELASTIC OBJECT CONTRACTION USING OPTICAL SENSOR

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This paper presents a detection of elastic movement of an object and measure the contractile activity of the object. An optical sensor is used to detect the Elastic object contraction, which is described. In the initial experiments, we used elastic. Next object will be animal muscle, so that we can determine the muscle contraction. Optical light is passed to the reflective plate fixed on the muscle, the backscattering is observed, and the contraction is detected by measuring the change of the distance, that occurs during muscle contraction and corresponds to muscle activity. The optical sensor converts the distance to voltage, which is recorded by digital oscilloscope. With respect to electromyography and to optical absorption-based sensors, our device has the advantage of lower invasiveness, of lower sensitivity to electromagnetic noise and to movement artifacts, and of being able to distinguish between isometric and isotonic contractions. Here electrical activity and optical activity is used to analyze the wave characteristics and muscle contractile activities.