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# PULSED LASERS AND LASER APPLICATIONS

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The book contains the materials on the fundamental and applied problems of pulsed lasers. May be interesting for researches and engineers working in the sphere of quantum electronics, spectroscopy, plasma physics, medicine, remote sensing and laser technologies.

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B-22

## THE INFLUENCE OF PH ON THE LUMINESCENT PARAMETERS OF THE WATER SOLUBLE EUROPIUM COMPLEX BASED ON 1,10-PHENANTHROLINE

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The value of pH regulates a large number of technological operations and many biological processes occurring in living cells. In medicine, the deviation of the pH of the medium from the standard may indicate the presence of any diseases. The substances used to determine the pH should have properties such as low exposure to the research object, fast response, and the ability to be used over a wide range of values. Europium complexes with organic ligands are potential candidates for use as pH sensors.

The spectral luminescent properties of the water soluble europium complex were studied at a pH change in a wide range: from 0.50 to 10.08. Solar PB2201 spectrophotometer was used to obtain absorption spectra. The luminescence emission and excitation spectra, luminescence kinetics were recorded using a Solar CM2203 spectrometer.

The experiments showed that the luminescence emission intensity decreases in a more acidic medium. The integral luminescence intensity at pH = 10.08 is almost 20 times greater than at pH = 0.50. It was found that the quantum yield of luminescence increases linearly from 0.3 to 4.0% with an increase in pH from 0.50 to 3.74, and increases linearly from 2.3 to 5.9% with a change in pH from 4.44 to 10.08. The luminescence lifetime is 200 microseconds at pH less than 2, with a decrease in the acidity of the medium, the luminescence lifetime increases and at pH = 10.08 reaches its maximum value of 400 microseconds. The coefficient of asymmetry of the europium ion in this compound, determined from the luminescence spectra, at pH less than 2.75 practically does not change, it increases with a change in pH from 2.75 to 4.44 and reaches its maximum value of 4.5 at pH = 4.44. In addition, it was found that it is possible to determine the pH value in a wide range by calculating the ratio of the luminescence intensities at the excitation wavelength of 290 nm to the luminescence intensity at the excitation wavelength of 325 nm, since this indicator gradually decreases in the studied pH range.

Based on obtained results, it is concluded that the new europium complex can be used as a multiparametric pH sensor in a wide range of pH.

The results have been obtained under support of the RSF, Grant No. 21-73-20138.

B-23

## IR ELECTROLUMINESCENCE IN BULK ZNSE SAMPLES DOPED WITH OPTICALLY AND ELECTRICALLY ACTIVE IMPURITIES. PROBLEMS AND PROSPECTS

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This work describes various methods for the preparation of low-resistance zinc selenide exhibiting optical activity in the mid-IR wavelength range. Methods of sequential doping of the initial CVD-ZnSe with optically (Cr, Fe) and electrically (Al, Cu) active impurities as a result of diffusion annealing, and the method of simultaneous co-doping from films prepared by aerosol pyrolysis are considered.

A review of methods for fabricating ohmic contacts to polycrystalline zinc selenide is given, and the influence of the contact geometry on the electrical and electroluminescent characteristics of the