

Lasing and sensor media on the base of Zinc and BF₂ complexes with different structures of dipyrromethenes

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The coordination complexes intensively are studying at the moment for applications on modern optical technologies. Photonics of new dipyrromethenes (dpm) complexes with p- and d-elements in this paper are researched. It is shown that BF₂-complexes with alkyl- and tetraphenyl substitutes have the best absorbance in visible region, efficient fluorescence and lasing with small threshold and high photostability as in solutions and in solid polymer matrices. The methods of improvement of laser properties are offered.

The complexes with halogen-substituted dpm have significant decreasing of fluorescence yields and appearance of phosphorescence in the frozen solutions (77K) and in solid matrices doped by these complexes. Their phosphorescence are quenched with oxygen therefore these compounds can be used as optical sensor media for determination of oxygen in gas mixtures. The additional substitution of –CH= meso-spacer with nitrogen-atom leads to significant long-wave shift and decreasing fluorescence because singlet-triplet conversion is increased. These compounds generate singlet oxygen and can be used in photodynamic therapy.

The Zn(dpm)₂-complexes have short-wave shifts, less fluorescent efficiency compared with BF₂-dpm and more high phosphorescence that their make are preferably for using in oxygen sensors.

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