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ABSTRACTS

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As can be seen in Figure, the degree of degradation of the initial compound is not the same when using different systems. In the case of using only the Fenton reagent, complete decomposition for 120 min does not occur. However, the conversion schedule of the starting compound tends to completely decompose 2.4-D, however over a longer period. The reaction of Fenton is primarily a chemical reaction. Generation of hydroxyl radicals in this case is slow. The limiting stage in this case is the formation of a hydroxyl radical as a result of a chemical reaction. The reaction rates of direct photolysis are much higher. The 222-nm radiation is absorbed by the high lying electronically excited states of the molecule being studied. As a result, one of the possible ways of the reaction is the population of photodissociative states responsible for breaking the chemical bonds in the initial molecule and, consequently, increasing the degree of degradation. Nevertheless, phenoxy acids are quite resistant organic toxicants.

The use of hydrogen peroxide additive increases the degree of degradation of 2.4-D. This is due to the fact that in addition to the reactions of direct photolysis of 2.4-D, the decomposition of hydrogen peroxide occurs under the influence of UV radiation, so there are two ways of destruction of 2.4-D in solution (direct photolysis on the one hand, interaction with hydroxyl Radical on the other). The most effective is the photo-Fenton system and hydrogen peroxide additives. Adding Fenton's reagent to the UV / H_2O_2 system gives the best results. The formation of hydroxyl radicals in the system due to the photolysis of peroxide is the determining factor affecting the degradation rate of 2.4-D.

1. *Murcia M.D., Vershinin N.O., Briantceva N., Gomez M., Gomez E., Cascales E., and Hidalgo A.M.* Development of a kinetic model for the UV/H_2O_2 photodegradation of 2.4-dichlorophenoxiacetic acid // Chem. Engineer. J. 2015. No. 266. P. 356–367.

E-4

PHOTOPHYSICAL AND PHOTOCHEMICAL PROCESSES IN BORON FLUORIDE COMPLEXES OF DIPYRROMETHENES AND THEIR APPLICATIONS IN MODERN OPTICAL DEVICES

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Boron fluoride complexes of dipyrromethenes (BODIPY) have good solubility in many solvents and are effective fluorophores in the visible region of the spectrum. This causes the possibility of their use as active media of liquid and solid-state tunable lasers. It is suggested to use as sensitizers for hydrogen generation under the action of sunlight on the medium used, in biological studies as fluorescent sensors and labels. Fundamental study of the photochemical and photophysical properties of boron fluoride complexes of dipyrromethenes will solve the problem of optimal practical use of compounds of this class.

The objects of study were chosen a number of BODIPY derivatives with substituents of different nature. The study of the photonics of these compounds revealed that they can be used as a base for developing active media of tunable lasers with a high service life, operating in the ranges of 548–585 and 680–692 nm. The introduction in the meso-position of the dipyrromethene molecule of the nitrogen atom (aza-BODIPY) leads to a decrease in the fluorescence efficiency due to the appearance of closely arranged energy states of different orbital natures and multiplicities, which increases the probability of intersystem crossing. In addition, for halogenated aza-BODIPYs, the ability of generation of singlet oxygen by an indirect method was studied using 1,3-diphenylisobenzofuran (DPBF) as the trap. According to the obtained data, the compounds studied can be recommended as a medium for effective generation of singlet oxygen, which is promising for use in medicine as a photosensitizer for photodynamic therapy.