

Degradation of the phenoxyacetic acids using a photoreactor with exciplex lamps

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The photochemical reactor described in [1] was upgraded by addition of a new Xe₂ exciplex lamp. The design of the reactor is simple and does not require addition of any reagents or additional oxidizing agents (which is an essential part of existing modern oxidation technologies proposing to generate the hydroxyl radical). The electronic absorption spectra of the studied solutions were recorded by a UV-VIS spectrophotometer. We have shown that using a photoreactor with a KrCl exciplex lamp allowed us to carry out degradation of the herbicide. The extent of degradation depends on the irradiation time. The emission from an Xe₂ exciplex lamp allowed us to completely mineralize 2,4-dichlorophenoxyacetic acid over a 60 minute period. Exposure to an Xe₂ exciplex lamp is preferred, but this lamp is not applicable for further biodegradation because a very aggressive oxidizing medium is created in solution for the microorganisms. This is in contrast to the KrCl lamp: when the KrCl lamp was used, the biodegradability of the photoproducts was observed to increase as the irradiation time increased.

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1. O. N. Tchaikovskaya, I. V. Sokolova, V. R. Artyushin, E. A. Sosnin, and G. V. Maier // *Instr. and Experim. Techn.*, 2011, Vol. 54, No. 6, pp. 841–845.