PRODUCTION OF NITRO COMPOUNDS IN THE REACTION WITH WATER ACTIVATED BY HOT PLASMA PULSED RADIATION [[1]](#footnote-1)\*)

DOI: 10.34854/ICPAF.2023.50.2023.1.1.175

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Distilled water was activated by hot plasma pulsed radiation. Hot plasma was generated by an IR10 spark discharge generator. The working gas was air at atmospheric pressure. The power released in the discharge was 0.59 J/s. The intensity of UV radiation from IR10 generator was (1.26 ± 0.2) 10−10 mol(sm2 s) −1.

The identification of 4-nitrophenol was carried out by the absorption line at 300 nm, which shifted to 401 nm in an alkaline solution. The dependence of the yield of 4-nitrophenol in the reaction of phenol with activated water on the concentration of phenol in the initial sample 8 ÷ 500 mg/L was studied for a processing time of 10 minutes (dose 350 ± 20 J). Water activated by hot plasma pulsed radiation was mixed with a sample of phenol solution in a ratio of 1:1. The concentration of 4-nitriphenol increases with the concentration of the initial phenol and reaches a plateau, determined by the amount of generated active species. We also stodied the dependence of the yield of 4-nitrophenol in the reaction with activated water at a phenol concentration in the sample of 25 mg/l on the treatment time up to 40 minutes, the dose up to 1450 ± 50 J, see Fig. 1. It can be seen that the maximum proportion of the resulting 4-nitrophenol is approximately 70% of the initial concentration of phenol. Additionally, the yield of 4-nitrophenol was compared under the direct action of radiation on a phenol solution of 25 mg/L and through activated water. The results are shown in Table 1.

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| Fig. 1 [C] – concentration of products, mol/L; t, min, is the time during which the water sample was activated by radiation. Numbers indicate: (1) – initial concentration of phenol sample 25 mg/L in mixture with distilled water 1:1; (2) – the concentration of 4-nitrophenol in a mixture of the origin phenol 25 mg/L and water, activated by radiation during the time t, 1:1, measured two days after treatment. | Tabl. 1. The concentration of 4-nitrophenol formed by the direct action of radiation on a solution of phenol and through activated water.   |  |  | | --- | --- | | Experimental conditions | Concentration of 4-nitrophenol | | Immediate exposure to radiation | (5.9 ± 0.5) 10−5  mol/L | | Through activated water | (6.4 ± 0.5) 10−5  mol/L |   It can be seen from the table that the yield of 4-nitrophenol under the direct action of radiation on the solution and through activated water is the same. |

In this way, it has been shown that the yield of 4-nitrophenol in contact with water activated by plasma radiation is about 70%, and the yield of product in the reaction with activated water and in the direct action of radiation on the solution is the same.

1. \*) [abstracts of this report in Russian](http://www.fpl.gpi.ru/Zvenigorod/L/Pt/ru/HB-Piskarev.docx) [↑](#footnote-ref-1)