

Investigation of water transfer to the gas phase under the action of a discharge with a liquid cathode

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The aim of the work was to study the process of water transfer from an aqueous electrolyte solution to the gas phase under the action of a DC discharge with a liquid cathode. Discharges with a liquid electrolyte cathode, which uses an aqueous electrolyte solution, find practical application in methods of water purification from organic impurities, surface modification of polymer materials, sterilization of aqueous solutions, spectral analysis of solutions for metal content, synthesis of nanomaterials and many other applications.

In this work, for the first time, the dependence of the coefficients of water transfer from an aqueous electrolyte solution under the action of a discharge with a liquid cathode on the temperature of the solution was studied. The study was carried out in the temperature range of the solution of 25–85 degrees Celsius. It is shown that the temperature of the solution has an extremely strong influence on the value of the water transfer coefficients. The study was carried out on two reactors of different types, differing both in the method of collecting the substance transferred by discharge into the gas phase and in the conditions of circulation of the solution and plasma-forming gas. For both types of reactors, approximating dependences of the water transfer coefficients on the solution temperature are found for these discharge conditions. It is shown that the dependences of the water transfer coefficients on the temperature of solutions are exponential and close for both types of reactors.

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