

Investigation of distribution of the emission intensities of components of plasma in a discharge with a liquid cathode

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The spatial distribution of the luminescence intensity of the discharge plasma components with a liquid electrolyte cathode in air at atmospheric pressure has been studied. A solution of sodium nitrate with a concentration of 0.01 mol/l was used as the electrolyte solution. The dependences of the luminescence intensity of the discharge plasma components with a liquid electrolyte cathode on the distance to the solution surface for OH radicals, molecular nitrogen, atomic hydrogen H I, atomic oxygen O I and atomic sodium Na I are found. It is shown that all these distributions, except for the Na I distribution, have local maxima coinciding with the surface of the liquid cathode and metal anode and local minima at a distance of 100 microns from the surface of the solution. The absolute maximum values of the intensity distribution of molecular nitrogen and atomic oxygen are reached at the metal anode, atomic hydrogen at the liquid cathode, and OH radicals in the central part of the discharge channel. The distribution of Na I has a single maximum at a distance of 70 microns from the surface of the solution and, as shown by the data of high-speed photography of the discharge, is an averaging over a large number of individual “flashes” of Na I luminescence localized in different discharge zones.

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