

Determination of the gas temperature in a discharge with a liquid water cathode by the background-oriented Schlieren method

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The background-oriented schlieren method is mainly used to determine relatively low temperatures, less than 1000 K. It is of interest to test the practical applicability of the method at higher temperatures using the example of a discharge with liquid non-metallic electrodes (DLNME). The discharge burns in an open atmosphere of air with a liquid (tap water) cathode and a metal anode. Previously, an experiment was carried out in DLNME at a fixed current of 60 mA, where the temperature reached 1500 K. It is assumed that with an increase in the discharge current the gas temperature will increase. In this work, the gas temperature of the DLNME was measured at a fixed current of 100 mA. Indeed, the gas temperature turned out to be higher and reaches a value of more than 2000 K. In practice, it is shown that the Background-oriented Schlieren method can be used to measure higher temperatures.

Keywords: low-temperature plasma, atmospheric pressure discharge, optical properties of plasma, BOS method.

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