NUMERICAL AND EXPERIMENTAL INVESTIGATION OF FORMATION OF WEAKLY CONDUCTIVE LIQUID DIELECTRIC FLOWS CAUSED BY A HIGH NONUNIFORM ELECTRICAL FIELD

Apfelbaum M.S., Gadzhiev M.Kh., Doludenko A.N.*

JIHT RAS, Moscow, Russia

**adoludenko@gmail.com*

A quasi–exponential formula for the current–voltage characteristics of low conductive dielectric fluids in the presence of high–voltage electric field was obtained analytically by solving the system of equations [1]. These equations are for the pre–breakdown charge formation in quasi–neutral media such as transformer oil. The high–voltage electric field is created by the "wire on plane" system of electrodes.

The formation of jets of a weakly conducting liquid formed under the action of an applied electric field of electrodes is studied. The McCormack method, the local mesh refinement and the account of influence of the space charge in fluid on the initial electric field were used for the numerical analysis of fluid flow characteristics. In addition, the results of experimental studies of fluid motion in this statement of the problem are presented. The characteristic velocities of fluid flow in the interelectrode region are given. Images of vortex structures and fluid flows are obtained. The results are presented for several values of the applied DC voltage.

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