

Characteristics of argon barrier micro-discharge in various operation modes excited by a saw-tooth voltage at atmospheric pressure

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Abstract

© 2018 Institute of Physics Publishing. All rights reserved. In this work modeling of atmospheric pressure barrier discharge in argon for saw-tooth voltage signal applied to the electrodes was conducted. The model included balance equations for the densities of charged (electrons, ions) and the excited particles, the electron energy density, and the Poisson equation for the electric potential. The fluxes of charged and excited particles (electrons, ions) and electron energy were given in the drift-diffusion form. Distributions of spatiotemporal parameters of the discharge for different forms of saw-tooth voltage signal were obtained. Numerical experiments have shown that, depending on the growth rate of the external voltage, the one-dimensional model gives three forms of discharge, two of which are slightly different types of Townsend discharge, and one form is a glow discharge.

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