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Optimizing Pulse Waveforms in Plasma Jets for Reactive Oxygen Species (ROS) Production[1] SETH NORBERG, NATALIA YU. BABAEVA, MARK J. KUSHNER, University of Michigan — Reactive oxygen species (ROS) are desired in numerous applications from the destruction of harmful proteins and bacteria for sterilization in the medical field to taking advantage of the metastable characteristics of $O_2(^1\Delta)$ to transfer energy to other species. Advances in atmospheric pressure plasma jets in recent years show the possibility of using this application as a source of reactive oxygen species. In this paper, we report on results from a computational investigation of atmospheric pressure plasma jets in a dielectric barrier discharge (DBD) configuration. The computer model used in this study, *nonPDP-SIM*, solves transport equations for charged and neutral species, Poisson's equation for the electric potential, the electron energy conservation equation for the electron temperature, and Navier-Stokes equations for the neutral gas flow. A Monte Carlo simulation is used to track sheath accelerated secondary electrons emitted from surfaces and the energy of ions incident onto surfaces. Rate coefficients and transport coefficients for the bulk plasma are obtained from local solutions of Boltzmann's equation for the electron energy distribution. Radiation transport is addressed using a Green's function approach. Various waveforms for the voltage source were examined in analogy to spiker-sustainer systems used at lower gas pressures.

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