Abstract Submitted
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Mechanisms of iodine atoms production by pulse discharge[1] ANATOLY NAPARTOVICH, IGOR KOCHETOV, SRC RF TRINITI, NIKOLAY VAGIN, NIKOLAY YURYSHEV, P. N. Lebedev Physics Institute — Pulsed electric discharge is most effective to turn COIL operation into pulse mode by instant production of iodine atoms. Numerical model is developed for simulations of an electric discharge in a mixture of gas flow outgoing from the singlet oxygen generator (SOG) with CF_3I. Electron scattering cross sections from CF_3I molecules are analyzed to reproduce recently published swarm data for CF_3I and N_2 mixtures. The model comprises a system of kinetic equations for neutral and charged species, electric circuit equation, gas thermal balance equation, and the photon balance equation. Reaction rate coefficients for processes involving electrons are found by solving the electron Boltzmann equation, which is re-calculated in a course of computations when plasma parameters changed. The processes accounted for in the Boltzmann equation include excitation, dissociation and ionization of atoms and molecules, electron-ion recombination, electron-electron collisions, second-kind collisions, and stepwise excitation of molecules. The last processes are particularly important because of a high singlet oxygen concentration in gas flow from the SOG. Results of numerical simulations for conditions of the experiments are compared with results of measurements.

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