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Pulse discharge production of iodine atoms for COIL ANATOLY NAPARTOVICH, IGOR KOCHETOV, Troitsk Institute for Innovation and Fusion Research, NIKOLAY VAGIN, NIKOLAY YURYSHEV, Lebedev Physics Institute RAS, TRINITI TEAM, LEBEDEV PHYSICS INSTITUTE COLLABORATION — The pulse mode of operation of the chemical oxygen iodine laser (COIL) is attractive for a large body of new applications. 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 the pulsed COIL initiated by electric discharge. 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 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 singlet oxygen chemical generator. Results of numerical simulations for conditions of the experiments are compared with results of measurements. Data will be presented for various conditions: gas pressure and composition, electrode geometry, electric circuit parameters.

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