Abstract Submitted
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Ozone kinetics in low-pressure discharges[1] VASCO GUERRA, Instituto de Plasmas e Fusao Nuclear, Instituto Superior Tecnico, Universidade Tecnica de Lisboa, Portugal, DANIIL MARINOV, OLIVIER GUAITELLA, ANTOINE ROUSSEAU, LPP, Ecole Polytechnique, UPMC, Universite Paris Sud-11, CNRS, Palaiseau, France — Ozone kinetics is quite well established at atmospheric pressure, due to the importance of ozone in atmospheric chemistry and to the development of industrial ozone reactors. However, as the pressure is decreased and the dominant three-body reactions lose importance, the main mechanisms involved in the creation and destruction of ozone are still surrounded by important uncertainties. In this work we develop a self-consistent model for a pulsed discharge and its afterglow operating in a Pyrex reactor with inner radius 1 cm, at pressures in the range 1-5 Torr and discharge currents of 40-120 mA. The model couples the electron Boltzmann equation with a system of equations for the time evolution of the heavy particles. The calculations are compared with time-dependent measurements of ozone and atomic oxygen. Parametric studies are performed in order to clarify the role of vibrationally excited ozone in the overall kinetics and to establish the conditions where ozone production on the surface may become important. It is shown that vibrationally excited ozone does play a significant role, by increasing the time constants of ozone formation. Moreover, an upper limit for the ozone formation at the wall in these conditions is set at 10(-4).

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