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Experimental and theoretical investigations of singlet oxygen production by high-pressure microdischarges J. SANTOS SOUSA, LPGP, CNRS-UPS, 91405 Orsay, France and IPFN, IST, 1049-001 Lisboa, Portugal, B. EISMANN, S. PANCHESHNYI, L.C. PITCHFORD, LAPLACE, CNRS-INPT-UPS, 31062 Toulouse, France, V. PUECH, LPGP, CNRS-UPS, 91405 Orsay, France, LPGP TEAM, LAPLACE TEAM — The so-called Micro-Cathode Sustained Discharge (MCSD), which is a three-electrode configuration using a Micro-Hollow Cathode Discharge (MHCD) as a plasma cathode, can be operated as a non-self-sustained discharge with low values of the reduced electric field and of the gas temperature. As a result, these MCSDs can efficiently generate large amounts of singlet delta oxygen, O2(1D). The remarkable stability of the MCSD has allowed us to operate glow discharges, free from the glow-to-arc transition, in rare-gas/oxygen mixtures at pressures up to atmospheric (P=100–1000mbar). High concentrations of O2(1D), from 10^{15} up to 10^{16}cm^{-3}, were measured in the MCSD afterglow for rare gas flow in the range 100-30000sccm, varying oxygen partial pressure (p(O2)=1–20mbar) and different discharge currents (I=1–12mA). The 0D plasma kinetics code ZDPlasKin [1] was used to calculate the generation of O2(1D) in the MCSD for different discharge and flow conditions and to estimate its density as a function of distance in the afterglow. Similar trends are observed in model and experiment, and detailed comparisons will be shown. [1] S.Pancheshnyi et al., these proceedings

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