Abstract Submitted
for the GEC09 Meeting of
The American Physical Society

Atmospheric pressure generation of singlet oxygen by arrays of microplasmas for DNA oxidation JOAO SANTOS SOUSA, LPGP, CNRS-UPS, 91405 Orsay, France and IPFN, IST, 1049-001 Lisboa, Portugal, GERARD BAUVILLE, BERNARD LACOUR, VINCENT PUECH, LPGP, CNRS-UPS, 91405 Orsay, France, MICHEL TOUZEAU, LTM, CNRS-UJF-INPG, 38054 Grenoble, France, JEAN-LUC RAVANAT, CEA, Inac, SCIB/LAN CEA-UJF, 38054 Grenoble, France — Recently, we demonstrated [1] that Micro-Cathode Sustained Discharges (MCSD) can be very effective for producing large amounts of $O_2(a^1\Delta)$ at atmospheric pressure. In the present work, we show that $O_2(a^1\Delta)$ densities higher than $3\ 10^{16}$ cm^{-3} can be produced by arrays of MCSD operating at atmospheric pressure in $He/O_2/NO$ mixtures, resulting in $O_2(a^1\Delta)$ fluxes above 30 mmol/h. The effect of different parameters such as gas flows and mixtures, discharge current and array geometry are discussed. Arrays of MCSD, allowing the production at atmospheric pressure of $O_2(a^1\Delta)$ and O_3 densities between 10^{13} and 10^{16} cm^{-3}, with an easily tunable ratio, appear to be very useful tools to study in details the reactivity of these reactive oxygen species with DNA constituents. Experiments were conducted showing that Adenine, Thymine and Cytosine constituents are effectively oxidized by O_3, while $O_2(a^1\Delta)$ only reacts with 2'-deoxyguanosine (dGuo). A more detailed study on the reactivity of $O_2(a^1\Delta)$ and O_3 with aqueous DNA solutions is in progress. [1] J.S. Sousa et al., Appl. Phys. Lett. **93**, 011502 (2008)

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Date submitted: 10 Jun 2009 Electronic form version 1.4