Abstract Submitted
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**Tailoring OH and O production in an atmospheric-pressure plasma in Helium with $O_2$ and $H_2O$ admixtures**[1] ERIK WAGENAARS, ALEXANDRA BRISSET, SANDRA SCHROETER, KARI NIEMI, DEBORAH O'CONNELL, University of York, U.K., JEAN-PAUL BOOTH, Ecole Polytechnique, France, ANDREW R. GIBSON, Ruhr University Bochum, Germany — Reactive oxygen species (ROS), including OH and O, are key in many applications of atmospheric-pressure plasmas. Controlled delivery of known amounts of ROS is important for the efficiency and safety of plasma-based treatments. Adding molecular admixtures such as $O_2$ and $H_2O$ to the plasma feed gas, rather than relying on ambient diffusion, enhances control of ROS production. Here, we investigated the kinetics of OH and O in an RF atmospheric-pressure plasma in Helium with $H_2O$+$O_2$ admixtures. The density of OH was measured by UV absorption spectroscopy. A 0D plasma-chemical kinetics model was used to compare the experimental results and understand the reaction pathways. Increasing densities of OH in the order of $10^{14}$ cm$^{-3}$ were measured for increasing $H_2O$ content. The addition of $O_2$ did not significantly increase the OH density, despite the fact that the OH production, mainly through O and O*, increases by a factor of ten, because the destruction pathways also depend on O and O*, and increase accordingly by roughly the same factor. This means that admixtures of $H_2O$+$O_2$ allow independent control of OH, through $H_2O$ content, and O, through $O_2$ content, allowing more detailed control of ROS delivery in applications.

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