Abstract Submitted
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(Student Award Finalist) Reactive species in humidity containing atmospheric pressure plasma jets – Numerical and experimental investigations[1] SANDRA SCHROETER, J. BREDIN, A. WIJAIKHUM, A. WEST, J. DEDRICK, K. NIEMI, York Plasma Institute, University of York, A. R. GIBSON, M. FOUCHER, J.-P. BOOTH, LPP Ecole Polytechnique-CNRS, N. DE OLIVEIRA, D. JOYEUX, L. NAHON, Synchrotron SOLEIL, Y. GORBANEV, V. CHECHIK, Dep. of Chemistry, University of York, E. WAGENAARS, T. GANS, D. O'CONNELL, York Plasma Institute, University of York — The formation and absolute densities of oxygen and hydrogen containing reactive species such as atomic oxygen (O), hydrogen (H), hydroxyl radicals (OH) and hydrogen peroxide (H_2O_2) in an atmospheric pressure plasma jet (APPJ) are investigated as a function of the humidity content in the helium feed gas. APPJs are effective sources for these species, which are known to be biologically active and form a central role in their potential for biomedical applications. To develop and tailor APPJs for therapeutics, quantification of the reactive species produced is necessary. In this work, different diagnostic techniques, such as UV and VUV absorption spectroscopy and picosecond two-photon absorption laser-induced fluorescence (ps-TALIF) and a 0-dimensional chemical kinetics model are applied. We find that the densities of hydrogen containing species increase non-linearly with increasing feed gas humidity. The trend of atomic oxygen depends strongly on impurities present in the APPJ. The model results show that the dominant formation and destruction mechanisms of the species of interest are strongly influenced by the humidity content with different processes dominating at high and low humidity.

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