Abstract Submitted
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Reaction kinetics of a kHz-driven atmospheric pressure plasma with humid air impurities[1] T. MURAKAMI, Tokyo Institute of Technology, Q. TH. ALGWARI, University of Mosul, K. NIEMI, T. GANS, D. O'CONNELL, University of York, W.G. GRAHAM, Queen's University Belfast — Atmospheric-pressure plasma jets (APPJs) have been gaining attention because of their great potential in bio-plasma applications. It is important to know the complex chemical kinetics of the reactive multi-species plasma. This is a study starting to address this by using a 0D time-dependent global simulation (comprising 1050 elementary reactions among 59 specie [1]) of kHz-driven (20 kHz) APPJ with a helium-based oxygen-mixture (0.5%) with ambient humid air impurity. The present model is initiated from time dependent measurements and estimates of the basic plasma properties [2]. The dominant neutral reactive species are reactive oxygen species and atomic hydrogen. The positive and negative oxygen ions and electrons are the most pronounced charged species. While most of the neutral reactive species are only weakly modulated at the driving frequency, the atomic oxygen metastables and atomic nitrogen metastables are strongly modulated. So are also the electrons and most of the positive and negative ions, but some are not, as will be discussed.

[1] T. Murakami et al Plasma Sources Sci. Technol.22 (2013) 015003.
[2] Q. Th. Algwari and D. O'Connell, Appl. Phys. Lett. 99 (2011) 121501.

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