Topic number: 5

Spatial investigations of reactive oxygen species inside the micro-scaled atmospheric pressure plasma jet

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The micro-scaled atmospheric pressure plasma jet (μ-APPJ) is a low temperature capacitively coupled non-equilibrium discharge operated under a helium gas flow at atmopsheric pressure[1]. The discharge channel of 40x1x1mm^3 is extended to the transition and the post discharge effluent region and provides good optical access. When admixing a small percentage of molecular oxygen, reactive oxygen species (ROS) such as atomic oxygen, ozone or metastables are generated inside the plasma which are of major interest in surface modification and germ reducing applications[2]. The production and destruction mechanisms of these radical species at atmospheric pressure and their interaction are not fully understood, yet. To validate recent simulation models [3] we measured the spatial atomic oxygen density distribution via two-photon laser induced fluorescence spectroscopy and the ozone density via uv-absorption spectroscopy. Density profiles such as can be seen in figure 1 showing the atomic oxygen density distribution under a variation of operation parameters such as applied power, gas mixture and gas velocity will be discussed.

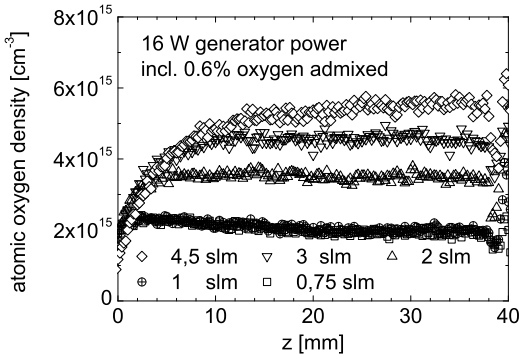

Fig. 1: Spatial increase of the atomic oxygen density inside the micro-scaled atmospheric pressure plasma jet under variation of the gas velocity.

Reference

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[3] Waskoenig J, Niemi K, Knake N, Graham L M, Reuter S, Schulz-von der Gathen V and Gans T, *2010* Pure and Apllied Chemistry **accepted**