Abstract Submitted
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Absolute atomic oxygen density measurements in core and effluent of a micro scaled atmospheric pressure plasma jet[1] VOLKER SCHULZ-VON DER GATHEN, NIKOLAS KNAKE, STEPHAN REUTER, Ruhr-Universitaet Bochum, KARI NIEMI, Queen's University Belfast — The micro atmospheric pressure plasma jet (μAPPJ) is a capacitively coupled rf discharge (13.56 MHz, $\sim$15 W transceiver power) developed, in particular, for optical diagnostics. The discharge is operated at a helium flow of about 1.4 slm with an admixture of oxygen ($\sim$0.5 vol.-%). In the effluent spatially resolved density distributions of the ground state oxygen atoms have been measured by two-photon absorption laser-induced fluorescence spectroscopy. After calibration by comparative measurements on xenon maximum densities of 2 x 10^{14}cm^{-3} have been measured. Variation of the admixture of molecular oxygen between 0 and 2 vol.-% reveals a maximum of the reactive oxygen species yield inside the effluent at 0.6 vol.-%. Varying the power a saturation of the oxygen density is observed beyond about 15 W. First spatially resolved investigations within the discharge core yielded dissociation degrees of more than 20%. While the admixture variation also results in an optimum atom production similar to the effluent, a power variation revealed significant deviations within the core region of the discharge.

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Volker Schulz-von der Gathen
Ruhr-Universitaet Bochum

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