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Mechanisms of Atomic Oxygen Generation and Destruction in the Effluent of an RF-Excited Atmospheric Pressure Plasma Jet (APPJ)
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The aim of this study is to gain a better insight into the mechanisms of atomic oxygen generation and destruction in the effluent of an atmospheric pressure plasma jet (APPJ). The APPJ is a 13.56 MHz RF-excited atmospheric pressure plasma source operated with 2 m^3/h helium feed gas plus ∼1vol% molecular oxygen admixture. The effluent contains very few charged particles and a high oxygen radical density in the order of 10^{16} cm^{-3}. The space resolved ground state atomic oxygen density is measured with two-photon absorption laser induced fluorescence (TALIF) spectroscopy. Optical emission spectroscopy (OES) measurements reveal the existence of excited atomic oxygen even at 10 cm distance to the jet's nozzle. UV-OES measurements and chemical model calculations are performed to understand energy transport mechanisms into the effluent.

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