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On the Role of Metastable Argon in Cold Atmospheric Pressure Plasma Jets with Shielding Gas Device[1] ANSGAR SCHMIDT-BLEKER, JORN WINTER, ZIK plasmatis at the INP Greifswald e.V., JOAO SANTOS SOUSA, VINCENT PUECH, Laboratoire de Physique des Gaz et des Plasmas (LPGP), CNRS & Université Paris-Sud, KLAUS-DIETER WELTMANN, STEPHAN REUTER, ZIK plasmatis at the INP Greifswald e.V., ZIK PLASMATIS AT THE INP GREIFSWALD E.V. TEAM, LABORATOIRE DE PHYSIQUE DES GAZ ET DES PLASMAS (LPGP), CNRS & UNIVERSITÉ PARIS-SUD TEAM — Shielding gas devices are a valuable tool for controlling the reactive species output of Cold Atmospheric Pressure Plasma (CAPP) Jets for biomedical applications. In this work we investigate the effect of different shielding gas compositions using a CAPP jet (kinpen) operated with argon. As shielding gas various mixtures of N_2 and O_2 are used. Metastable argon (Ar*) has been quantified using laser absorption spectroscopy and was identified as an important energy carrier in the CAPP jets effluent. The Ar* excitation dynamics was studied using phase resolve optical emission spectroscopy. Based on these findings a kinetic model for the gas phase chemistry has been developed that uses the Ar* density and dynamics as input and yields densities of O_3, NO_2, HNO_2, HNO_3, N_2O_5, H_2O_2 and N_2O produced by the CAPP jet for different shielding gas compositions. The results are in good agreement with Fourier-Transform Infrared Spectroscopy measurements on these species.

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