Abstract Submitted
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Kinetic of propane in homogeneous high pressure low temperature plasmas of atmospheric gases S. PASQUIERS, N. MOREAU, N. BLIN-SIMIAND, L. MAGNE, P. JEANNEY, F. JORAND, LPGP-CNRS-UPS, Orsay, France, DIREBIO TEAM — The kinetic of propane in non-thermal plasmas of N_2/O_2 mixtures is currently under study owing to applications such as cleaning of polluted air streams or plasma assisted ignition and combustion. We have recently suggested that, for C_3H_8 diluted in N_2, quenching collisions of the nitrogen metastable states on the hydrocarbon leads to produce H_2 and propene (N. Moreau et al., to appear in J. Phys. D : Appl. Phys.). The present work deals with the effect of oxygen addition on propane consumption in a photo-triggered discharge (homogeneous plasma) working at 460 mbars. By-products are identified and their concentrations are quantified (chromatography) as functions of the O_2 concentration (up to 20%), at 0.5% propane concentration. H_2 concentration decreases when the oxygen concentration increases, but do not drop to zero in the air-like mixture. This effect is explained using a self-consistent 0D discharge and kinetic model. The removal of C_3H_8 and the production of H_2 follow from a balance between quenching processes and oxidation kinetic of the hydrocarbon. The model predictions are also compared to the measure of the absolute OH-radical density as function of time in the discharge afterglow (UV-absorption).

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