

Abstract Submitted
for the GEC10 Meeting of
The American Physical Society

Nitrous oxide production-loss balance in non-thermal high pressure N_2/O_2 plasmas and correlation with acetaldehyde removal W. FAIDER, S. PASQUIERS, P. JEANNEY, L. MAGNE, N. BLIN-SIMIAND, F. JORAND, LPGP-CNRS-UPS, DIREBIO TEAM — Various nitrogen oxides and ozone molecules are produced in high pressure non-equilibrium plasmas in N_2/O_2 mixtures. Amongst these compounds, the production-loss balance of N_2O involves excited states of atomic and molecular oxygen and nitrogen, in particular metastables which play important role in the conversion of hydrocarbons and VOCs. The measure of the N_2O density should help in the understanding of the excited states kinetics if measurements can be compared to predictions of a self-consistent modelling of the discharge and plasma reactivity. This is the case for the photo-triggered discharge which allows to create a transient homogeneous plasma. The present work deals with the N_2O kinetic processes studied with the help of model predictions compared to the measure of the molecule density by laser absorption spectroscopy in the infrared (QCL). Main parameters are the O_2 percentage in the mixture (at 460 mbars) and the specific deposited energy. Results are discussed with respect to the existing literature on the N_2O kinetic. The effect of addition of a small amount of acetaldehyde (less than 0.5 %) to the N_2/O_2 mixture is examined in order to get information about the role of N_2 and O metastable states in the removal of the pollutant molecule.

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Date submitted: 28 May 2010

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