Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Gas-phase Reactive Oxygen and Nitrogen Species in Air Surface Dielectric Barrier Discharges by FTIR and UV spectroscopy HUNG-WEN CHANG, Department of Chemical Engineering, National Taiwan University, YUKINORI SAKIYAMA, Department of Chemical and Biomolecular Engineering, University of California, Berkeley, CHENG-CHE HSU, Department of Chemical Engineering, National Taiwan University, DAVID B. GRAVES, Department of Chemical and Biomolecular Engineering, University of California, Berkeley — Atmospheric pressure plasmas are considered promising for biomedical treatment purpose due to the production of reactive oxygen species and reactive nitrogen species during the discharge. In this study, a surface micro-discharge system which operates at 10 kHz, 0.01 – 1 W/cm^2 in ambient air is used. FTIR and UV-absorbance are used to investigate the time-average gas phase composition and time-resolved ozone concentration, respectively. The results showed that the gas composition is greatly influenced by the power consumption in plasmas. At 0.3 W/cm^2, the gas phase is dominant by NOx species and nearly no ozone is observed while at 0.05 W/cm^2 the amount of NOx is less and the ozone is dominant. Also, time-resolved ozone measurement by means of UV (254 nm) absorbance shows that ozone concentration reaches higher than 1000 ppm in the first tens of seconds and quenched within 1 minutes at high power condition. However, at low power condition no obvious quench of ozone is observed and the ozone concentration attains a steady state in response to the equilibrium of ozone generation and diffusion loss

Hung-wen Chang
Department of Chemical Engineering, National Taiwan University

Date submitted: 29 May 2012 Electronic form version 1.4