Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

**Student Excellence Award Finalist: Absolute flux of OH radicals from an atmospheric pressure plasma jet to a substrate measured by laser induced fluorescence.**[1] SANTOSH KONDETI, University of Minnesota, Minneapolis, MN, PINGSHAN LUAN, University of Maryland, College Park, MD, JINGKAI JIANG, University of Minnesota, Minneapolis, MN, GOTTLIEB OEHRLEIN, University of Maryland, College Park, MD, PETER BRUGGEMAN, University of Minnesota, Minneapolis, MN, GOTTLIEB OEHRLEIN GROUP COLLABORATION, PETER BRUGGEMAN GROUP COLLABORATION — Cold atmospheric pressure plasma jets (APPJs) have great promise for localized heat sensitive surface treatments due to the abundant production of reactive species such as OH. The density of OH radicals produced by an RF driven Ar + 1% $H_2O$ APPJ was measured by laser induced fluorescence (LIF) in $O_2$, air and $N_2$ environments. The spatial variation in the density of quenching molecules of the laser excited state in the plasma effluent was determined by a computational fluid dynamics model. A four level LIF model was used to obtain the 2-D absolute density of OH radicals. The OH radical flux was correlated with the etching depth of polystyrene suggesting an OH etching probability of 0.022. The density of OH radicals was highest off axis in the mixing zone of the effluent and the surrounding molecular gas, likely due to the influx of $O_2$. The position of the substrate when at distances from the nozzle larger than the visible plasma jet plume, does not influence significantly the OH density profile except for the near substrate boundary layer. Hence, non-touching free-jet conditions can be used to estimate OH radical fluxes to a substrate for the investigated experimental conditions.

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Date submitted: 10 Jul 2018 Electronic form version 1.4