Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Cavity-enhanced absorption spectroscopy to characterize atmospheric pressure plasma jets JEAN-PIERRE VAN HELDEN, ANDY NAVE, STEPHAN REUTER, JUERGEN ROEPCKE, INP Greifswald, Germany, MICHELE GIANELLA, GRANT RITCHIE, Department of Chemistry, Physical and Theoretical Chemistry Laboratory, University of Oxford, United Kingdom —
Non-equilibrium atmospheric pressure plasma jets gain more and more interest as their technological applications increase in diverse fields such as material processing and plasma medicine. Hence, it is essential to diagnose the fluxes of the species generated by these plasma sources to identify relevant fundamental processes and to improve process efficiency. Especially for a comprehensive understanding of the kinetics of the transient species involved, high precision measurements of reactive molecular precursors, free radicals and to identify of any short lived species are of crucial importance. However, the detection of transient species in these type of plasmas poses a challenge for diagnostic techniques as the plasmas typically have small dimensions and high density gradients in space and time. We have overcome these limitations by using cavity-enhanced absorption spectroscopy (CEAS). In this contribution, the latest results concerning the detection of transient species in two types of plasma jets employing CEAS in the near- and mid-infrared spectral range will be presented. We will show that with these methods spatially resolved investigations of concentrations in the mm sized effluent of the plasma jet can be achieved.

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Date submitted: 07 Jun 2016 Electronic form version 1.4