Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

The impact of solution chemistry on the absorption spectra of plasma-generated solvated electrons in aqueous solutions[1] HERNAN E. DELGADO, PAUL RUMBACH, DAVID M. BARTELS, DAVID B. GO, University of Notre Dame — In this work, we use a low-temperature atmospheric plasma as a cathode in an electrochemical cell to generate solvated electrons, and a total internal reflection absorption spectroscopy (TIRAS) technique to measure their optical absorbance at different wavelengths. Solvated electrons are a species of great interest because of their ability to drive a variety of chemical reactions at the plasma-liquid interface. Historically, their absorption spectrum and thermodynamic properties in aqueous solutions have been studied extensively with pulse radiolysis. However, while radiation generates solvated electrons in the bulk from the solvent molecules, solvated electrons from plasma-liquid interactions form near the interface, which can lead to different behavior. For example, we have observed significant differences in the plasma-generated $(e^-)_{aq}$ optical absorption spectrum, including a shift of the spectrum toward the blue and a suppression of the Lorentzian tail on the high-energy side. We will present further study of these spectra in different solutions with varying salt (sodium perchlorate) concentrations in order to understand the interfacial behavior of plasma-solvated electrons.

[1]This work was supported by the US Army Research Office under Award Number W911NF-17-1-0119

Hernan E. Delgado
University of Notre Dame

Date submitted: 01 Jun 2017 Electronic form version 1.4