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Investigation of the rates of surface and bulk ROS-generating reactions using indigo dye as an indicator CARLY ANDERSON, DOUGLAS CLARK, DAVID GRAVES, University of California, Berkeley — We present evidence for the existence of two distinct processes that contribute to the generation of reactive oxygen and nitrogen species (RONS) in liquids exposed to cold atmospheric plasma (CAP) in air. At the plasma-liquid interface, there exists a fast surface reaction zone where RONS from the gas phase interact with species in the liquid. RONS can also be produced by "slow" chemical reactions in the bulk liquid, even long after plasma exposure. To separate the effects of these processes, we used indigo dye as an indicator of ROS production; specifically generation of hydroxyl radical. The rate of indigo decolorization while in direct contact with CAP is compared with the expected rate of hydroxyl radical generation at the liquid surface. When added to aqueous solutions after CAP exposure, indigo dye reacts on a time scale consistent with the production of peroxynitrous acid, ONOOH, which is known to decompose to hydroxyl radical below a pH of 6.8. In this study, the CAP used was a air corona discharge plasma run in a positive streamer mode.

Carly Anderson
University of California, Berkeley

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