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Active interrogation of plasma-liquid boundary using 2D plasma-in-liquid apparatus[1] JANIS LAI, JOHN FOSTER, University of Michigan — Plasma medicine and plasma-based water purification technologies rely on the production and transport of plasma-derived (direct or indirect) reactive species into the bulk medium. This interaction takes place at the interface between the gas phase plasma and the liquid medium. The nature of radical production and subsequent radical transport from this region or boundary layer is not well understood due to the difficulty of implementing diagnostics to interrogate this region. We present a 2-D plasma-in-liquid water apparatus that makes the interface region assessable to optical diagnostics. Using colorimetric chemical probes, acidification and oxidation fronts are tracked using high-speed imaging and spectroscopy. Additionally, observed, plasma-induced fluid dynamical effects are also discussed. Forces at the interface can play a key role in the transport of radicals into the bulk solution. The role of plasma-driven interfacial forces as well as that of the applied, local electric field on chemical front propagation velocity and induced circulation are also discussed.

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Janis Lai
University of Michigan

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