Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Reactions of Solvated Electrons Initiated by Sodium Atom Ionization at the Vacuum-Liquid Interface[1] JUSTIN WIENS, University of Wisconsin-Madison, WILLIAM ALEXANDER, Montana State University-Bozeman, GILBERT NATHANSON, University of Wisconsin-Madison, TIMOTHY MINTON, Montana State University-Bozeman — Solvated electrons are powerful reagents in the liquid phase that break chemical bonds and create new reactive species, including hydrogen atoms. Electrons and hydrogen atoms born near the surface, however, behave differently than those created within the liquid. We explore this behavior by exposing liquid glycerol to a beam of sodium atoms. The Na atoms ionize in the surface region, generating electrons that react with deuterated glycerol, $C_3D_5(OD)_3$, to produce D atoms, D_2, D_2O, and glycerol fragments. Surprisingly, 40% of the D atoms desorb into vacuum before attacking C-D bonds to produce D_2. These D atoms must traverse the interfacial region before desorbing, demonstrating that Na ionization prepares reactive species that reside momentarily at the surface and often escape before reacting with the solvent.

[1]This work was supported by National Science Foundation as part of the Center for Energetic Non-Equilibrium Chemistry at Interfaces

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Date submitted: 11 Nov 2011 Electronic form version 1.4