Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Single-Molecule Tracking of Polymer Surface Diffusion[1] MICHAEL SKAUG, JOSHUA MABRY, DANIEL SCHWARTZ, University of Colorado Boulder
— The mobility of polymers adsorbed on a solid surface is important in thin film formation, adhesion phenomena and biosensing applications, but it is still poorly understood. We used single-molecule fluorescence experiments to follow the motion of isolated polyethylene glycol chains adsorbed at a hydrophobic solid-aqueous interface. We found that molecules moved on the surface via a continuous time random walk mechanism, where periods of immobilization were punctuated by flights through the bulk liquid. The dependence of surface mobility on molecular weight suggested that surface-adsorbed polymers maintained effectively three-dimensional surface conformations. These results indicate that polymer surface diffusion, rather than occurring in the two dimensions of the interface, is dominated by a three-dimensional mechanism that leads to large surface displacements and significant bulk-surface coupling.

[1]The authors acknowledge support from the U.S. Department of Energy Basic Energy Sciences, Chemical Sciences, Geosciences, and Biosciences Division (DE-SC0001854).

Michael Skaug
University of Colorado Boulder

Date submitted: 12 Nov 2013 Electronic form version 1.4