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Single-Molecule Studies of Polymer Translational Diffusion at Surfaces LIANG HONG, STEVE GRANICK, University of Illinois at Urbana-Champaign — Single-polymer diffusion at solid and organic solvent interfaces has been investigated with polydimethylsiloxane (PDMS) using both fluorescence correlation spectroscopy (FCS) and single-molecule imaging (SMI). In contrast to previous related work from this laboratory, here we cover a broad range of concentrations, from the melt state to polymers adsorbed from dilute solution. As the surface coverage increases above the dilute regime, the translational diffusion coefficient as well as the polymer conformations vary with a complex interdependence. Initially diffusion speeds up with increasing surface coverage; this is followed by an obvious jamming process at higher surface coverage. Studies in progress involve not only the dependence on polymer molecular weight and its concentration in the liquid phase, but especially on film thickness when the polymers are confined into molecularly-thin films inside a modified surface forces apparatus.

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