Effect of Interfaces on Self-diffusion and Glass Transition Temperature of Poly(isobutyl methacrylate) Thin Films REIKA KATSUMATA, AUSTIN DULANEY, CHRISTOPHER ELLISON, University of Texas at Austin - McKetta Department of Chemical Engineering — In thin films, physical properties such as the glass transition temperature (Tg), modulus, and viscosity, are different compared to that in thick films due to higher interfacial area to volume ratio. However, the effects of film thickness and associated interfaces on self-diffusion are not well understood, partly because only a few techniques are available for such studies. In this study, we employed fluorescence recovery after patterned photobleaching to evaluate the self-diffusion coefficient (D) of fluorescently labeled poly(isobutyl methacrylate) (PiBMA, Mn = 11 kg/mol, PDI = 1.2). Films 16 - 300 nm in thickness were spin coated onto two substrates then D and Tg were examined: one set of films possessing attractive polymer/substrate interactions on silica substrates, and the other set possessing repulsive polymer/substrate interactions using poly(cyclohexylethylene) substrates. D was measured in the melt state (Tg + 48 K) and the D of thick films were identical to the bulk value regardless of the substrate type. The D of a ~ 19 nm thick film on a repulsive substrate was four times larger than its bulk value while Tg was increased by about 10-15 K. In contrast, attractive substrates typically do not affect D or Tg of PiBMA.