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Effect of Nanoconfinement on the Glass Transition Temperature and Small Molecule Diffusion in Polymers of Varying Backbone Stiffness HUI DENG, MANISH MUNDRA, JOHN TORKELSON, Northwestern University — Fluorescence spectroscopy was used to determine the glass transition temperature in ultrathin supported bisphenol-A polysulfone (BPAPS) and bisphenol-A polycarbonate (BPAPC) films and compared to previous results for ultrathin supported polystyrene (PS) films. BPAPC and BPAPS are more rigid than PS due to the presence of aromatic rings in their polymer backbones. A dramatic increase in Tg-reduction upon confinement was seen for polymers with increased backbone stiffness. A fluorescence-multilayer film technique was then used to determine the diffusion coefficient of a small molecule probe in ultrathin supported PS films. A decrease in the diffusion coefficient of the probe was observed upon confinement of the PS films. This procedure is also being applied to ultrathin supported BPAPC and BPAPS films to explore the impact of polymer backbone rigidity on small molecule diffusion in nanoconfined polymers.

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