

Abstract Submitted  
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**Screening Effect of Supercritical Carbon Dioxide on Polymer/Substrate Interactions**<sup>1</sup> PETER GIN, NAISHENG JIANG, MAYA ENDOH, Materials Science and Engineering, Stony Brook University, BULENT AKGUN, SUSHIL SATIJA, NCNR, NIST, TAD KOGA, Materials Science and Engineering, Stony Brook University — The kinetics and thermodynamic properties of polymer melts near interfaces and in confined geometries can vary significantly from their bulk counterparts. This behavior can be attributed to the presence of an immobile layer at the polymer/substrate interface, which has been reported to hinder the mobility of polymer chains in thin films even at a large length scale. Here, we investigate the use of supercritical carbon dioxide (scCO<sub>2</sub>) as a medium to screen the polymer/substrate interactions and enhance chain mobility in polymer thin films. In-situ neutron reflectivity was utilized to measure the interdiffusion of deuterated polystyrene (d-PS) into various matrices of hydrogenated PS (h-PS) with thicknesses ranging from 0.5 Rg to 5 Rg. We found that at the unique T (36 ° C) and P (8.2 MPa) conditions, where the anomalous adsorption of CO<sub>2</sub> molecules in polymer thin films occurs, the diffusion constants remained unchanged regardless of bottom layer thickness, while no diffusion occurred below 1Rg at high temperature (170 ° C).

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