**330b Glass Transition Temperature of Polymer Thin Films on Graphite Substrate**

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Carbon nanotube (CNT) has been widely used in polymer composites due to its exceptional mechanical and physical properties. The macroscopic reinforcement of CNT essentially results from the change of physical and chemical properties of polymers near the interface. Polymer thin film/substrate configuration provides a well-defined system for studying the interfacial polymer dynamics. However, most research in this field is focused on the silicon-based substrate, which cannot resemble the CNT surface considering their different entropic and enthalpic effects. In light of this, a model system, polymer (PS) thin film on highly ordered pyrolytic graphite (HOPG), was used to mimic the PS/CNT interface. The polymer dynamics (i.e. glass transition temperature, Tg) in vicinity of the HOPG substrate were measured. The film thickness was changed from 0.1 Rg (radius of gyration of PS) to 10 Rg so that we could explore the effects of both the polymer-air and the polymer-substrate interactions on Tg. The influence of near-critical CO2 on Tg of those polymer thin films was examined as well. The competing impacts of the entropic confinement (by substrate) and the free-volume increase (by CO2) on Tg were evaluated. These results will provide valuable guides for the CO2-assisted processing of polymer nanocomposites (blending, foaming, injection, etc).