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The effect of surface chemistry on the glass transition of amorphous polycarbonate inside cylindrical nanopores DARIYA REID, Texas A&M University, Chemical Engineering Department, MARCELA ALVES FREIRE, Universidade Federal de Minas Gerais, Brasil, JODIE LUTKENHAUS, Texas A&M University, Chemical Engineering Department — Nanoporous anodic aluminum oxide (AAO) templates are used to study the effect of confinement on the glass transition of amorphous polycarbonate (PC). In order to further study the effect of surface chemistry on physical behavior, the bare AAO surface is modified using alkyl- and fluoro-silanes of varying length. PC nanowires (200 nm in diameter) are prepared by melt-wetting the polymer into AAO templates under applied pressure. Using modulated differential scanning calorimetry (MDSC) and thermogravimetric analysis (TGA), it is found that the hydrophilic surface of bare AAO contributes to the degradation of the polymer. Modifying the AAO surface using silane chemistry prevents polymer degradation and introduces additional features in MDSC thermograms, which could be due to the interaction of the polymer with the nanopore surface. Using scanning electron microscopy (SEM), changes are observed in the tips of the PC nanowires as the AAO surface transitions from hydrophilic to hydrophobic.

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