

Abstract Submitted
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Liquid Substrate Effects on the Glass Transition Temperature of Nanoscopically Confined Polystyrene Spheres DANE CHRISTIE, Princeton University, CHUAN ZHANG, Sphera Materials, RODNEY PRIESTLEY, Princeton University — The effect of the liquid-polymer interface on the glass transition temperature (T_g) of polystyrene (PS) was investigated using differential scanning calorimetry. Polystyrene nanoparticles of different radii were suspended in either water, glycerol or an ionic liquid. Particles suspended in water (or cast into a film in air) exhibited a T_g -confinement effect consistent with that of freestanding films of PS. Particles suspended in an ionic liquid exhibited an invariance in T_g with confinement while those suspended in glycerol exhibit a modest, depression in T_g with confinement. Upon re-suspension in water, particles formerly suspended in glycerol showed a partial recovery of their T_g in water. However, particles re-suspended in water from an ionic liquid showed no recovery of their T_g in water. These results are explained in the context of chain mobility and interfacial energy, and provide insight and a probable resolution to contradictory observations in the literature.

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