Abstract Submitted
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Temperature Dependence of Polymer Diffusion in Silica/PS Nanocomposites[1] WEI-SHAO TUNG, University of Pennsylvania, NIGEL CLARKE, University of Sheffield, RUSSELL COMPOSTO COMPOSTO, KAREN WINEY, University of Pennsylvania — Temperature dependence of homo-polymer diffusion can be explained by WLF equation. Here, we explore whether the WLF equation applies to polymer diffusion in nanocomposites. Previously, we found the diffusion coefficient shows a monotonic decrease while we increase the loading of silica nanoparticles, and it is interesting for us to investigate the mechanism of the decrease. By looking at the temperature dependence of polymer diffusion, we are able to get more information if this decrease is caused by the entropic barrier or enthalpy interaction between polymer chain and fillers. Our composites are made of phenyl-capped silica nanoparticles and polystyrene through rapid evaporation method. By using forward recoil elastic scattering (FRES), we are able to probe the depth profile of tracer polymer (dPS) and obtain the diffusion coefficients by fitting the profile with Fick's second law.

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