Abstract Submitted
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Relaxation behaviors of nanoparticles in polymer composites: influence of local frictions by polymer chains[1] BYEONGDU LEE, PAPPANNAN THIYAGARAJAN, SURESH NARAYANAN, ALEC SANDY, VILAS POL, CHIEH-TSUNG LO, DAVID BOHNSACK, Argonne National Laboratory — The dynamics of Au nanoparticles (AuNP) tethered with thiol-terminated polystyrene (PS) in the composites with poly(styrene-b-2-vinylpyridine) diblock copolymers (PS-PVP) have been studied by x-ray photon correlation spectroscopy and small-angle x-ray scattering. Relaxation behaviors of nanoparticles located selectively in PS domain due to enthalpic interaction, interestingly, are not correlated with those of matrix polymer chains, i.e., their relaxation times are not dependent on the molecular weights of PS-PVP. They relax faster in PS-PVP than in PS homopolymer having the same molecular weight as the PS brush of PS-PVP. On the other hand, the influence of morphological structures of PS-PVP, however, is significant: AuNP moves faster in the lamellae phase than those in the cylinder phase.

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Byeongdu Lee
Argonne National Laboratory

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