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Investigation of Gold Nanoparticle Diffusion in Polymer Thin Films using X-ray Standing Waves MARTIN TOLKIEHN, Argonne National Laboratory, WARD LOPE, University of Chicago, XUEFA LI, SURESH NARAYANAN, Argonne National Laboratory, ALETA HAGMAN, Northwestern University, HEINRICH JAEGER, University of Chicago, JIN WANG, Argonne National Laboratory — Nanoparticle marker motion can be used to infer the ordering kinetics and nanoparticle dynamics in polymer/metal nanocomposite thin films. In current experiments, by using x-ray standing waves generated by total external reflection from the substrates, we elucidated the diffusion properties of thermally evaporated gold nanoparticles at homopolymer and diblock copolymer thin films. Different to recent results with gold particle monolayer embedded in a sandwich structure of polymer thin films, with a sub-nm spatial resolution we demonstrate that the monolayer at the surface does not diffuse into the polymer thin films even at a temperature well above the polymer glass transition temperature.

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