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Dynamics of Silica Particles Grafted with Polymer Brush in Polystyrene Matrix TAIKI HOSHINO, MORIYA KIKUCHI, JST, ERATO, DAIKI MURAKAMI, JST,ERATO, KOJI MITAMURA, JST, ERATO, YOSHIKO HARADA, JST,ERATO, KIMINORI ITO, YOSHIHITO TANAKA, RIKEN SPring-8 Center, SONO SASAKI, Graduate School of Science and Technology, Kyoto Institute of Technology, MASAKI TAKATA, RIKEN SPring-8 Center, ATSUSHI TAKAHARA, JST, ERATO, Institute for Materials Chemistry and Engineering, Kyushu University — Nanoparticles (NPs) in soft materials near the glass transition temperature sometimes show fast diffusive behavior, called hyperdiffusion. In this study the dynamics of polystyrene (PS)- grafted silica NPs in PS matrix have been investigated by X-ray photon correlation spectroscopy (XPCS). XPCS system was setup at 27-m-long undulator beamline BL19LXU, SPring-8 (Japan). Detectors, a direct-illuminated CCD camera with a pixel size of $20 \times 20 \mu\text{m}^2$ and a two-dimensional hybrid pixel array detector PILATUS, whose pixels were covered with a mask with $\sim 50 \mu\text{m}$ diameter holes for enhancement of the spatial resolution, were located about 3.2 m downstream of the sample. By XPCS measurements, autocorrelation functions, expressed by $g(q, t) = \exp(-2(\Gamma t)^\beta) + 1$ were obtained. At much higher temperature than the glass transition of PS matrix, $g(q, t)$ with $\beta \leq 1$ were observed, but at decreased temperature, $\beta > 1$ were observed. These behaviors can originate from hyperdiffusion. The detail of the measurements and the results will be presented.

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