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Photoinduced Trans-Cis Isomerization of Azobenzene Probes Tagged to Polystyrene in Thin and Ultrathin Films YOHEI TATEISHI, KELJI TANAKA, TOSHIHIKO NAGAMURA, Kyushu University — For the last decade, molecular motion in confined polymer systems have been extensively studied. In the most studied case, polystyrene (PS), a conclusion obtained is that glass transition temperature in the PS thin and ultrathin films is lower than the corresponding bulk value. Although why the enhanced mobility must be manifested in the thin and ultrathin states is far from clear on molecular level for the moment, it is no wonder the presence of the free surface is one of responsible factors in the active molecular motion. In this study, photoinduced trans-cis isomerization of azobenzene chromophores in PS films was examined as a function of film thickness. The photoisomerization was composed of fast and slow modes. The fractional amount of the fast mode increased with decreasing thickness, implying that an effect of the surface becomes remarkable with decreasing thickness. Finally, local free volume and molecular motion with a relatively small scale in the surface region were discussed. Such enables us to gain access to information about hierarchical molecular motion in the surface region of polymer films.

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