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Conformational Analysis of Single Polymer Chain by Super-resolution Fluorescence Microscopy HIROYUKI AOKI, KAZUKI MORI, AKIHIKO SHIN, SHINZABURO ITO, Department of Polymer Chemistry, Kyoto University — The direct observation of individual polymer chains would provide valuable information to understand the fundamental properties of polymer materials. Fluorescence imaging is the most effective method to detect a single molecule embedded in a bulk medium; however, the imaging of the conformation of a single chain has been impossible because of the diffraction-limited spatial resolution (~ 200 nm). In the current study, we developed a super-resolution fluorescence microscopy technique, photo-activated localization microscopy (PALM), for the direct observation of the conformation of a single polymer chain. For the PALM observation, a trace amount of poly(butyl methacrylate) (PBMA) labeled by rhodamine spiroamide was dispersed in the unlabeled PBMA matrix. The conformation of the individual PBMA chain was observed in three dimensions with the lateral spatial resolution of 20 nm and the depth resolution of 50 nm. The nanometric imaging by the super-resolution technique was applied to the conformational analysis of single polymer chain under macroscopic deformation.

Hiroyuki Aoki
Department of Polymer Chemistry, Kyoto University

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