

# SUPER-RESOLUTION OPTICAL MICROSCOPY FOR STRUCTURE ANALYSIS OF POLYMER MATERIALS

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**A** polymer material shows unique physical properties such as viscoelasticity. The origin of the various characteristic properties of polymers is the large degree of freedom of individual molecule, which has a long chain-like shape with large molecular weight. Therefore, the direct information of the conformation and dynamics of a single polymer chain is a key to understand the fundamental aspect of polymer physics. The most powerful method to observe single polymer chains is the fluorescence imaging of the dye-labelled polymer chain dispersed in the unlabelled polymer matrix. However, the information from the fluorescence microscopy has been limited because the structure smaller than 200 nm cannot be observed by optical microscopy because of the diffraction limit of light. Recent development of optical microscopy enabled the fluorescence imaging with the high spatial resolution of ~10 nm beyond the diffraction barrier. We employed the super-resolution fluorescence microscopy to study the structure and dynamics of polymer materials at the single chain level. The current talk deals with the principle of the super-resolution microscopy for polymers and its application to investigate the conformational dynamics of single polymer chain in macroscopic deformation processes.

## Biography

Hiroyuki Aoki is a Senior Scientist in Materials and Life Science Division, J-PARC Center, Japan Atomic Energy Agency. He obtained his degrees of BE, ME, and PhD from Kyoto University in 1996, 1998, and 2001, respectively. He became an Assistant Professor of Department of Polymer Chemistry, Kyoto University in 2001 and promoted to an Associate Professor in 2006. In 2016, he moved to J-PARC as a Senior Scientist. His research interests are focused on structure and dynamics of polymer materials at the single molecule scale. He was awarded Inoue Research Award for Young Scientist from Inoue Foundation for Science (2002), Young Scientist Lectureship Award (2008), SPSJ Award for the outstanding paper in *Polymer Journal* (2008), and SPSJ Science Award from Society of Polymer Chemistry, Japan (2016).

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