

Transformation of Two-Dimensional Structures by External Stimuli

Yoshihiro KIKKAWA

y.kikkawa@aist.go.jp

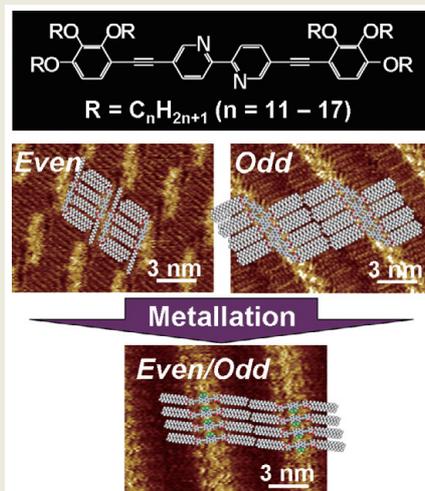
Electronics and Photonics Research Institute, National Institute of Advanced Industrial Science and Technology (AIST)

Precise integration of nano-materials and the following alteration of their patterns on a surface would provide molecule based devices and circuits with tunable properties and functions. We are trying to fabricate the two-dimensional nano-patterns, which can be changeable by external stimuli, such as light, heat, metallation, and so on. In this context, bipyridine derivatives with various number and length of peripheral alkyl chains were synthesized, and the two-dimensional structures were

observed by a scanning tunneling microscopy at the solid/liquid interface. Two types of nanostructures were alternately observed depending on the number of carbon atoms in the alkyl chains (odd-even effect). However, metal coordination at the bipyridine core part allowed the structural convergence, that is, the odd-even effect was quenched by the metallation.

Polymer Preprints, Japan **2010**, 59, 2920.

Langmuir **2010**, 26, 3376.



Upconversion for Continuous-Wave Light Using POSS-Core Dendrimer

Kazuo TANAKA* and Yoshiki CHUJO

kazuo123@chujo.synchem.kyoto-u.ac.jp*

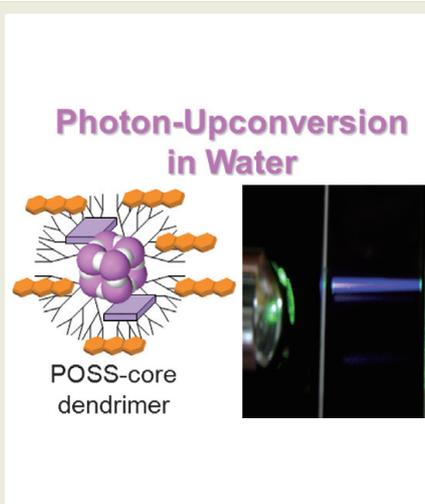
Department of Polymer Chemistry, Graduate School of Engineering, Kyoto University

Photon upconversion via triplet-triplet annihilation (TTA), in which a singlet-excited molecule can be obtained from multiple triplet-excited molecules, can generate a shorter-wavelength light than that of the irradiation light and proceed under continuous wave-irradiation. This system is applicable for bioimaging at deep spots inside vital bodies without laser irradiation. We report the strategy and experimental results for the TTA-supported upconversion in aqueous solutions by using a dendrimer

as a scaffold for the molecular accumulation. Strong emission was observed from the sample solution containing the Pt complex, anthracene, and the POSS-core dendrimer in the buffer with the excitation at 537 nm. Significant emission between 380–450 nm was observed from the solution. These data are direct evidence for the emission caused by TTA-assisted upconversion.

Polymer Preprints, Japan **2011**, 60, 114.

Chem. Commun. **2010**, 46, 4378.



Topology-Directed Control of Thermal and Salt Stabilities: Formation of Micelles by Self-Assembly of Linear and Cyclized Amphiphilic Block Copolymers

Takuya YAMAMOTO

yamamoto.t.ay@m.titech.ac.jp

Department of Organic and Polymeric Materials, Tokyo Institute of Technology

The thermal and salt stabilities of a polymeric micelle were remarkably enhanced by a *topology effect*. Linear poly(butyl acrylate)-*b*-poly(ethylene oxide)-*b*-poly(butyl acrylate) and corresponding cyclic poly(butyl acrylate)-*b*-poly(ethylene oxide) were self-assembled to form flower-like micelles. The cmcs of the amphiphiles were similar, and DLS, AFM, and TEM measurements showed that both micelles are spherical with approximately 20 nm in diameter. In spite of no

significant change in the chemical composition or structure of the micelle, the cloud point (T_c) was elevated by approximately 50 °C via the linear-to-cyclic topological conversion of the copolymer, and the T_c was able to be controlled by coassembly. Furthermore, the micelle formed from the cyclic amphiphile exhibited a higher salt stability. *J. Am. Chem. Soc.* **2010**, 132, 10251.

Polymer Preprints, Japan **2011**, 60, 580.

