**Bundle formation of supramolecular fibers of amphiphilic diarylethene by depletion force and photoinduced submillimeter-scale shrinking**

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In order to apply photochromic diarylethene in practical use, especially in molecular electronics, assembly and arrangement of the molecules are very important. Therefore, supramolecular chemistry in two- and three dimensional assemblies is attracting interest.

Self-assembled microstructures of an amphiphilic diarylethene showed a photoinduced reversible morphological change in water [1-5]. Photoisomerization of the core diarylethene gave rise to a morphological transformation between colorless microspheres and colored fibers. This system showed reversible morphological change also by temperature change. These behaviors can be interpreted as a photoinduced LCST transition (Figure 1a-d).

Supramolecular nanofibers composed of the closed-ring isomer formed bundles in methylcellulose aqueous solution by depletion force while the spheres composed of the open-ring isomer were not coagulated [6]. Upon irradiation with UV light to the suspension of the open-ring isomer, the fibers were found to be generated and the formed submillimeter-sized bundles showed photoinduced shrinking over than 100 m by the visible light irradiation (Figure 1e).

   

(e)

**Figure 1.** Sphere-fiber phase transition of diarylethene **1**: TEM image of (a) open-ring isomer **1a**, (b) closed-ring isomer **1b**; optical microscope image (c) immediately after UV irradiation and (d) after 7 min of UV irradiation; (e) shrinking of a long bundle upon irradiation with visible light for 108 s.

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