Electronic Supplementary Information (ESI)

Supramolecular Single-Walled Carbon Nanotubes (SWCNTs) Network Polymer Made by Hybrids of SWCNTs and Water Soluble Calix[8]arenes

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Experimental

Materials. All solvents and reagents were used as supplied except the following. Milli-Q water was used for preparation of aqueous solutions. As-prepared (AP) HiPco SWCNT (d ～ 1 nm) was purchased from Carbon Nanotechnologies, Inc.

Measurements. The ^{1}H NMR spectra were recorded at 270 MHz with a JEOL-JNM EX270 spectrometers. UV-Vis absorption spectra were recorded with a JASCO V-630 spectrophotometer. Dynamic light scattering (DLS) measurements were carried out on Beckman Coulter N5 Submicron Particle Size Analyzer at 20 ^{o}C. Tapping mode atomic force microscopy (TM-AFM) was taken on multimode SPA 400 (SEIKO Instruments). Nanoprobe cantilevers (SI-DF20, SEIKO Instruments) were utilized. The sample was prepared by slow evaporation on substrate overnight at room temperature. Mica was used as a substrate for TM-AFM measurement. Transmission electron microscopy (TEM) image was performed using a JEM-1025 operated at an accelerating voltage of 100 kV. TEM sample was prepared by depositing one drops of desired solution on a 100 mesh copper grid covered with a carbon film and removing the excessive solution with Kimwipes wipers, and drying the TEM grid at room temperature.

Purification of SWCNTs. The purification of HiPco SWCNTs followed literature method.[1]

Adamantanetrimethylammonium Iodide (**AdTriMe**), **Guest Dimer and Adamantane carbomethylpyridinium bromide** (**AdPy**) were prepared according to previous papers.[2,3]

Solubilization of SWCNTs with *p*-Sulfonatocalixarenes. *p*-Sulfonatocalixarene (0.0269

mmol) was dissolved in aqueous solution (5 mL). To the mixture, purified SWCNTs (1 mg) were added and sonicated in low-energy ultrasonic bath (Bransonic 2510) for 3 h, followed by centrifugation.

UV-Vis Spectra of SWCNTs Suspended in CX8, Triton X-405 and SDBS

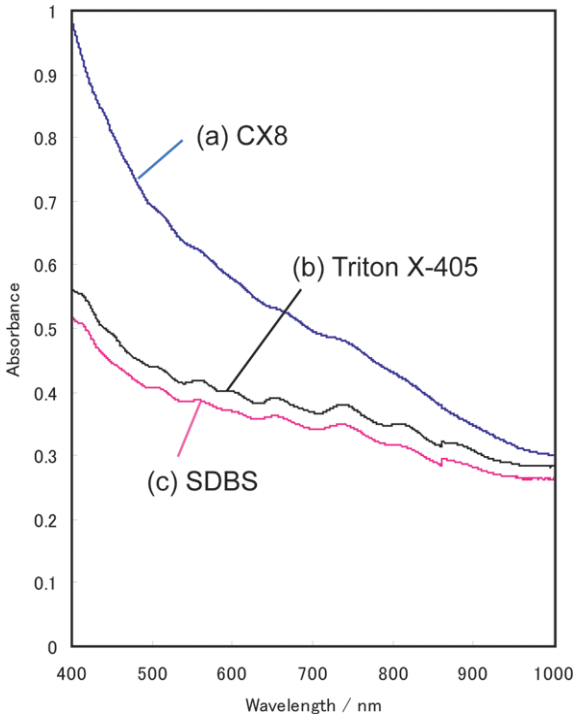

Figure 1S. UV-Vis spectra of the aqueous supernatant (5 mL) containing SWCNTs with (a) **CX8**, (b) **Triton X-405** and (c) sodium dodecylbenzene sulfonate (**SDBS**). Applied concentration of **CX8**, **Triton X-405** and **SDBS** was 5.38 mM. Solubility of SWCNTs with **CX8**, **Triton X-405** and **SDBS** was 2.94 x 10^{-2}, 1.87 x 10^{-2} and 1.74 x 10^{-2} mg/mL, respectively.

UV-Vis Spectra of CX8/SWCNT hybrids upon Addition of Salts

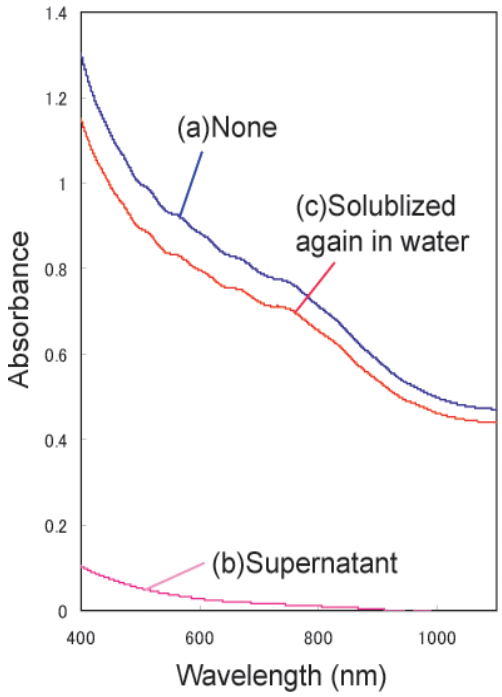

Figure 2S. UV-Vis spectra of (a) **CX8/SWCNT hybrids**, (b) the supernatant of **CX8/SWCNT hybrids** with KCl salts (150 eq. to **CX8**) and (c) re-dissolved **CX8/SWCNT hybrids** in water.

^{1}H NMR Spectra of CX8 and CX8/SWCNT hybrids

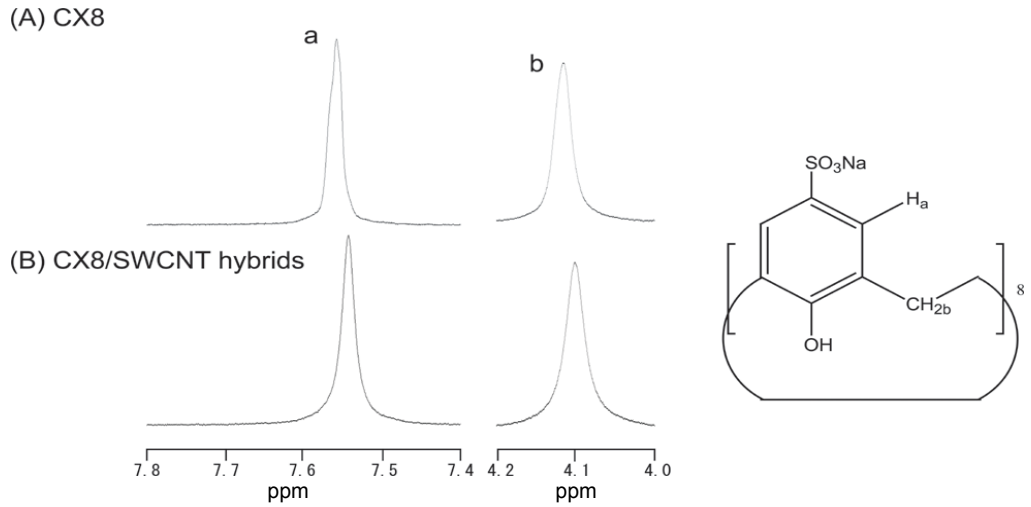

Figure 3S. ^{1}H NMR spectra of (A) **CX8** (2.66 mM), (B) **CX8/SWCNT hybrids** (Concentration of **CX8** was 2.66 mM) in D_2O at 25 ^oC.

^{1}H NMR Spectra of CX8/SWCNT hybrids with AdPy

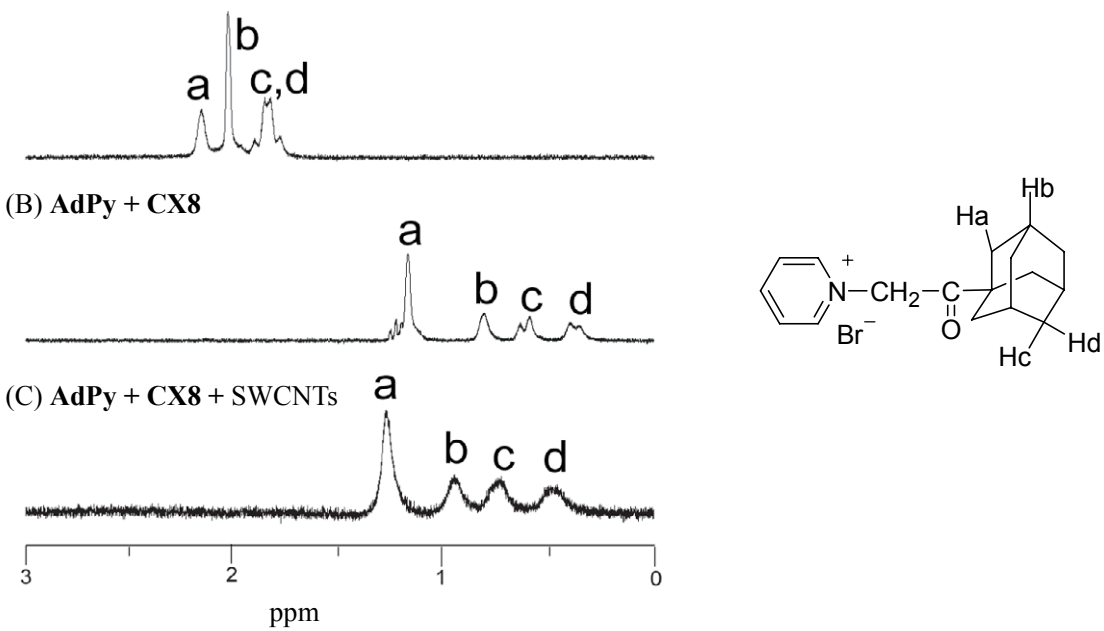

Figure 4S. ^{1}H NMR spectra of (A) **AdPy** (2.66 mM), (B) **AdPy** (2.66 mM) with **CX8** (2.66 mM) and (C) a supernatant containing SWCNTs solubilized by **CX8** (2.66 mM) with **AdPy** (2.66 mM) in D_2O at 25 ^oC. Signals of adamantyl group of **AdPy** were largely shifted toward downfield with **CX8**.

Dynamic Light Scattering (DLS) Measurements

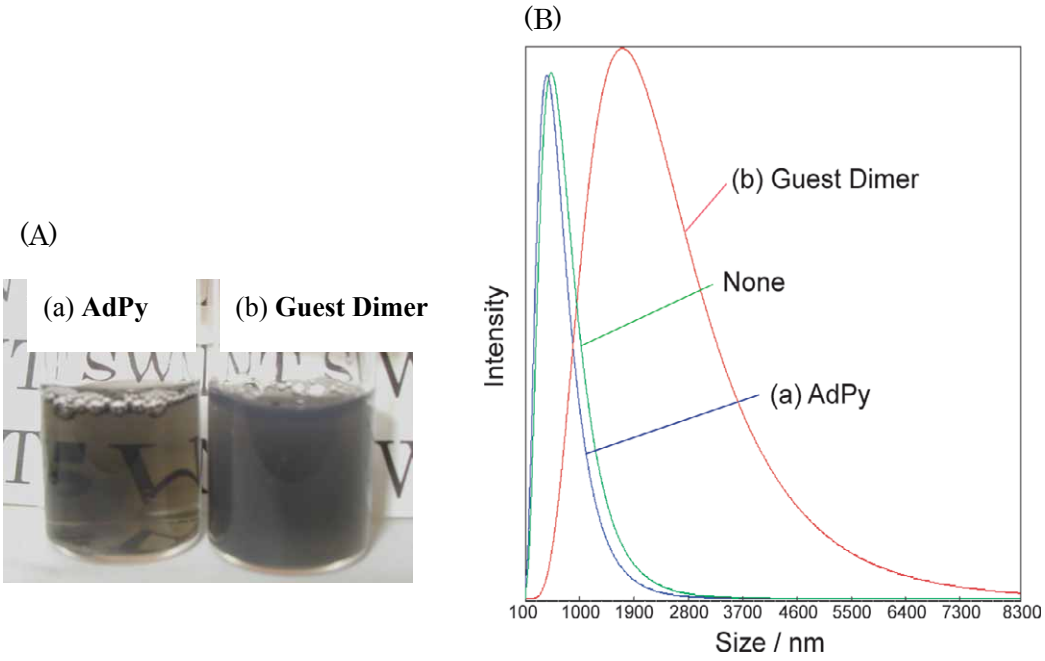

Figure 5S. (A) Photographs of **CX8/SWCNT hybrids** upon addition of (a) **AdPy** and (b) **Guest Dimer**. Black suspensions were observed upon addition of **Guest Dimer**. (B) Size distributions obtained by dynamic light scattering: **CX8/SWCNT hybrids** by adding (a) **AdPy** and (b) **Guest Dimer**.

References

1) W. Zhou, Y. H. Ooi, R. Russo, P. Papanek, D. E. Luzzi, J. E. Fischer, M. J. Bronikowski, P. A. Willis and R. E. Smally, *Chem. Phys. Lett.,* 2001, **350**, 6.
2) S. Shinkai, K. Arai, T. Matsuda and O. Manabe, *Bull. Chem. Soc. Jpn.*, 1989, **62**, 3856.
3) K. Ohga, Y. Takashima, H, Takahashi, Y. Kawaguchi, H, Yamaguchi and A. Harada, *Macromolecules*, 2005, **38**, 5897.