Supplementary Material

1. **Synthesis of C10AZOC2N3**

The synthetic route of 1-[2-(4-decylphenylazo-phenoxy)-ethyl]-1-diethylenetriamine (C10AZOC2N3) was shown in Scheme 1. 1H and 13CNMR spectra were recorded on Bruker Digital NMR Spectrometer AscendTM400 at room temperature and ESI-MS spectra were recorded using LCQ Fleet ion trap mass spectrometer.



**Scheme 1 |** Synthesis pathway for C10AZOC2N3.

## Synthesis of 4-decyl-(4’-hydroxy)azobenzene (C10AZOH)

4-Decylaniline (5 g, 21 mmol) was dissolved in the mixture of water (17 mL), hydrochloric acid (6 mL) and acetone (17 mL) under 0°C. Then, sodium nitrite (15 mL, 1.4 mol.L-1) was added slowly into this solution. After 30 min stirring under 0º, the aqueous solution (30 mL) of phenol (2 g, 0.021 mol), sodium hydroxide (0.84 g, 0.021 mol) and sodium carbonate (2.3 g, 0.021 mol) was added slowly into this solution, lasting for about 1 h. The mixture was reacted under 0º for 2 h, and then stirred overnight at room temperature. The reaction mixture was filtered. A khaki solid obtained was purified by silica gel column chromatography with petroleum ether and dichloromethane (*v/v,* 1/1) to yield a yellow solid C10AZOH (5.8 g, 80%). 1H NMR (400 MHz, CDCl3) δ (ppm): 0.88 (t, 3H, CH3), 1.26 (m, 16H, CH2),2.67 (t, 2H, CH2), 6.94 (d, 2H, H-Ar), 7.31 (d, 2H, H-Ar), 7.80 (d, 2H, H-Ar), 7.86 (d, 2H, H-Ar).

## Synthesis of 4-decyl-(4’-(2-bromoethyl)phenyl)azobenzene (C10AZOC2Br)

1,2-dibromoethane (56 g, 0.30mol) and potassium carbonate (5 g, 0.0375mol) was added into ethanol (40 mL) in a 100 mL flask, and heated to 70°C. Then, the acetone solution (100 mL) of C10AZOH (5 g, 0.015 mol) was added dropwise under stirring. The solution was refluxed for 12 h. Finally, the solvent was removed and the residual was purified over silica gel using petroleum ether and dichloromethane (*v/v,* 1/1) as the eluent. 5.55 g bright yellow chemical was obtained, yield 84%. 1H NMR (400 MHz, CDCl3) δ (ppm): 0.88 (t, 3H, CH3), 1.26 (m, 16H, CH2), 2.67 (t, 2H, CH2), 3.69 (t, 2H, CH2), 4.38 (t, 2H, CH2), 7.01 (d, 2H, H-Ar), 7.31 (d, 2H, H-Ar), 7.79 (d, 2H, H-Ar), 7.89 (d, 2H, H-Ar).

## Synthesis of 1-[2-(4-decylphenylazo-phenoxy)-ethyl]-1-diethylenetriamine (C10AZOC2N3)

C10AZOC2Br (5 g, 0.011 mol) was dissolved in tetrahydrofuran (100 mL), and added dropwise into the mixture of diethylenetriamine (20 mL) and tetrahydrofuran (20 mL) under stirring at 0°C. Then, the mixture reacted for 12 h at room temperature. The solution was evaporated under vacuum-rotary, and the residue was dissolved in dichloromethane and then extracted with 1 mol/L NaOH and water for 8-10 times, to remove generated hydrogen bromide and excess diethylenetriamine approximately. The oil phase was dried with magnesium sulfate and filtered, and the filtrate was evaporated under vacuum-rotary to obtain the crude product, which was purified by column chromatography with dichloromethane and methyl alcohol (*v/v,* 1/1) to yield a yellow product C10AZOC2N3 (4.72 g, 90%). 1H NMR (400 MHz, CDCl3) δ (ppm): 0.88 (t, *J* = 6.8 Hz, 3H), 1.26-1.32 (m, 16H), 2.18 (s, 4H), 2.65-2.71 (m, 6H), 2.77-2.85 (m, 4H), 3.06 (t, *J* = 5.2 Hz, 2H), 4.16 (t, *J* = 5.2 Hz, 2H), 7.02 (d, *J* = 9.2 Hz, 2H), 7.31 (d, *J* = 8.4 Hz, 2H), 7.79 (d, *J* = 8.4 Hz, 2H), 7.89 (d, *J* = 9.2 Hz, 2H). 13C NMR (133 MHz, CDCl3) δ (ppm): 14.14, 22.69, 29.59, 31.35, 35.86, 41.71, 48.68, 49.23, 50.70, 52.39, 53.45, 67.67, 114.67, 122.52, 124.56, 129.06, 145.94, 147.13, 150.95, 161.05. ESI-MS: [M+H]+ C28H45N5O+, Calcd 468.3, Found 468.3.

## 1H, 13C NMR and ESI-MS spectra of C10AZOC2N3



**1H NMR**



**13C NMR**



**ESI-MS**

1. **Surface tension ( γ ) and critical micelle concentration (cmc) of C10AZOC2N3**

**Supplementary Figure 1.** γ−log c plots of C10AZOC2N3 in aqueous solutions at 25 °C, measured by employing the du Noüy ring method (Krüss K100, Germany), and the critical micelle concentration (cmc) is 7.2x10-6 mol/L.



1. **Micelles of C10AZOC2N3 in aqueous solution characterized by Dynamic light scattering**

**Supplementary Figure 2.** The scattering intensity versus the hydrodynamic diameters of 0.1mM C10AZOC2N3 aqueous solution before and after UV light irradiation.



1. **UV-vis absorption spectrum of SOMs**



**Supplementary Figure 3.** UV-Vis absorption spectra of SOMs solution at different UV light irradiation conditions, measured on a UV-Vis Tu-1901 spectrophotometer using ultrapure water as a blank at 25 °C.